

**PIONEERS IN
MINIATURIZATION**

REPLACEMENT TYPE TRANSFORMERS & REACTORS

CHANNEL FRAME FILAMENT/TRANSISTOR TRANSFS.

Pri. 115 V 50/60 Cycles—Test Volts RMS: 1500

Type No.	Secondary	W	D	H	M	Lbs.
FT-1	2.5 VCT-3A	2 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
FT-2	6.3 VCT-1.2A	2 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
FT-3	2.5 VCT-6A	3 $\frac{3}{4}$	1 $\frac{1}{4}$	2	2 $\frac{3}{4}$	1
FT-4	6.3 VCT-3A	3 $\frac{3}{4}$	1 $\frac{1}{4}$	2	2 $\frac{3}{4}$	1
FT-5	2.5 VCT-10A	3 $\frac{3}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-6	5 VCT-3A	3 $\frac{3}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-7	7.5 VCT-3A	3 $\frac{3}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-8	6.3 VCT-8A	4	2 $\frac{1}{2}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{4}$
FT-10	24 VCT-2A or 12V-4A	4	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{4}$
FT-11	24 VCT-1A or 12V-2A	3 $\frac{3}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
FT-12	36 VCT-1.3A or 18V-2.6A	4	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{4}$

Taps on pri. of FT-13 & FT-14 to modify sec. nominal V,
-6% +6%, +12%

FT-13	26 VCT-.04A	2 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{3}{4}$	$\frac{1}{4}$
FT-14	26 VCT-.25A	2 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$

DOUBLE SHELL POWER TRANSFORMERS

Type No.	High V.	DC ma	5V. Fil.	6.3 VCT Fil.	W	D	H	M	N	Wt. Lbs.
R-101	275-0-275	50	2A	2.7A	3	2 $\frac{1}{2}$	3	2 $\frac{1}{2}$	2	2 $\frac{1}{2}$
R-102	350-0-350	70	3A	3A	3	2 $\frac{1}{2}$	3 $\frac{3}{4}$	2 $\frac{1}{2}$	2	3 $\frac{1}{2}$
R-103	350-0-350	90	3A	3.5A	3 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{3}{4}$	2 $\frac{3}{4}$	2 $\frac{1}{4}$	4 $\frac{1}{2}$
R-104	350-0-350	120	3A	5A	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$
R-105	385-0-385	160	3A	5A	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{4}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$	7

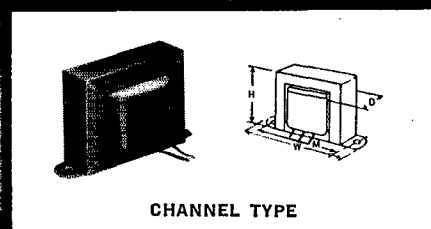
VERTICAL SHELL POWER TRANSFORMERS

Type No.	High V.	DC ma	5V. Fil.	6.3 VCT Fil.	W	D	H	M	N	Wt. Lbs.
R-110	300-0-300	50	2A	2.7A	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	2	1 $\frac{3}{4}$	2 $\frac{1}{2}$
R-111	350-0-350	70	3A	3A	2 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{1}{4}$	2	2 $\frac{3}{4}$	3 $\frac{1}{2}$
R-112	350-0-350	120	3A	5A	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4	2 $\frac{1}{2}$	2 $\frac{3}{4}$	5 $\frac{1}{2}$
R-113	400-0-400	200	3A	6A	3 $\frac{3}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{4}$	3	3 $\frac{1}{4}$	8

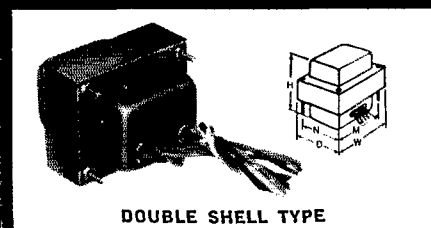
CHANNEL FRAME FILTER REACTORS

Inductance Shown is at Rated DC ma—Test Volts RMS: 1500

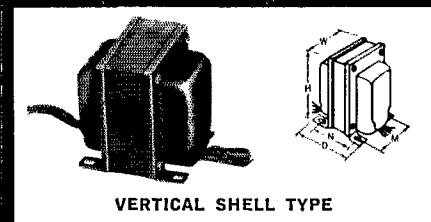
Type No.	Induct. Hys.	Current	Resistance Ohms	W	Dimensions, in.			Wt. Lbs.
					D	H	M	
R-55	6	40ma	300	2 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	$\frac{1}{2}$
R-14	40ma	250	27 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$	$\frac{3}{4}$
R-15	12	30ma	450	27 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
R-16	15	30ma	630	27 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{4}$	2 $\frac{3}{4}$	$\frac{3}{4}$
R-17	20	40ma	850	3 $\frac{3}{4}$	1 $\frac{5}{8}$	2	2 $\frac{1}{4}$	1 $\frac{1}{2}$
R-18	8	80ma	250	3 $\frac{3}{4}$	1 $\frac{5}{8}$	2	2 $\frac{1}{4}$	1
R-19	14	100ma	450	3 $\frac{3}{4}$	1 $\frac{7}{8}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$
R-20	5	200ma	90	4 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
R-21	15/3	200ma	90	4 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	2 $\frac{1}{2}$
R-220	100/8 Mhy 25/2 Mhy	2.5A 5A	.6 .16	3 $\frac{3}{4}$	2	2 $\frac{3}{4}$	3 $\frac{1}{4}$	1 $\frac{1}{2}$



CHANNEL TYPE



DOUBLE SHELL TYPE



VERTICAL SHELL TYPE

UNITED TRANSFORMER CORP.





New standard of performance for AM, CW, SSB reception

- Band-pass filter front end—equivalent of four tuned circuits preceding 1st mixer.
- Crystal-controlled high frequency oscillator.
- 5 steps of selectivity plus Hallicrafters' exclusive upper/lower sideband selection.
- Linear CTO, direct reading in kc.



SX-115
RECEIVER

The experienced amateur will immediately recognize in the SX-115 a first rate engineering triumph that creates an *entirely new class* of deluxe receiver.

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.

Additional features: Highest order of

mechanical and electrical stability; linear tuning; constant tuning rate; separate noise limiters for SSB/CW and AM; dual loop AVC; spurious signal and image rejection better than 60 db. down; sensitivity less than one micro-volt; perfect match for Hallicrafters HT-33 and HT-32 series exciters and transmitters.

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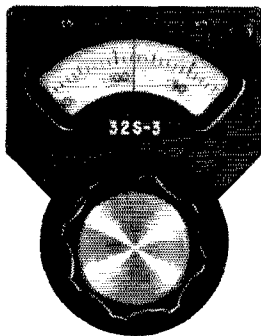
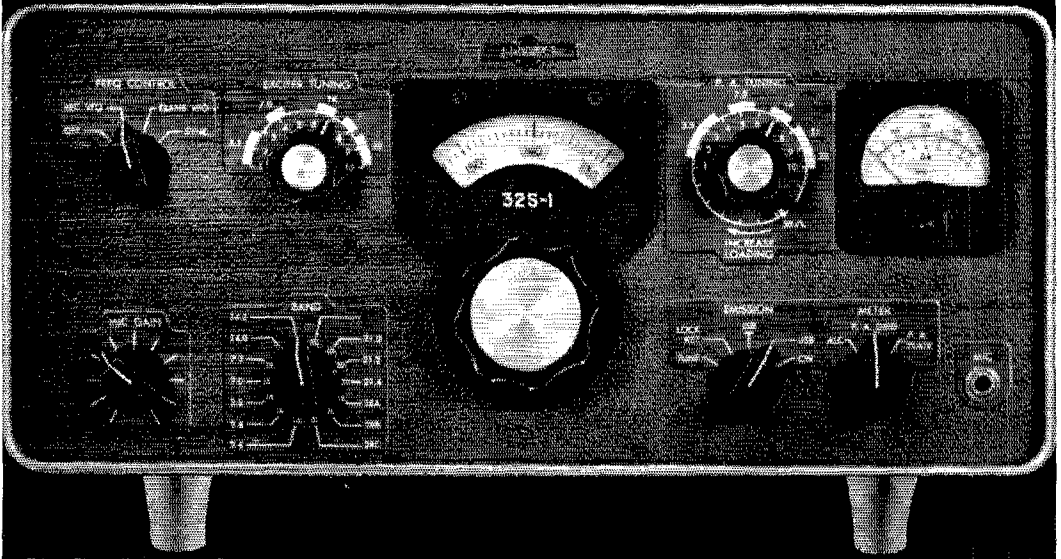
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How can
you
improve
on the
32S-1
?



It's the finest transmitter of its kind. An SSB or CW unit with a nominal output of 100 watts, its features include Mechanical Filter-type sideband generation, permeability-tuned VFO, crystal-controlled HF oscillator, RF inverse feedback and automatic load control.

But what if the 32S-1 had these *additional* CW features?

- a new keying method
- spotting control
- a keying hardness control
- side-tone level adjust
- a simpler means of disengaging the crystal oscillator patch cord

You'd have an even finer transmitter.

Collins did all these things, and calls the results 32S-3. It'll be available in limited quantity at your distributor in September. Check with him today for more information.



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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	3000	.100	—	0	32	—	.12	655	5.0
	SSB		.333 ⁽³⁾							14.5
3-1000Z	B	3000	.240	—	0	65	—	.30	1360	7.5
	SSB		.670 ⁽³⁾							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	C/CW ⁽⁷⁾	800	.08	—	-20	6	—	.03	27	6.3
2C39A	C/AM ⁽⁷⁾	600	.065	—	-16	5	—	.035	16	1.0

(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.

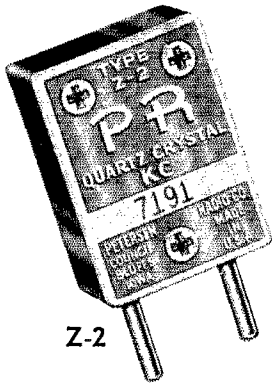


Use



and know where you are!!

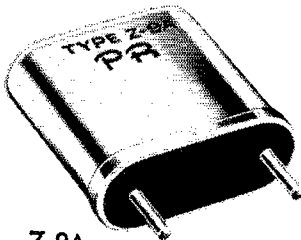
No matter where you use them...in SSB exciters... receivers... AM or CW transmitters...in CB transceivers ... wherever circuits call for crystals... PRs are **OUTSTANDING!**



Z-2

With PR Crystals you are **ALWAYS SURE** of—

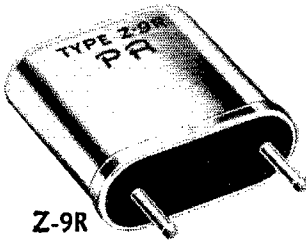
- Accuracy
- Dependability
- High Activity
- Low Drift
- Unconditional Guarantee



Z-9A

Since 1934, PR Crystals have been the Standard of Quality for Amateurs and Commercials alike. PR Crystals are used in many fields where split-second timing, precision and dependability are vital. They are used in tracking stations of the satellite and missile program, and in many other high precision types of equipment.

And of course PRs are in the rigs of thousands of proud Amateurs. If you are not already using PR Crystals, get them now from your jobber. PRs will give you the finest precision frequency control that money can buy!



Z-9R

FUNDAMENTAL, PR TYPE Z-2 — Frequency Ranges in Kcs.: 3,500 to 4,000 (80M); 7,000 to 7,425 (40M); 8,000 to 8,222 (2M); 8,334 to 9,000 (6M). ±500 Cycles.....\$2.95 Net
(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

Citizens Band, PR Type Z-9R, .005%\$2.95 Net

Standard of Quality since 1934
PETERSEN RADIO COMPANY, INC.
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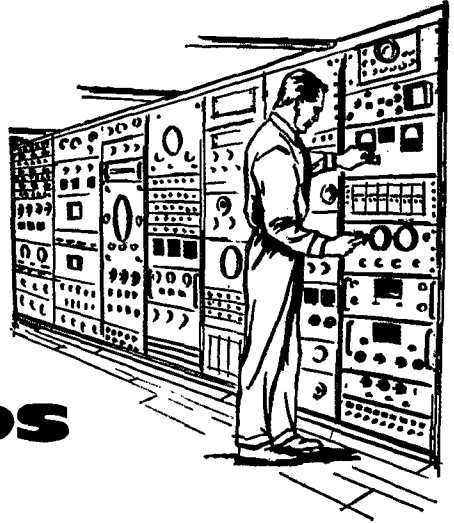
Section Communications Managers of the ARRL FCC Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members holding Canadian or FCC amateur license, General or Conditional Class or above. These include OES, OES, OPS, OO and OBS. SCMs desire applications for S&C, 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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TER-250-300 U		DC to 30 mc	250	500
TER-500-70 U		DC to 30 mc	500	1000
TER-500-600 B	DA-199/U	DC to 30 mc	500	1000
TER-1800-300 U		DC to 30 mc	1800	3600
TER-3500-70 U		DC to 30 mc	1750	3500
TER-3500-600 B	DA-200/U	DC to 30 mc	1750	3500
TER-5000-50U	DA-209/U	DC to 30 mc	5000	10,000
TER-5000-70 U	DA-210/U	DC to 30 mc	5000	10,000
TER-5000-300 U		2-30 mc	5000	10,000
TER-5000-600 B	DA-201/U	DC to 30 mc	5000	10,000
TER-18KA-50 U		DC to 30 mc	18,000	36,000
TER-18KC-50 U		DC to 30 mc	18,000	36,000
TER-18KA-70 U		"	18,000	36,000
TER-18KC-70 U		"	18,000	36,000
TER-18K-600 B		4-28 mc	18,000	36,000
TER-18K-600 BF		4-28 mc	18,000	36,000
TER-25KA-50 U		DC to 30 mc	25,000	50,000
TER-25KC-50 U		"	25,000	50,000
TER-25KA-70 U		"	25,000	50,000
TER-25KC-70 U		"	25,000	50,000
TER-25K-600 B		4-28 mc	25,000	50,000

For companion RF Broadband Transformers refer to Sales Service Bulletin #8015.

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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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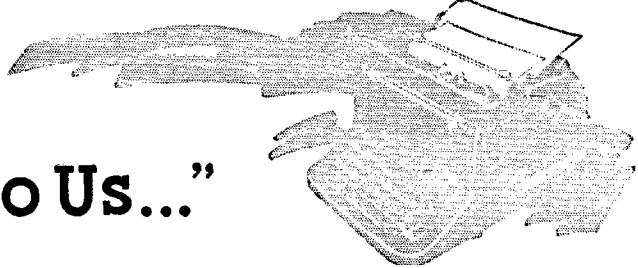
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"It Seems to Us..."



HOOVER BECOMES PRESIDENT

Herbert Hoover, jr., W6ZH, of San Marino, California, was unanimously elected as the fifth president of the League at the Board of Directors meeting at Hartford on May 11.

"Herb" Hoover has been on the air since 1915, using the calls 6ZH, 6XH, 3ZH, W4SR, and K6EV. He also holds the call K6ZH at his beach home in Carpinteria. He operates 160 through 10 meters a.m., s.s.b., and c.w. from K6ZH, and specializes in 2 meter RTTY at the San Marino QTH.

Our new president is well-known in engineering, business and diplomatic circles as well. He received an A.B. in engineering from Stanford in 1925 and an M.B.A. from Harvard in 1928. The next year he served as an instructor at Harvard. From 1929-1934 he was a communications engineer for Western Air Express and TWA; during this period he helped organize Aeronautical Radio, Inc. (ARINC), which provides communications for airlines, and was its first president (1930-1932). W6ZH was a Teaching Fellow at the California Institute of Technology during the school year of 1934-1935. Later that year he founded the United Geophysical Company, a petroleum and mining contractor, and remained its president until 1953. During this period he received several patents on methods and instrumentation.

He also served as a consultant to a number of countries during the period 1942-1952. In 1953-1954 he was a consultant to the U.S. Secretary of State, primarily engaged in resolving the British-Iranian petroleum dispute. In 1954, he was appointed Undersecretary of State, and served in that capacity until 1957.

Since 1957 he has been a consulting engineer. He is a director of a number of corporations, and serves on the executive, budget and finance committees of several. He is also a director or trustee of many non-profit organizations including the University of Southern California, Claremont Mens College, Free-

doms Foundation, Boys' Clubs of America, the Business Council, and the California State Chamber of Commerce. He's a member of the American Institute of Mining Engineers, American Association of Petroleum Geologists, Society of Economic Geologists, Seismological Society of America and the Society of Exploratory Geophysicists.

As an amateur, "Herb" Hoover has always liked building his own, starting with a Ford spark coil, galena detector, and Quaker Oats-box coil when he was 12 or so. After World War

I, he received the license 6ZH and used a k.w. spark 60-cycle sync gap, with an audion detector on the receiving end, in conjunction with 6AE and 6SR. While temporarily in Washington he built up a k.w. tube rig at the Bureau of Standards; under the call 3ZH he was heard in Switzerland and elsewhere in Europe during the 1922 Trans-Atlantics. He has been a member of the A-1 Operators' Club since 1933, and is an honorary member of the QCWA.

W6ZH's famous father, though never a ham himself, was of tremendous help to the fraternity, especially during his days as Secretary of Commerce in the early twenties. The "Hoover Bands", drawn up on a "gentleman's agreement" basis in the absence of effective legislation, formed the pattern on which our present amateur assignments are based. The third generation of amateur interest in the Hoover family is represented by W6ZH's son, Pete, W6APW.

The League is deeply honored to have as its head so distinguished and capable a man. It is in fact a tribute to all of the amateur fraternity that a person who has made such a mark in business, government and scientific endeavor would consent to make a place in his schedule for the active leadership of a hobby group. With his guidance, and his dedication to the ideals of amateur radio, the League is assured of continuing growth and progress for our future.



FLASH — The Oscar II package was launched into polar orbit on June 1. The frequency is just a few kilocycles below the announced 145-Mc. channel. In addition to W1AW bulletins, orbital predictions are being carried by stations of the Oscar network led by W6EE. See page 43 of June *QST* for information on reporting procedures. Oscar II may still be up by the time you read this, so — if you haven't already — fire up your two-meter receiving gear and earn an Oscar QSL card from space!

ROCKY MOUNTAIN DIVISION CONVENTION

Denver, Colorado — July 21-22

Cool colorful Colorado is a vacationers' paradise . . . and the setting for the Rocky Mountain Division Convention to be held July 21-22 at the Brown Palace Hotel in Denver. It is sponsored by the Denver Radio Club, Inc. The program includes sessions on v.h.f., RTTY, DX, s.s.b., antennas and similar technical topics. YL, MARS, SCM-SEC and AREC meetings are scheduled in addition to an ARRL Forum headed by Rocky Mountain Division Director Carl L. Smith, W0BWJ, with John Huntoon, W1LVQ, ARRL General Manager, and a discussion with FCC Engineer in Charge Andy Bahlay, K900A answering questions. There will be equipment displays, a hidden transmitter hunt for mobileers, and the club station W0OUI, on the air on 3.890 kc. and 29.624 Mc. Special activities of interest of XYLs include a fashion show. At the stroke of midnight, "The Old Man" will appear to conduct the ROWH initiation.

Special Saturday luncheon reservations are available for DX, v.h.f., and RTTY groups, and Sunday breakfasts for s.s.b., and YLs. There will be a Saturday evening banquet and a Sunday dinner.

Pre-registration tickets are \$3.50 if purchased before July 9; convention registration after that date is \$4.50 and entitles holders to all functions except meals. Banquet tickets are \$4.25 and Sunday dinner is \$3.25. Hotel reservations should be made with the Brown Palace Hotel, 321 17th Street, Denver 2, or a choice of many other hotels and motels in the city. Make all Convention remittances payable to the Denver Radio Club, Inc., and mail to Ben Lane, 217 East 7th Avenue, Denver 3, Colorado.

WEST GULF DIVISION CONVENTION

Corpus Christi, Texas—August 3-5

The West Gulf Division ARRL Convention will be held in Corpus Christi, Texas, August 3-5 at the remodeled Robert Driscoll Hotel, and the Corpus Christi Amateur Radio Club is host. The club station W5MS will be active during the convention.

There will be transmitter hunts on two or three different frequencies. Program topics will range from home construction projects to future communication developments. Among those expected to attend are Dr. R. O. "Doc" Best, W5QKF, West Gulf Division Director, Roy K. Eggleston, W5QEM, West Gulf Division SCM and John Huntoon, W1LVQ, Secretary and General Manager from ARRL Hq.

Registration is \$10.00, which includes all general functions. A pre-convention party on Corpus Christi Bay front will be held Friday night, August 3, and will be free for all who pre-register before July 15.

A Royal Order of the Wouff Hong initiation is scheduled. An FCC representative is expected to be on hand. Holland Henderson, W5AQK is convention chairman, with Henry Binz, W5MQR, vice-chairman. Further convention information and registration may be obtained by writing to West Gulf Division Convention, P. O. Box 2073, Corpus Christi, Texas.

COMING A.R.R.L. CONVENTIONS

July 7-8 — West Virginia State, Jackson's Mills (near Weston).

July 21-22 — Rocky Mountain Division, Denver, Colorado.

August 3-5 — West Gulf Division, Corpus Christi, Texas.

September 1-3 — ARRL National, Portland, Oregon.

September 1-3 — Delta Division, New Orleans, Louisiana.

October 13 — Hudson Division, New York, N. Y.

October 19-20 — Ontario Province, Toronto.



25 Years Ago
this month

July 1937

. . . Ross Hull continued the description of his experiments on v.h.f. signals over long, indirect paths. Other technical articles included descriptions of a noise silencer, a harmonic-generating circuit, an antenna mast built from ladders, a linear filter for harmonics, a four-band portable or mobile transmitter, the use of inverse feedback, a crystal-controlled transmitter for 56 Mc., and a number of the usual hints and kinks.

. . . Big 56-Mc. DX was reported to have occurred during May, for the third successive year. A station in Cambridge, Mass., worked Watertown, South Dakota, for an hour.

. . . W6KFC (now W4KFC) was top man in the April ORS party.

. . . Walter Stiles, W8DPY, won the Paley Award for 1936. This award by the president of CBS was to go annually to that amateur radio operator who made the greatest contribution, either technical or operational, to the American people. The original award was entrusted to the permanent custody of ARRL, where it is now displayed in our lobby. W8DPY's selection for the 1936 Paley award was on the basis of his performance during the March 1936 flood emergency.

QST

RTTY Test Equipment

Relieving the Guesswork in Construction and Adjustment

BY JOHN E. MAGNUSSON,* W0AGD

In an earlier article,¹ the author outlined some of the basic fundamentals involved in RTTY equipment and operation. In this writing, he discusses simple test units which facilitate the design of the receiving terminal unit and the adjustment of the f.s.k. system.

ONE does not have to be connected with RTTY very long before he becomes aware of the need for adequate test equipment. The four most essential items are the fork-driven audio oscillator, the variable-frequency audio oscillator, vacuum-tube voltmeter and oscilloscope. It is probably safe to say that most of those who will have a serious interest in RTTY will already own the v.t.v.m. (or a reasonable substitute) and scope. This leaves two important pieces of equipment which can be either purchased or constructed. RTTY men have a slogan, "RTTYers build," and these two units can be assembled with a minimum investment. Two approaches to the problem are suggested. If you already possess one of the units, you can build the other; if you have neither, you can build a combination unit requiring only a single power supply.

Fork-Driven Standard

The circuit of a fork-driven oscillator is shown

* E. F. Johnson Co., Waseca, Minn.

¹ Magnusson, "Getting Started in RTTY," *QST*, June, 1962.

in Fig. 1. It includes a frequency-multiplying stage that will provide output at 2125, 2550 and 2975 cycles in addition to the basic frequency of 425 cycles. Frequency selection is made by S_1 which changes the value of capacitance across the inductors. The output voltage is adjustable over a wide range by means of the gain control, R_1 , in the grid circuit of the multiplier stage.

Such a unit will serve as a standard in calibrating the variable audio oscillator described later, and for several other RTTY adjustments, such as checking the audio-frequency response of an a.m. modulator to be used in f.s.k. on the v.h.f. bands and the response of an s.s.b. transmitter for f.s.k. operation. (Note: When using two tones and an s.s.b. transmitter for f.s.k. operation on the h.f. bands, be sure to watch your drive to the transmitter. Overdriving may degrade the normal carrier and sideband suppression. You will be cited if you transmit more than two tones as a result of inadequate suppression. Improper adjustment may result in transmitting five or more tones.)

Tuning forks for 440 cycles may be obtained in most piano and musical-instrument stores for \$2.50 or less. The frequency of the fork can be lowered to 425 cycles by carefully filing a notch in the fork while checking the frequency against a standard.² In constructing the fork-driven unit, the firm mounting of the tuning fork has been of utmost importance. The fork should be mounted at one corner of the chassis where the latter is most rigid. The handle of the tuning fork is threaded and the steel mounting bracket (see Fig.

² *Radio Amateur's RTTY Handbook*, RTTY column, *CQ*, April, 1960.

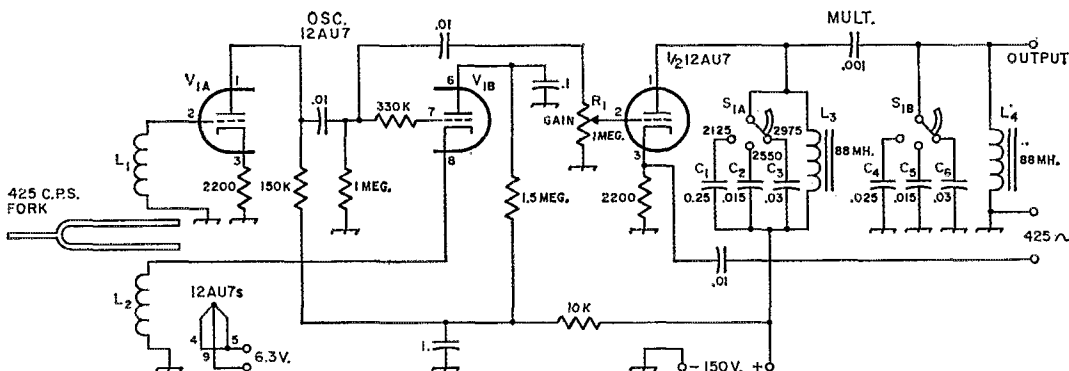


Fig. 1—Circuit of the fork-driven oscillator. Resistances are in ohms and resistors are 1/2 watt. Capacitances are in μf . and capacitors are tubular molded paper.

C_1 — C_6 , inc.—Approximate value; adjust for resonance as described in text.

L_1 , L_2 —1000-ohm coils removed from headset (must be

properly phased to obtain oscillation).

L_3 , L_4 —88-mh. toroid (old telephone loading coils).

R_1 —Linear-taper control.

S_1 —Two-pole three-position progressively-shortening rotary switch (Two Centralab PA-2042 ganged, or equivalent).

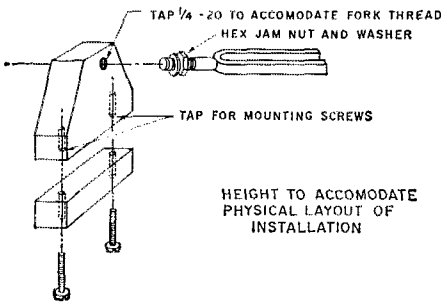


Fig. 2—Tuning-fork mounting bracket and stiffener.

2) is tapped to accept it. Jam nuts and split lock-washers should be used as fasteners. If you can have the mounting bracket plated, fine. If not, use a small pressurized can of aluminum paint to give the mounting a more finished appearance and, more important, to prevent rusting. For further constructional details, reference is made to previously published material.² If a separate power supply is desired, it may be a duplicate of that shown in Fig. 3. Adjustment of the tuned multiplier circuits will be discussed later.

The Variable-Frequency Oscillator

In building a terminal unit, one of the first problems that you face is that of providing some means of checking the resonant frequency of a variety of tuned audio circuits. Unfortunately, the fixed frequencies obtainable from the fork-

driven oscillator are not adequate for this job. A variable-frequency oscillator is required so that the frequency of maximum response, or maximum attenuation may be determined.

Fig. 3 shows the circuit of a variable-frequency oscillator covering the range of 1500 to 3500 cycles. The output waveform is very acceptable. The circuit is a modification of one shown in the last several editions of *The Radio Amateur's Handbook*. C_1 and C_2 are dual 365- μmf . broadcast-replacement-type variables with the sections of each connected in parallel to provide maximum capacitances of 650 to 700 μmf . The two units are ganged to a single control by means of pulleys and dial cord. C_3 and C_4 are compression-type trimmers for adjusting the minimum capacitances of the two units to the same value. If you have access to a capacitance or impedance bridge, measure the maximum and minimum capacitances of the two units and equalize the minimums with the trimmers. The only special precaution to be taken in assembling the unit is that C_1 must be insulated from chassis by mounting the unit on a sheet of insulating material. The rotors of C_2 are grounded and therefore the dial should be attached to the shaft of this section. (If another method of ganging is used, be sure that it provides the necessary insulation between the shafts of C_1 and C_2 .)

R_1 should be adjusted so that oscillation takes place over the entire range. If necessary, additional fixed capacitance (equal values across C_3 and C_4) may be added to bring the lowest fre-

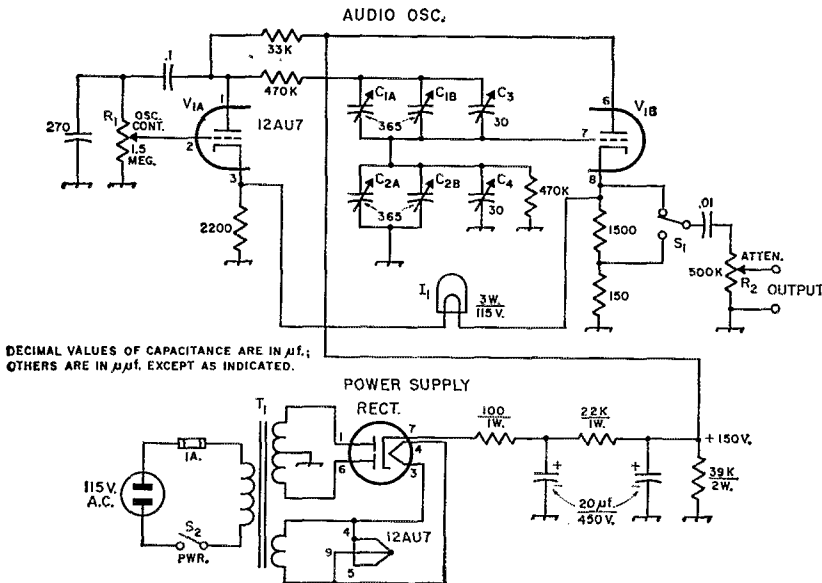


Fig. 3—Circuit of the variable audio oscillator and its power supply. Resistances are in ohms, and resistors are $\frac{1}{2}$ watt unless indicated otherwise. Capacitors marked with polarity are electrolytic; other fixed capacitors may be ceramic or paper.

C_1 , C_2 —Dual-section broadcast-replacement variable, sections in parallel, ganged as described in the text. Note that C_1 must be insulated from chassis

C_3 , C_4 —Mica or ceramic trimmer.

I_1 —3-watt 115-volt lamp (G.E. 3S6).

R_1 —Linear-taper control, screwdriver shaft.

R_2 —Linear-taper control, knob shaft.

S_1 —S.p.d.f. toggle switch.

S_2 —S.p.s.t. toggle switch.

T_1 —460 volts r.m.s., c.t., 50 ma.; 6.3 volts, 2.5 amp. (Stancor PC-8418, Triad R-4A, or similar).

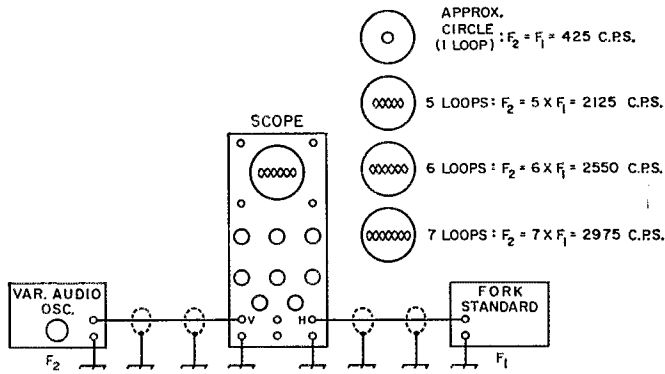


Fig. 4—When the variable audio oscillator is set to a frequency that is an exact multiple of the fork-standard frequency, the number of loops displayed on the scope screen indicates the order of multiplication.

quency down to 425 cycles, but do not add so much that 2975 cycles cannot be reached at the other end of the range.

Calibration

The variable oscillator may be calibrated against the fork-controlled oscillator with the arrangement shown in Fig. 4. The number of loops displayed on the scope screen indicates the multiplication factor. Each time the variable oscillator is used, it is wise to check it against the standard.

Adjustment of the Fork-Driven Circuits

Now that the variable oscillator has been calibrated against the 425-cycle standard, we

capacitance needed in each case may be determined from the fact that the reactance of the capacitor should equal the reactance of the inductor at resonance. Any tuned circuit within the range of the variable oscillator may be checked in a similar manner.

Tuning Indicator

A tuning indicator making use of an oscilloscope is shown in Fig. 6. This indicator will help you in setting your f.s.k. system for the proper degree of shift. The LC circuit should be adjusted to resonance at 2550 cycles. This can be done as previously described with the capacitor connected in parallel with the inductor.

The network and the scope are connected with twin-conductor shielded cable. Before connecting the circuit to the RTTY equipment, the scope face should be "calibrated" by successively feeding in at the network input terminals signals at 2550, 2125 and 2975 cycles.³ The sweep selector on the scope should be set to "external." On the Heath O-9 scope, the vertical attenuator was set at X 10, and the vertical gain at 20. Horizontal gain was set at 100. A 2500-cycle input signal should result in a vertical-line trace on the scope, a 2125 cycle signal should result in a diagonal trace tilted to the left, and a 2975-cycle signal should produce a similar line tilted to the right. R₁ is adjusted to equalize the lengths of the traces. You will notice that as you sweep across these frequencies with the variable audio oscillator, a dot on the scope face generates into a straight line, and the straight line rotates almost 180 degrees and degenerates back into a dot. The input

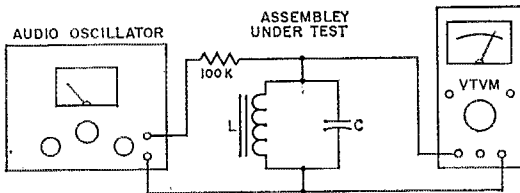


Fig. 5—Setup for measuring the resonant frequency of an audio LC circuit using the variable audio oscillator and a vacuum-tube voltmeter.

can use it to check the tuning of the frequency-multiplying circuits in the fork-driven unit. With the oscillator, the LC circuit and a v.t.v.m. connected as shown in Fig. 5, resonance will occur when a maximum reading appears on the v.t.v.m. By making a note of the frequency at which maximum deflection takes place, it is easy to tell whether more or less capacitance is needed for resonance at the three desired frequencies of 2125, 2550 and 2975 cycles. The approximate

³ McCoy, "Radioteletype Reception by Tone Conversion," *QST*, December, 1960

(Continued on page 148)

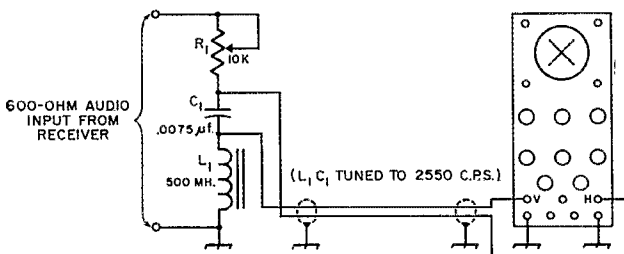
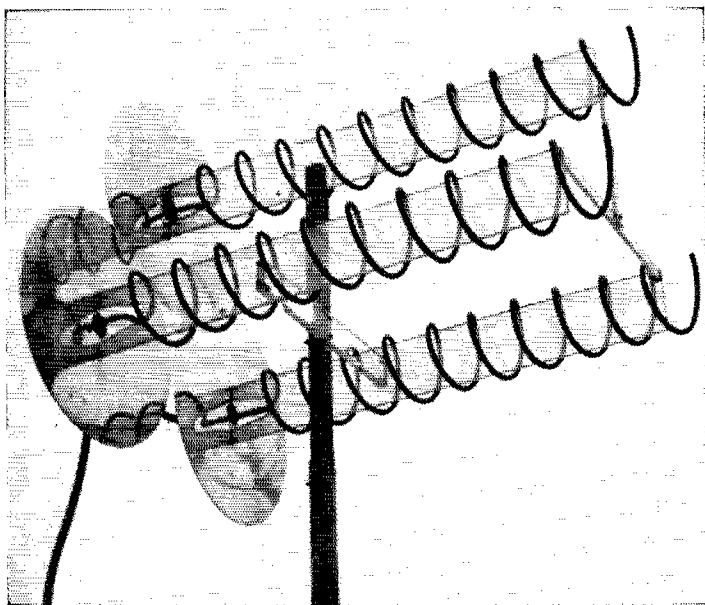


Fig. 6—RTTY tuning-indicator circuit. Individual values of C₁ and L₁ are not critical, but the combination should be adjusted to resonate at 2550 cycles as described in the text. R₁ is a linear-taper control.



Three-helix array for 1215 Mc. used at W4SGI. Horizontal supports are strips of polystyrene. The reflectors are aluminum transcription disks.

*Practical Ideas for
Circularly-
Polarized
U.H.F. Arrays*

Using the Helical Antenna at 1215 Mc.

BY EDWARD A. SCOTT,* W4VSN, AND H. EUGENE BANTA,** W4SGI

THE helical antenna seems to have had little attention in amateur circles, possibly because it is quite large and difficult to build for 144 Mc., the highest frequency that most of us have used to any great extent. Design work on this type of antenna system by W8JK,¹ and its widespread use by any other services, suggest that it should be considered or amateur work in the 1215-Mc. band. Accordingly, we gave it a try, following work with Yagis and plane and corner-reflector arrays at this frequency.

Design information, as set forth by W8JK, follows. The helical antenna is shown schematically in Fig. 1.

$$D = 0.32\lambda.$$

$$G = 0.8\lambda \text{ or more}$$

$$S = 0.22\lambda.$$

$$g = 0.12\lambda.$$

$$\text{Bandwidth} = 0.75 \text{ to } 1.3 \times \text{design } \lambda.$$

$$\text{Impedance} = 140 \frac{\text{circumference}}{\lambda}$$

$$\text{Pitch angle} = 12.5 \text{ degrees.}$$

$$\text{Beam width} = \sqrt{\frac{12,300}{\text{No. of turns}}}, \text{ or}$$

$$10 \text{ turns} = 36 \text{ degrees}$$

$$8 \text{ turns} = 41 \text{ degrees}$$

$$6 \text{ turns} = 47 \text{ degrees.}$$

Gain is maximum if each turn is 1.2 wavelength long.

* 340 East Drive, Oak Ridge, Tennessee.

** 100 Elliott Circle, Oak Ridge, Tennessee.

¹ J. D. Kraus, *Communications*, September, 1949.

Digesting this information, we decided on a 10-turn helix designed for 1100 Mc. This was chosen rather than 1215 Mc., as gain increases at frequencies above the design center. Also, there are many TACAN stations between about 1000 and 1200 Mc., and these can be useful in receiving tests with wide-coverage receivers like that in the APX-6.² The principal dimensions in inches for 1100 Mc. work out as follows:

$$\lambda = 10.72.$$

$$G = 8.57.$$

$$S = 2.37.$$

$$D = 3.43.$$

$$g = 1.28.$$

Don't be alarmed by those two decimal places; one distinct advantage of the helical antenna is that it is a broadband device, and dimensions are not at all critical. For all practical purposes the above can be to the nearest easily-measured figure, with whatever rule you may have available.

A suitable material for the helix is the light $\frac{1}{4}$ -inch copper tubing sold by auto-supply houses for fuel-line use. Casting about for a suitable object about 3 inches in diameter, to be used as a form for winding the helix, we came up with a Morton's salt box, which can be used full or refilled with sand to give it firmness. When the tubing is wound as tightly as possible on this form, and then released, it loosens to about $3\frac{1}{4}$ inches in diameter. Material to support the helix in use

² For information on conversion and use of the APX-6 on 1215 Mc., see *QST*, September, 1960, and February, 1961.

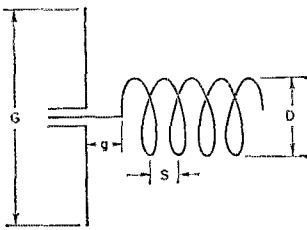


Fig. 1—Schematic diagram of the helical antenna. Optimum dimensions, as given by Kraus, in wavelength, appear in the text. Dimensions in inches given are for a design center of 1100 Mc., which is well suited for amateur 1215-Mc. use. The feed impedance of the single helical antenna with reflecting plane is about 130 ohms, so it must be matched to practical transmission-line impedances by a simple "Q" section.

should have good insulating qualities, so we made a block of polystyrene $3\frac{1}{4}$ by 24 inches in size, notched at the mounting end and drilled and tapped as shown in Fig. 2.

The ground plane (reflector) should have at least a $4\frac{1}{4}$ -inch radius. It can be anything larger, and may be of copper, brass, or any other good conductor. Aluminum transcription disks, familiar to any broadcast station operator, are good, though the reflector need not be circular in shape. The support for the helix is centered on the reflector, which has a 1-inch hole at the center for the matching transformer, Fig. 3A.

The "g" section of the helix is a continuation of the conductor. Bend the tubing gently into a smaller radius, so that you end up with a straight piece $1\frac{1}{4}$ inches long, on the axis of the coil. Mount the polystyrene support on the reflector, and work the coil onto the support, "g" end toward the reflector. Shape the coil to a uniform $2\frac{3}{8}$ -inch pitch, and pin or cement it in place.

The impedance of the single helical antenna is approximately 130 ohms, which can be matched to 50-ohm coax with an 80-ohm "Q" section. The inner conductor of the matching section can be the same size as used for the helix, if a 1-inch outer sleeve is used, as shown in Fig. 3A. The inner conductor can be a continuation of the helix, if it is soldered to the coax fitting, and the latter mounted through a hole in the end of the 1-inch sleeve. Or, the matching section can be made

separately, mounted in position on the back of the reflector, and then the ends of the inner conductor and helix butted together and soldered through the hole in the reflector.

Polarization

The helix may be wound in either direction, provided the direction is standardized among stations intending to work together. If the helix is wound like a right-hand screw it is polarized this way. Left-hand winding produces left-hand polarization similarly. Either works with horizontal or vertical polarization equally well, the loss compared to matched linear polarization being a theoretical 3 db. It may be considerably less than this, due to polarization shift on most paths. Where a station is using horizontal or vertical to transmit over rough terrain, with resultant large polarization shift, the use of circular polarization at the other end may even result in a gain in average signal level. But be sure that the coils are wound in the same direction throughout an area of activity; a right-hand antenna trying to receive a left-hand signal is at the classical polarization disadvantage, some 23 db.

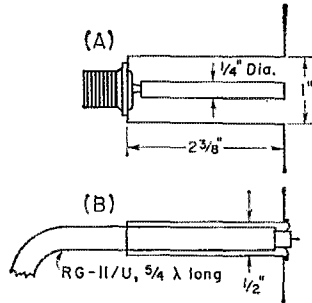


Fig. 3—A typical "Q" section for matching the single helix to 50-ohm coax is shown at A. The decoupler for use with each of the three helices in phase is shown at B. The outer conductor is soldered to the reflector surface, but insulated therefrom at all other points of physical contact.

A 3-Helix Array

At W4SGI three helices are used in phase. These are mounted at the corners of an equilateral triangle 12 inches on a side, backed up by three 12-inch transcription disks. These will overlap a bit. They may be left that way, or trimmed where necessary to present an even surface. At the center of each disk is soldered a quarter-wave decoupler, made as shown in Fig. 3B. A piece of RG-11/U coax $5/4$ -wavelength long is run inside a $1\frac{1}{2}$ -inch-diameter sleeve. The outer vinyl covering is left on, except for a short portion at the end. Here the braid is folded back and soldered to the surface of the reflector. The center conductor is soldered to the "g" piece. The three pieces of coax are then brought together for a 4-way splice with the 50-ohm transmission line. A splice, if done carefully, is probably better than plugs and jacks of the ordinary variety. There are coaxial fittings that work well at 1200 Mc., but they come high. Be sure that the helices

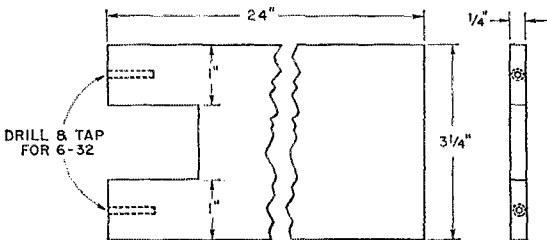
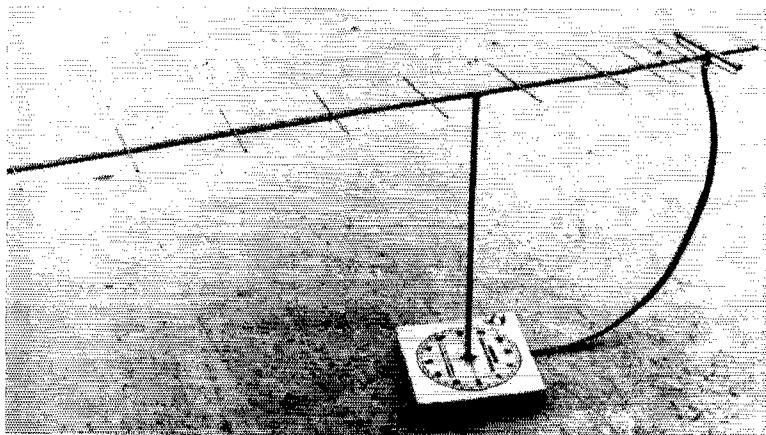


Fig. 2—Insulation in the antenna should be of good quality and kept to a minimum. The authors use polystyrene blocks of the dimensions given. Any other insulating material used should be thoroughly dry, and treated so that it will not absorb moisture.



Yagi for 1215 Mc. used for comparisons with the helical arrays. Modeled after the W2NLY-W6QKI Long Yagi design, it is about 2 feet long, or almost the same length as the helical antenna. Though it appears to work well, it is somewhat inferior to the single helix, and is far more frequency sensitive.

are mounted so as to have their axes exactly parallel.

Results

Circular polarization was new in our experience, and we expect that it will be for most amateurs. Precise measurement of the performance of these antennas was not possible with the equipment at our disposal, but indications are that the single helix of 10 turns is about 4 db. better than our best single Yagi. At least part of this superiority is undoubtedly due to the uncritical nature of the helix. Dimensional accuracy of about plus or minus 0.01 inch is necessary in a

Yagi for this frequency, whereas the helix is not critical at all. It can be made almost any size within reason, and still work well, provided that the transmission line and antenna impedances are reasonably well matched.

Some may want to experiment with the helix without going to the expense of polystyrene supports. Any good insulation may be used, and even wood may serve if it is thoroughly dry, and treated so that it will remain so when used out of doors. Generally speaking, the less insulation in the helix itself, the better, and good materials will pay off.

QST

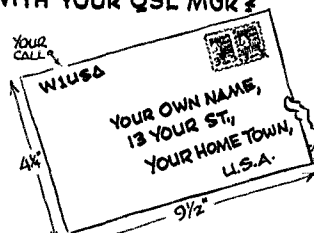
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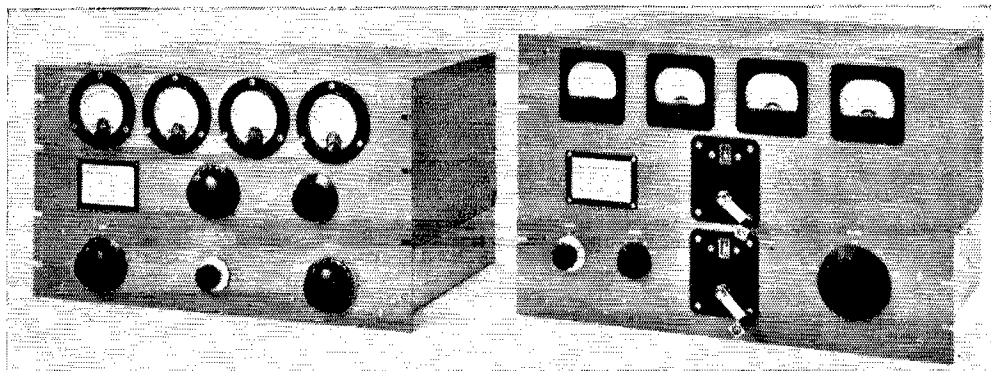
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Improved Harmonic Suppression for Multiband Systems



Two amplifiers built to the same general circuit design and layout. The one on the left uses a pair of 4-125As, that at the right a pair of 4-250As. Both are capable of a kilowatt input on c.w. The 4-250As can handle envelope peaks of 2 kilowatts on sideband.

The Pi-L Plate Circuit in Kilowatt Amplifiers

An extra L network tacked on the pi-network tank helps get rid of those harmonics that multiband antenna systems are only too capable of radiating. This article shows how the circuit was applied to two kilowatt amplifiers — both of which are worth your attention because of their construction ideas, too.

BY RAYMOND F. RINAUDO,* W6KEV

DURING the past ten years the pi network has become almost the standard plate tuning and loading circuit for a radio-frequency power amplifier, whether it ends up with a 6146 or a pair of 4-400s. This came about quite naturally when TVI became a problem because the pi network lends itself very nicely to band switching, with tuning and loading done with capacitors — the capacitors, plate switch and coil being located in a comparatively small shield enclosure. All of this was had along with reasonably good harmonic attenuation: second harmonic down 35 to 40 db. and higher harmonics further attenuated.

However, along with the popularity of the pi network, we have had the development of the three-band beam, the multiband dipole and the multiband vertical. While the multiband antenna is a god send to those with limited acreage, in which category the vast majority of us fall, it serves to bring up another problem because we now find that 35- or 40-db. attenuation of the second harmonic at the amplifier is quite often not enough. The multiband antenna is all too ready to radiate that 20-meter harmonic when the amateur is actually transmitting on 40. Obviously,

the antenna under discussion is of the type which requires no tuner between the transmitter and the feed line. A solution to the problem is to put a filter in the transmission line which will pass only the frequencies in one band. But then, when changing to a different band, another filter must be substituted and some of the ease of band change has been lost.

Another way in which the situation can be improved is to use a pi-L network. The pi-L will give 10 to 15 db. more attenuation of the second harmonic than will the pi¹ and even more attenuation of the higher harmonics. This circuit has been used in some commercially-built amateur equipment such as the Collins KWS-1. Further improvement can be had by designing the amplifier plate circuit for a higher loaded Q . For example, raising the loaded Q from 10 to 20 will increase the harmonic attenuation by 6 db. Unfortunately, one runs into the law of diminishing returns here; the losses in the plate coil begin to be large enough to cause serious heating, and a loaded Q of 20 is near the practical upper limit in most cases.

¹ *Fundamentals of Single Side Band*, Collins Radio Company.

* Eitel-McCullough, Inc., San Carlos, Calif.

The 4-125A Amplifier

With the harmonic problem in mind, a design was worked out in late 1958 for an amplifier which was to replace the pi-network final then in use. The requirements were as follows:

- 1) Operation from 3.5 to 28 Mc., band switched.
- 2) Power input of 1 kw. with 2500 volts on the plate.
- 3) R.f. power output to feed into a 50-ohm coaxial load.
- 4) Standard 19-inch rack mounting with a minimum practical panel height.
- 5) Amplifier enclosed in a shield and incoming power leads bypassed for TVL.
- 6) Harmonic radiation via the feed line to be minimized.
- 7) A minimum amount of cash to be involved.

The result of the above design is the 4-125A amplifier shown in the photographs.

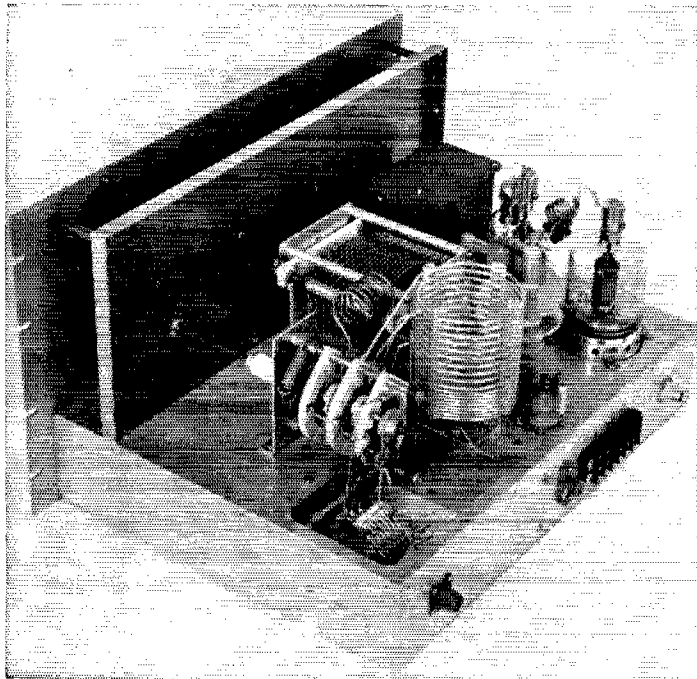
The amplifier uses a pair of neutralized 4-125As in parallel. The grid circuit is tuned, fairly high C , and makes provision for bridge neutralization via bypass condenser C_2 , Fig. 1. The plate circuit is a pi-L network with an operating Q of 15, and plate current is shunt fed. Individual meters are used to measure grid, screen and plate currents and filament voltage.

The amplifier is built on a $13 \times 17 \times 3$ -inch aluminum chassis behind a $10\frac{1}{2} \times 19$ -inch panel. The meters are excluded from the r.f. field by a 7×17 -inch aluminum sub-front panel which is set back two inches from the front panel. The resulting enclosure, which is above the chassis and screened by perforated aluminum, is 11 by 17 by 7 inches. The underside of the chassis is divided into two units by a shield running from

front to back. The grid compartment is 10 by 13 by 3 inches and the output compartment containing the loading capacitors and L net coil is 7 by 13 by 3 inches. The bottom of the chassis is covered by perforated aluminum sheet to allow convection air currents to cool the tubes. No blowers or fans are needed to cool the 4-125As, provided that cooling air is allowed to flow freely past the tubes.

In keeping with requirement (7), maximum use was made of the surplus markets and trades with fellow hams, and the author's own junk boxes were given a thorough going over. No real compromise was made by the use of inferior components, but inevitably several of the parts used are either not too commonly-available surplus items or are once-standard parts which are no longer manufactured. But for each of these, a standard commercial part exists which is as good as or better than the one used and will fit into the space available. The standard part is the one given in the parts list. That the use of used and surplus parts paid off is attested to by the fact that the immediate cash outlay was less than \$20! On the other hand, if the reader wants to build the amplifier using all new parts, the cost will be approximately \$235, including tubes.

As mentioned previously, the grid circuit operates with fairly high C . Approximately 300 $\mu\text{f.}$ is used on 3.5 Mc., 150 $\mu\text{f.}$ on 7 Mc., and proportionally smaller amounts for the higher-frequency bands. A large tuning capacitance is used so that there will be a minimum of clipping of the waveform of the driving signal when the grid is driven positive. A distorted waveform at the grid of an amplifier will mean more harmonic



Chassis view of the 4-125A amplifier. The plate tuning capacitor is at the center. The pi coil for 3.5-21 Mc. is vertical. The 28-Mc. pi coil is mounted horizontally between the band switch and the tank capacitor. The plate r.f. choke and neutralizing capacitor are partially hidden by the plate coil. The filament transformer is at the far end of the chassis between the 4-125As and the sub-front panel.

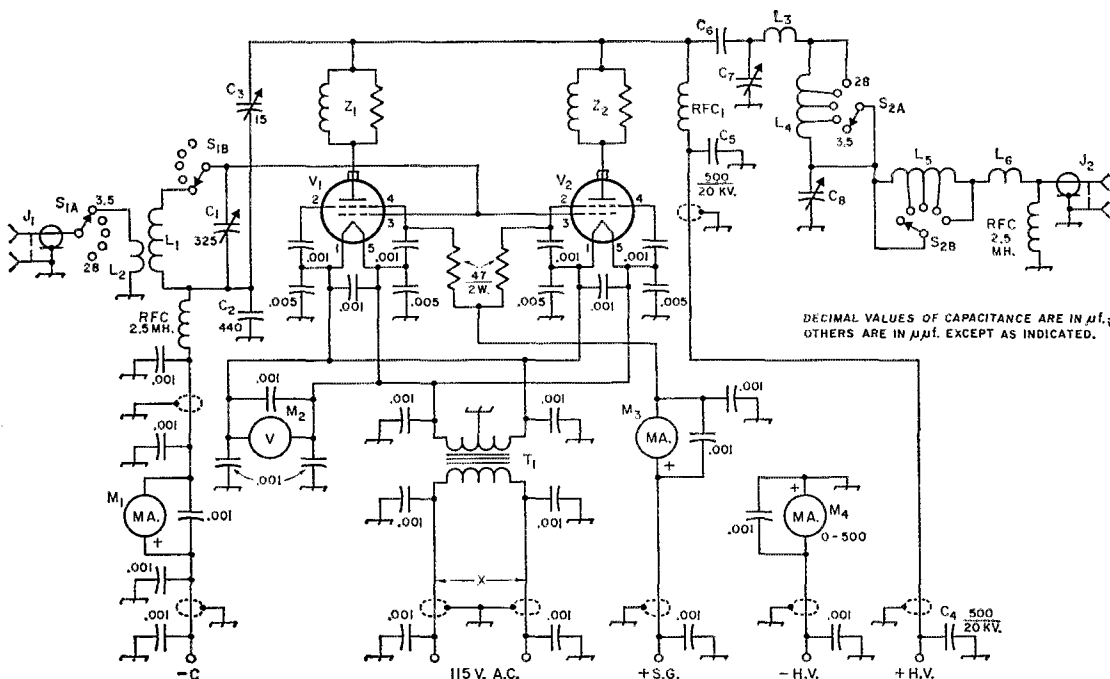


Fig. 1—The amplifier circuit. Either 4-125As or 4-250As may be used at V_1 and V_2 . See specification below for circuit values that differ with the two types. "X" indicates point where the two cooling-fan motors are connected in the 4-250A amplifier. Shielded wiring in supply leads is continued up to the bypass capacitors nearest the r.f. circuit. All 0.001- and 0.005- μ f. capacitors are disk ceramic, 1000-volt rating.

C_1 —320 $\mu\mu$ f., 0.0245-inch spacing (Hammarlund MC-325-M).

C_2 —440 $\mu\mu$ f., silver mica (two 220- $\mu\mu$ f. in parallel).

C_3 —Disk neutralizing, 2.2–15 $\mu\mu$ f. (Millen 15011).

C_4, C_5 —500- $\mu\mu$ f., 20-kv. ceramic (Centralab TV-20).

J_1, J_2 —Coaxial chassis-mounting connectors.

L_1 —3.5 Mc.: 32 turns no. 20, $\frac{3}{4}$ -inch diam., 16 turns per inch (Air Dux 616T).

7 Mc.: 14 turns No. 20, $\frac{3}{4}$ -inch diam., 16 t.p.i. (Air Dux 616T).

14 Mc.: 11 turns No. 18, $\frac{5}{8}$ -inch diam., 8 t.p.i. (Air Dux 508T).

21 Mc.: 9 turns No. 18, $\frac{1}{2}$ -inch diam., 8 t.p.i. (Air Dux 408T).

28 Mc.: 6 turns No. 18, $\frac{1}{2}$ -inch diam., 8 t.p.i. (Air Dux 408T).

L_2 —3.5 Mc.: 4 turns insulated hookup wire at cold end of L_1 .

7 Mc.: 3 turns same.

14, 21, and 28 Mc.: 2 turns same.

M_2 —0–8 or 0–10 volts a.c.

M_4 —0–500 ma. d.c.

RFC1—Transmitting choke (B & W 800, National R-175A, Raypar RL-100).

S_2 —Ceramic, 2 poles, 5 positions (Radio Switch Corp., Marlboro, N.J.); see text.

V_1, V_2 —4-125A or 4-250A.

Z_1, Z_2 —4 turns No. 12, $\frac{1}{2}$ -inch diam., $\frac{1}{2}$ inch long, with four 220-ohm, 2-watt composition resistors in parallel.

For 4-125As:

C_6 —0.001- μ f., 20-kv. ceramic (two Centralab TV-20s in parallel).

C_7 —250- $\mu\mu$ f., 3000-volt variable (Johnson 154-9).

C_8 —0.001- μ f., 2000-volt variable (two Johnson 154-3 in parallel, ganged).

L_3 —6 turns No. 10, 1-inch diam., $1\frac{1}{2}$ inches long.

L_4 —Vari-pitch Air Dux 2408D4, modified as described in text.

L_5 —Indented Pi Dux 1411A, modified as described in text.

L_6 —4 turns No. 14, $\frac{1}{2}$ -inch diam., $1\frac{1}{4}$ inches long.

M_1 —0–50 ma. d.c.

M_3 —0–100 ma. d.c.

S_1 —1 section, 2 poles, 5 positions (Centralab 2505).

T_1 —5 volts, 13 amp. (Triad F9A or F15U).

For 4-250As:

0.002- μ f., 20-kv. ceramic (four Centralab TV-20s in parallel).

300- $\mu\mu$ f., 10-kv. variable (Jennings UCS-300).

0.0012- μ f., 3000-volt variable (Jennings UCSL-1200).

See text.

Illumitronic Pi Dux No. 195–2, modified as described in text.

Vari-pitch Air Dux 1608D6, tapped as described in text.

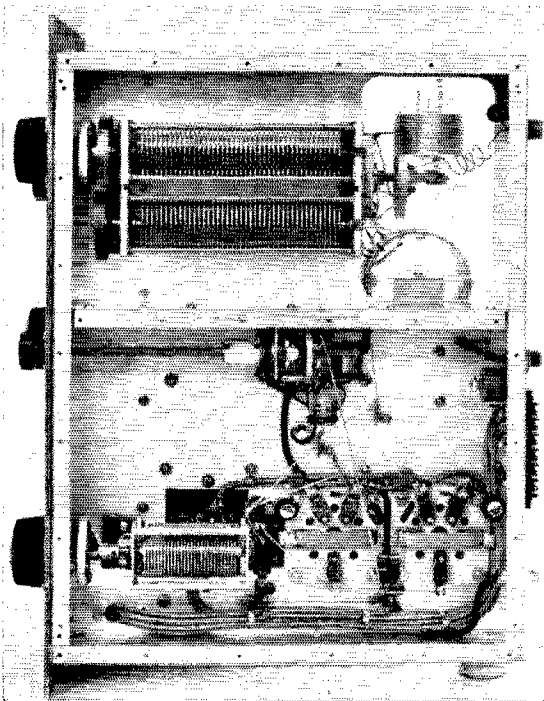
6 turns No. 12, 1-inch diam., 1 inch long.

0–100 ma. d.c.

0–200 ma. d.c.

2 sections, 1 pole per section, 11 positions, 5 positions used (Centralab YD sections with P-270 index assembly); see text.

5 volts, 29 amp. (Stancor P-6492).



Below the 4-125A chassis. The two loading capacitors at the top, ganged together by means of gears, are separated from the grid circuit by an aluminum shield running from the front to the rear of the chassis. The L net coils are directly behind the loading capacitors. The grid band switch and coil are at about the center of the chassis. The grid tuning capacitor is mounted off the chassis by means of bakelite blocks and is directly under the filament transformer.

signal in the plate circuit and, hence, a more difficult job to suppress it. For example, in Class C, B or AB₂ operation, during the portion of the cycle that the grids of two 4-125As in parallel are driven positive, the grids look like a resistor of about 1200 ohms to the tuned grid circuit, and that portion of the cycle will be distorted unless precautions are taken to prevent it. Waveform clipping is minimized by using plenty of tuning capacitance in the grid circuit. Of course, for AB₁ operation, the amount of C is not important because the grid is never driven positive and looks like an infinite resistance to the tuned circuit.

The grid tank circuit uses individual coils for each band. A link coil of insulated hookup wire is wound over the cold end of each coil. The hot ends of the coils and the links are switched by S₁, a 2-section, 5-position switch having one wafer. This switch is mounted on the underside of the chassis by means of an aluminum bracket. The coils are mounted between the appropriate switch terminal and a tie point and are oriented so that there is a minimum of coupling between them.

The tube sockets are mounted on the underside of the chassis, and spring clips on the top of the chassis held by the socket mounting bolts

ground the metal tube base shield. Bypassing of the screen and filament terminals is done in the more-or-less standard way. The screen terminals on each socket are connected together by a $\frac{3}{8}$ -inch wide strip of thin copper. Each screen terminal is then bypassed to the nearest filament terminal with a disk ceramic capacitor. A disk ceramic capacitor is connected between the filament terminals and another is used to bypass one side of the filament to ground. The remaining filament terminal is grounded with a short, heavy lead. Grounding one side of the filament has been found to be helpful in eliminating v.h.f. parasitics. Those who expect to use the amplifier for linear service should use bypass capacitors to ground on both filament terminals and ground the filament transformer center tap as shown in Fig. 1. A slightly cleaner signal will result. A 47-ohm, 2-watt carbon resistor is used to feed screen voltage to the screen terminal of each socket and is a parasitic preventive measure.

The pi-L plate tank circuit is made up of individually available coils, capacitors and switch. The switch, which is mounted on the chassis with an aluminum bracket, is made by Radio Switch Corporation of Marlboro, New Jersey. The switch used was bought on the surplus market and has three wafers, each wafer with six contacts. Since the wafers were already there it was decided to make use of them by paralleling the contacts on two wafers and using the parallel combination to switch the coil in the pi portion of the network. The circulating current in the pi coil is about twice as high as that in the L coil. However, the current rating of the switch is 20 amperes, so a single section is all that is really needed to handle the pi coil switching. Also, because six contacts per wafer were available, the sixth contact was used to provide a 3.8-Mc. position; that this is not necessary can be seen by the later description of the 4-250A amplifier. If the builder wishes to retain the 6-position band switch, he should order a Model 86 switch, standard bearing, non-shorting, 30-degree detent, with two Type A wafers. If a 5-position band switch will do, then the builder should order a Model 86 switch, standard bearing, non-shorting, 30-degree detent, with one Type B wafer. The second switch, by virtue of having only one wafer, will cost about three dollars less. The coils used in both the pi and the L are home-brew for 28 Mc. Illumitronic Engineering Pi Dux coils are switched in for the lower-frequency bands. It is of interest to note that as originally built, the pi coil was a Pi Dux 2007A, which is wound with No. 12 wire. After a bit more than two years' use, two of the turns shorted because coil heating had softened the polystyrene insulating supports. The damaged coil was replaced with a Pi Dux 2408D4, which is made of No. 10 wire. An r.f. choke completes the output circuit to ground for d.c. as a safety precaution.

Drive power is fed into the amplifier through a BNC coaxial receptacle and the output power is taken out by means of a U.H.F. receptacle.

Plate voltage is fed in through a Millen 37001 high-voltage terminal.

When the amplifier was completed, it was first tested for parasitics without suppressors of any kind. As is almost always the case with a tetrode or pentode amplifier, it oscillated merrily in the v.h.f. range—at about 150 Mc., as a check with the grid-dip meter showed. The parasitic was killed by the installation of suppressors, Z_1 and Z_2 , in the plate lead to each tube. The test for parasitics is to operate the amplifier with reduced plate and screen voltage and no fixed bias on the control grid, but using a grid leak of about 5000 ohms to ground to develop bias if the amplifier breaks into oscillation. No drive is used and no load is connected to the output. With this amplifier the plate voltage was set at 1000 volts and the screen voltage increased until the plate current was about 200 ma. and the tubes were dissipating about 100 watts each. At this point the screen voltage was between 150 and 200 volts. If an amplifier can be operated in this manner with no current showing on the grid meter, with no change in plate current, and with no detectable r.f. in the amplifier as the grid and plate tuning, loading and band-switch controls are tuned through their full range, then the amplifier can be considered adequately stable. This is a much more severe test than the one often made where full plate and screen voltages are applied and bias is reduced until the tube or tubes are dissipating full rated power with no excitation.

With the components used, the amplifier will operate with up to 3000 plate volts in Class C c.w. or Class AB₁ linear, or up to 1500 volts for Class C a.m. plate-modulated service. Screen voltage for Class C c.w. or plate-modulated a.m.

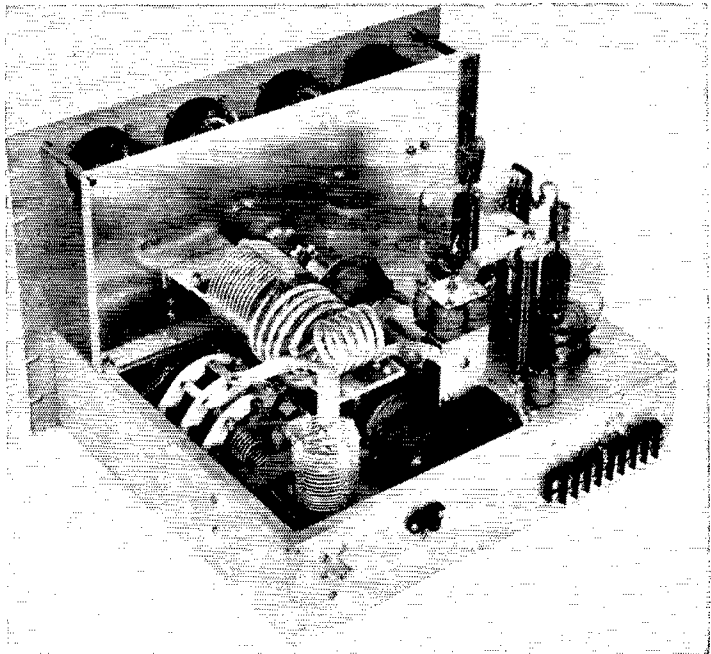
is 350 volts; for AB₁ linear it should be 600 volts. Grid bias should be -100 to -150 volts for Class C c.w., -210 for Class C, plate modulated, and approximately -95 volts for Class AB₁. The exact value of bias for AB₁ should be adjusted for the required idling plate current for the voltage used. Recommended values are as follows, for two tubes: 2000 volts, 85 ma.; 2500 volts, 70 ma.; 3000 volts, 60 ma.

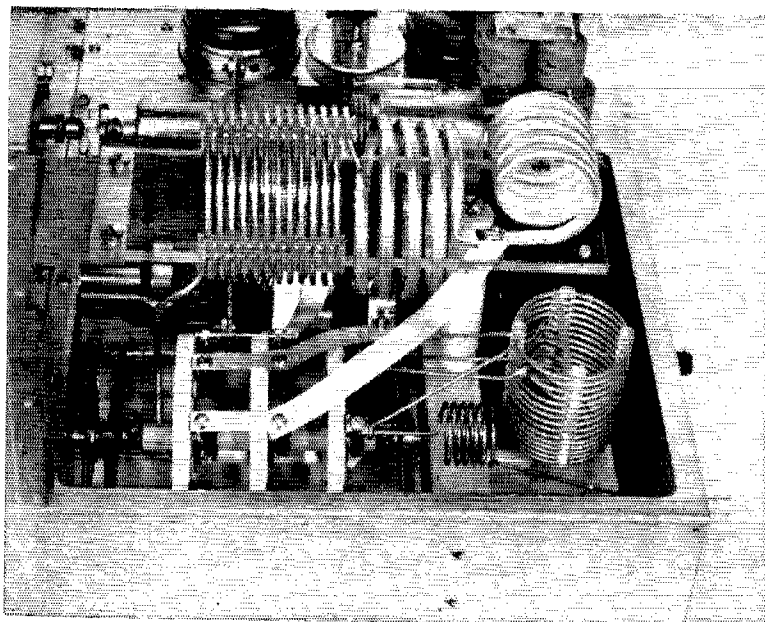
The screen voltage for Class C operation should come from a separate supply of reasonably good regulation. A series dropping resistor from the plate supply is not recommended. For Class AB₁ service, the screen voltage should be well regulated. While an electronically-regulated supply can be used, the simplest method is to use a string of VR tubes in series with a resistor from the plate supply. The reason that Class AB₁ permits this simple method of getting screen voltage is that the screen current excursions are not very great and are well within the capability of VR tubes.

Both the plate tank coil, L_4 , and the L-network coil, L_5 , are mounted on the chassis by means of aluminum angles bolted to the plastic mounting strip furnished with each coil. L_4 is modified and tapped as follows: Turns are removed from the close-wound end until 18 turns remain. Starting from the end of the coil which has the wide-spaced turns, the 21-Mc. tap is at 2 turns, the 14-Mc. tap at the 4th turn, the 7-Mc. tap at the 8th turn, and the 3.8-Mc. tap (if used) at the 16th turn. Since the 16th turn is in the close-wound portion of the coil, it is much easier to make the tap if the turn on each side is pushed in toward the center of the coil.

The L-network coil, L_5 , is modified by removing turns until 13 turns remain. Starting from

In the 4-250A amplifier the band switch is in a chassis cut-out with the pi coil above it. The 28-Mc. L coil and the vertically-mounted 3.5-21 Mc. L coil are between the switch and the rear of the chassis. The plate blocking capacitors are mounted on a bracket held by the vacuum variable plate-tuning capacitor at the center. The plate r.f. choke and its bypass capacitor are beside the 4-250A nearest the rear of the chassis.





Close-up of the 4-250A pi-L plate tank coils and band switch. The horizontally-mounted 6-turn wire coil is L_6 , and the vertically-mounted coil is L_5 .

the L_6 end, taps are placed as follows: 21-Mc. tap at 2 turns, 14-Mc. tap at 5 turns, 7-Mc. tap at 7 turns, 3.8-Mc. tap (if used) at 12 turns.

Non-standard items used are the grid tuning capacitor from the surplus market, the neutralizing capacitor, which National Radio Company no longer makes, the plate tuning capacitor, no longer made by E. F. Johnson, and the loading capacitor, C_8 , which is made up of two capacitors taken from a surplus BC-653 transmitter. The two E. F. Johnson units specified for C_8 will simplify the ganging of the two because they have the shaft out the back as well as the front. The two surplus capacitors did not have this feature and, consequently, gears had to be used for ganging.

The tuning and loading adjustments of the pi-L plate circuit are exactly the same as with a pi network. Plate circuit loading is increased by reducing the capacitance of C_8 . Whenever the loading capacitance is changed, the plate circuit must be retuned to resonance with the plate tuning capacitor, C_7 .

When the amplifier is first tested, it should be neutralized. The neutralizing capacitor, C_3 , is adjusted so that there is about one-half inch spacing between the two plates; then, with plate and screen voltages off and a load connected, excitation is applied and the grid circuit is tuned to resonance. The excitation level is set so that the grid current is only a few ma. Then plate and screen voltages are applied and the plate circuit is tuned to resonance. Plate-circuit resonance is best indicated by the peaking of the screen-grid current as the plate tuning capacitor is tuned through resonance. The loading control is adjusted so that the screen current is about 60 ma. If the plate input is less than desired, increase the grid drive and plate loading until the correct

plate current is flowing with screen current at 60 ma. The plate circuit must be retuned to resonance with each change of loading.

The check for neutralization is to tune the plate circuit through resonance, observing both screen and grid currents. When the amplifier is correctly neutralized, the grid-current meter will show a small current peak at the same setting of the plate tuning capacitor that gives a peak in screen current. Neutralization should be done on the 21-Mc. band.

After the amplifier has been neutralized it should be checked for parasitic oscillations, using the procedure given previously. In some cases, parasitics will make it difficult to find the correct neutralization setting. But if construction details are followed, particularly those pertaining to bypassing and the installation of suppressors, parasitic oscillations should not be a problem.

The 4-250A Amplifier

Quite some time after the 4-125A amplifier had been completed and had been operating satisfactorily, a design for a de luxe version was worked out. In this case, the requirements were the same as before except that the rig had to be capable of 2-kw. p.e.p. input for sideband service, and all the parts used were to be currently-available new items. The result is the 4-250A amplifier shown in the photographs.

The 4-250A amplifier uses essentially the same circuit as the 4-125A version. However, the plate circuit was designed for an operating Q of 18 instead of 15, in order to take advantage of the heavy-duty plate coil and switch which were to be used. An examination of the photographs shows the similarity of the two rigs in the mechanical layouts and the method of making the shield enclosures. Because all new parts were

used, the second amplifier turned out to have a better appearance both inside and out than did the first one.

The 4-250A amplifier is built behind a standard 19-inch rack panel $12\frac{1}{4}$ inches high. The chassis is 17 by 15 by 4 inches and the shield enclosure above the chassis is 17 by 12 by $7\frac{3}{4}$ inches. The vertical sub-panel is set back three inches from the front panel. The grid-circuit compartment is $6\frac{1}{4}$ by 15 by 4 inches and is separated from the rest of the under-chassis space by a shield which runs from front to back. The remainder of the underside of the chassis is opened up to the upper compartment by cutting out that portion of the chassis top. This increases the available space for the plate-circuit components and makes it much easier to connect the various parts together. The filament transformer is mounted in the plate-circuit area on the under-chassis shield which forms the grid compartment. Both the shield enclosure above the chassis and the bottom cover are made of perforated aluminum, which allows convection currents to help keep the tubes and parts cool. The 4-250As require forced-air cooling of the base, and small Barber-Coleman fans are used to blow air directly upward at the tube base pins and through the holes in the tube socket and tube base.

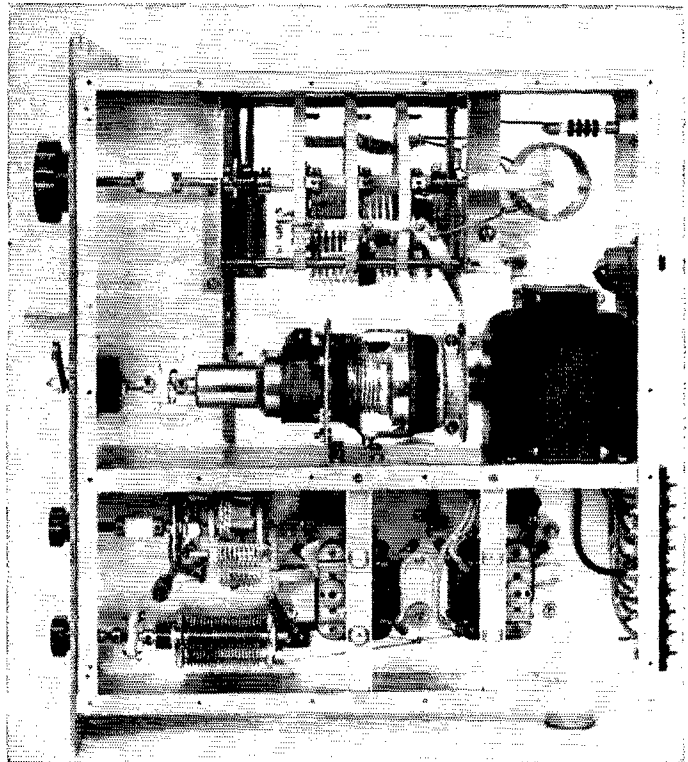
The grid circuit coil turret is made up of commercial coil stock and rotary switches. Two rotary switch wafers are used where only one is really needed to do the necessary switching. The coils are mounted between the wafers on the

switch lugs and the axes of all the coils are parallel. The arrangement used with the 4-125As where coils for adjacent bands are at right angles is better, because odd resonances in unused coils are less likely to cause trouble. However, this arrangement has been perfectly satisfactory in performance and is more rugged mechanically.

The cooling-fan motors are mounted on home-brew shock mounts to reduce noise. Rubber grommets with the same spacing as the motor mounting studs are mounted in the support channels which hold the motors, then a sleeve of length equal to the thickness of the grommet is slipped into each grommet. A large washer is placed on each side of the sleeve before the mounting screw is passed through and threaded into the motor mounting stud. Two shock mounts are needed for each motor. The grommet size used is that which fits into a $\frac{3}{8}$ -inch hole. A $\frac{1}{4}$ -inch diameter sleeve $\frac{1}{4}$ inch long is just the right size to fit the grommet hole. There is no reason, though, why larger grommets and sleeves cannot be used.

Vacuum variable capacitors are used for plate tuning and loading. These require 24 and 30 turns, respectively, to cover the full capacitance range. Counter dials which read each tenth of a turn are used to drive them. The dials are made by Gates Radio Company, Quincy, Illinois, part No. M3401F. These were chosen because they are r.f. tight and do not require much space behind the panel.

Bottom view of the 4-250A amplifier. The plate band switch, at the top, is mounted on aluminum brackets. The vacuum variable loading capacitor is at the center and the filament transformer is between it and the rear of the chassis. The bracket which supports the loading capacitor also supports the plate tuning capacitor. The grid band-switching turret and tuning capacitor are at the front of the grid compartment. A cooling fan is mounted directly below each tube socket.



The plate-circuit switch is made by Radio Switch Corporation. It is a Model 88 with 36-degree detent and three Type A wafers. Two of the three wafers are paralleled and switch the pi coil. The remaining one handles the L coil.

The Illumitronic coils used in the plate circuit both require modification. The 28-Mc. pi coil should be removed and replaced with one of slightly greater inductance consisting of 5 turns of 3/16-inch copper tubing, 1 5/8 inches in diameter and 2 inches long. The remainder, L_4 , of the pi coil should be modified by removing turns from the wire end, leaving 12 1/2 turns. Turns are removed from the close-wound end of the L coil, L_5 , until 15 turns remain. The 28-Mc. L coil, L_6 , is home-brew. The taps on the pi coil are placed as follows: 28 Mc.: junction of L_3 and L_4 ; 21 Mc.: 2 3/4 turns from the 28-Mc. tap; 14 Mc.: 5 turns from the 28-Mc. tap; 7 Mc.: 9 3/4 turns from the 28-Mc. tap. The taps on L_5 are as follows: 28 Mc.: at junction of L_5 and L_6 ; 21 Mc.: 3 turns from the 28-Mc. tap; 14 Mc.: 5 turns from the 28-Mc. tap; 7 Mc.: 9 turns from the 28-Mc. tap. An r.f. choke is used to complete the d.c. circuit to ground at the coax output connector as a safety measure should the plate blocking capacitor, C_6 , break down.

A type BNC receptacle is used to feed drive power into the amplifier and a type C receptacle at the output. The d.c. plate voltage is fed into the amplifier via a Millen high-voltage terminal, type 37001.

Many combinations of plate, screen and bias voltages can be used, as a look at a tube-data sheet will show. The following voltages are typical:

	C.W.	A.M. Phone	AB ₁ Linear	
Plate	2500	2500	3500	volts
Screen	500	400	555	volts
Grid	-150	-200	-105*	volts

* Set to give 45-ma. plate current per tube with no drive power.

The tune-up procedures are the same as for the 4-125A. Also, the amplifier should be checked for parasitics as described previously. Best linearity is achieved by increasing the loading on the amplifier until the power output just starts to fall off; during this adjustment, the drive power is held constant.

In operation, there is little to choose between the two rigs for the c.w. man. At 1-kw. input on c.w., the amplifiers handle identically; however, the 4-250As are easier to drive. For a 2-kw. p.e.p. input on s.s.b., the 4-250A amplifier stands alone. Which version the builder chooses depends upon his requirements as balanced against the necessary cash outlay. It should be pointed out that a third version combining the better or less-expensive components of the two designs presented could be built around 4-250As and result in an amplifier not costing much more than the strictly economic 4-125As.

Design of the Pi-L Network

The design of the pi-L tank circuits has been covered be-

fore in excellent articles presented in *QST*.^{2,3} However, two different approaches are again presented here for those who would like to apply the circuit to transmitters of their own design.

The first method is to use values of components for the pi network with which the builder is already familiar and alter them suitably to make the pi-L work. Figs. 2A and 2B show a pi and a pi-L network, either of which will match a power amplifier tube to a 50-ohm load.

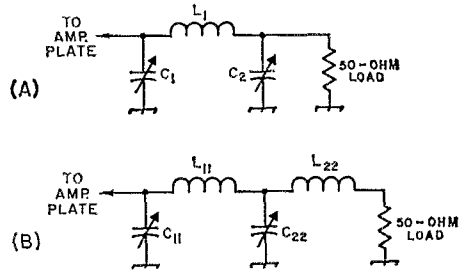


Fig. 2

First, the capacitance and voltage rating of C_1 and C_{11} are exactly the same for both circuits. The capacitance of C_{22} will be about one-half to two-thirds that required for the pi capacitor, C_2 . The voltage rating of C_{22} must be three or four times that required for C_2 . The inductance L_{11} will be greater than L_1 by about 25 per cent. The inductance L_{22} , which has no direct counterpart in the pi, will have an inductance of about one-third to one-half of L_{11} . The circulating currents in L_{11} are the same as in L_1 ; therefore, a coil made of a wire size suitable for a pi net will also be good for a pi-L. The currents flowing in L_{22} are much smaller than those in L_{11} , so it can be made of smaller wire. For example, if L_{11} must be made of No. 10 wire, L_{22} could be made of No. 14 or 16.

This approach will allow the intrepid experimenter to convert his present pi-network output circuit to a pi-L without much pain. But for those who prefer a more formal method, the following is offered:

Just as the pi is designed as two L networks placed back-to-back, the pi-L is designed as three L nets placed back-to-back. In Fig. 3, a pi-L tank circuit is broken down into its

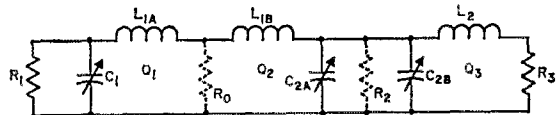


Fig. 3

three equivalent Ls. The first L matches the desired tube load resistance R_1 to a resistance R_0 and is composed of C_1 and L_{1A} . The second L matches R_0 to the resistance R_2 and is made up of L_{1B} and C_2 . The third L matches R_2 to the load R_3 (the transmission line) and consists of C_{2B} and L_2 . R_1 is determined from the approximate formula:

$$R_1 = \frac{E}{2 \times I}$$

where E = plate voltage applied to the tube and I = plate current in amperes.

First, the value of Q_1 is selected. Q_1 is the operating Q of the plate circuit and is usually chosen to be between 10 and 20. Knowing R_1 and Q_1 the capacitive reactance X_{C1} of the plate tuning capacitor C_1 is calculated from:

$$X_{C1} = \frac{R_1}{Q_1}$$

Also, calculate R_0 from:

$$R_0 = \frac{R_1}{Q_1^2 + 1}$$

Then, calculate the inductive reactance X_{L1A} of the inductance L_{1A} from:

$$X_{L1A} = R_0 Q_1$$

This completes the calculation of the reactances for the first L network.

QST

² Miedke, "Pi and Pi-L Design Curves," *QST*, November, 1955.

³ Grammer, "Simplified Design of Impedance-Matching Networks," *QST*, March, April and May, 1957.

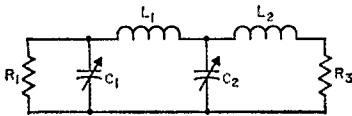


Fig. 4

Before proceeding with the second L network, which consists of L_{1B} and C_{2A} , the value of R_2 should be selected (R_2 must always be greater than R_0 and R_A). Although it is possible to arrive at operating values for L_{1B} and C_{2A} by first selecting Q_2 (the Q of the second L network), it is best, from an equipment designer's viewpoint, to calculate R_2 to match the voltage capability of available tuning capacitors. This is done from:

$$R_2 = \frac{E^2}{P}$$

where E = r.m.s. voltage across R_2

P = Amplifier power output in watts.

Because the peak voltage must be considered when determining capacitor voltage breakdown (peak voltage equals 1.41 times r.m.s. voltage) and some safety factor is desired, it is best to let E equal one-half the capacitor breakdown voltage. For a kilowatt transmitter, it is suggested that 1000- to 2000-volt capacitors be considered. Convenient values of power output can be calculated by assuming an efficiency of 75 per cent for a c.w. or plate-modulated amplifier, and 60 per cent for a linear. Don't forget that for an a.m. phone rig, the power output at the crest of a 100-percent-modulated envelope is four times the carrier output.

Having calculated R_2 , proceed with determining Q_2 from:

$$Q_2 = \sqrt{\frac{R_2}{R_0} - 1}$$

Calculate X_{C2A} (capacitive reactance of C_{2A}) from:

$$X_{C2A} = \frac{R_2}{Q_2}$$

Calculate X_{L1B} (inductive reactance of L_{1B}) from:

$$X_{L1B} = R_0 Q_2$$

Next, the capacitive and inductive reactances for the third L network, C_{2B} and L_2 , are calculated. First, calculate Q_3 , the Q of the third L net, from:

$$Q_3 = \sqrt{\frac{R_2}{R_3} - 1}$$

where R_3 is the load that the amplifier will be working into, usually 50 ohms for coax feed lines. It can be almost anything else but must be less than R_2 . Then determine X_{C2B} , the capacitive reactance of C_{2B} , from:

$$X_{C2B} = \frac{R_2}{Q_3}$$

Then calculate X_{L2} , the inductive reactance of L_2 , from:

$$X_{L2} = R_3 Q_3$$

Since the inductances L_{1A} and L_{1B} are in series, these are combined in one coil, L_1 . The inductive reactance is equal to the sum of the separate parts

$$X_{L1} = X_{L1A} + X_{L1B}$$

Similarly, the two capacitors C_{2A} and C_{2B} are in parallel and are combined in one capacitor, C_2 . X_{C2} , the capacitive reactance of C_2 , is obtained by

$$X_{C2} = \frac{X_{C2A} X_{C2B}}{X_{C2A} + X_{C2B}}$$

The actual values for the capacitors and coils can be determined for any frequency from:

$$C = \frac{10^6}{2\pi f X_C}$$

$$\text{and } L = \frac{X_L}{2\pi f}$$

where C = Capacitance in μmf .

L = Inductance in μh .

f = Frequency in Mc.

The complete pi-L network with the combined inductances and capacitors is shown in Fig. 4. □57

NEW BOOKS

Design & Operation of Regulated Power Supplies, by Irving M. Gottlieb. Published by Howard W. Sams & Co., Inc., 1720 East 38th St., Indianapolis 6, Indiana. Cat. No. RSP-1. 112 pages, 5½ by 8½ inches, paper cover. Price, \$2.95.

A down-to-earth discussion of regulated power supplies including their design, theory of operation, and applications. The book explains the basic concepts of regulated power supplies and why regulation is necessary. Six chapters cover the basic concepts of regulated power supplies, open-loop circuits using VR tubes and Zener diodes, closed-loop regulating circuits and special techniques in closed-loop regulators. Many circuits are included in the text with component values given and provide the reader with all the data needed to actually build the regulated power supplies.

Electronic Circuit Analysis, Volume 1, Passive Networks, by Phillip Cutler. Published by McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N. Y. 6¼ by 9¼ inches, 454 pages, including index, cloth cover. Price, \$8.00.

This volume begins with an introduction to the notation for voltages and currents. Information on network theorems and loop and nodal methods of analysis, along with a review of determinants, is given. The reader is introduced in one section of the book to the concepts of graphic analysis applicable to non-linear elements, such as vacuum tubes and transistors. Some detail is given to graphic solutions obtained

by load line techniques. This book should give the reader a solid foundation in the basic concepts and techniques essential to mastering problems of analysis, design, and maintenance of electronic equipment.

Basic Mathematics for Electronics, 2nd edition, by Nelson M. Cooke. Published by McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 36, N. Y. 6¼ by 9¼ inches, 679 pages, cloth cover. Price, \$10.75.

This second edition of a standard work has been enlarged and brought up-to-date. Providing a full course in basic mathematics, it also covers mathematical applications in basic electric and electronic circuits. Beginning with a review of arithmetical computations, it follows with elementary algebra, trigonometry, and logarithms. Several chapters have been expanded. A new chapter on meter circuits, which explains the circuits of voltmeters, ammeters and ohmmeters as related to Ohm's law, is included. Of course, as you would expect, the book is chuck-full of tables — mathematical symbols, greek alphabet, conversion factors, logarithms, trigonometric functions and squares, square roots and reciprocals. An interesting innovation is that the inside front and back covers, which are usually blank, contain some of the many tables and charts used in the book. Another feature of the book is the use of a two color format with the second color used for emphasis on a particular portion of a problem. Rules, concepts and equations appear in color. Whether used for self-study, school work, or as a mathematical reference, this book is certainly a complete mathematics handbook for electronics.

(More on page 76)

V.H.F. Repeater Problems and Possibilities

BY JAMES P. GREEN,* K6QNY

THE v.h.f. amateur bands provide reliable line-of-sight mobile communications. Depending on receiver sensitivity, only moderate power is necessary for generally noise-free reception. But in mobile-to-mobile work over paths that are not line-of-sight, results are highly variable.

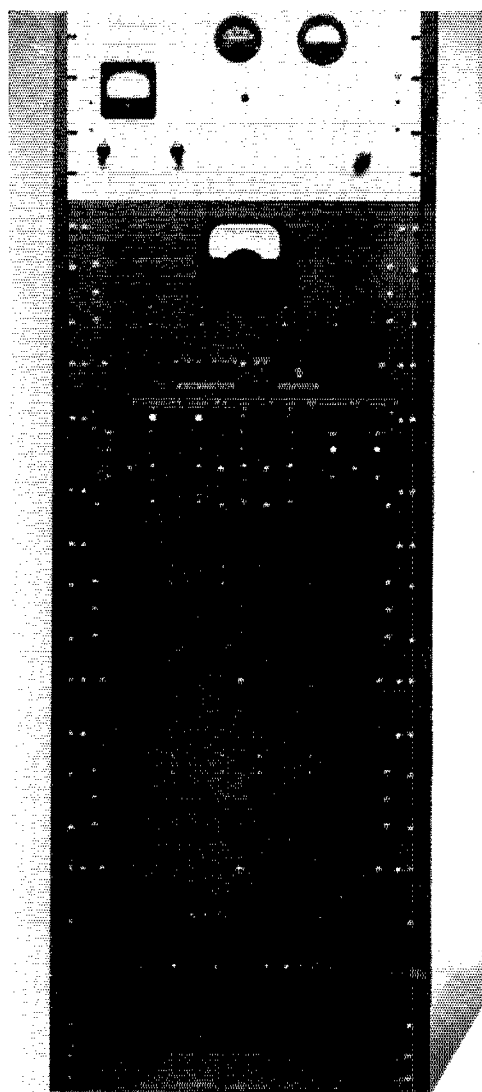
The usual v.h.f. mobile antenna is about six feet above ground, resulting in a radio horizon of about three miles. Effective coverage depends on the height of the antenna at the other end of the path, and on terrain, but mobile-to-mobile work is seldom good over more than a few miles. The communications range of mobile stations can be increased greatly by the use of an active repeater station, located on a mountain or hill visible to the mobiles.

In such a repeater, audio from the receiver is fed to a transmitter operating on a different frequency from the receiver. Mobile units listen on the repeater frequency, instead of to each other. A repeater 5000 feet above the surrounding terrain has a radio horizon of about 87 miles. Adding the three-mile horizon of the mobile brings the distance for reliable communication up to about 90 miles, resulting in a service area for mobile-to-mobile work of some 25,000 square miles. This coverage via a repeater is seldom equalled by mobiles on lower frequencies without repeaters.

Emission

The type of emission to be repeated determines the over-all complexity of the station. No successful attempt has been made to repeat amateur s.s.b. signals. C.w. presents many of the same frequency control and stability problems. A.f.s.k. teletype works through an a.m. system, but better copy can be produced if the incoming RTTY signal is made to key locally-generated mark-and-space tones. A repeater for a.m. signals requires speech processing in the form of level control. An f.m. repeater is the simplest, and possibly the best for mobile communications, though little used by amateurs thus far. The constant volume charac-

* 4448 Marlborough Ave., San Diego, California.

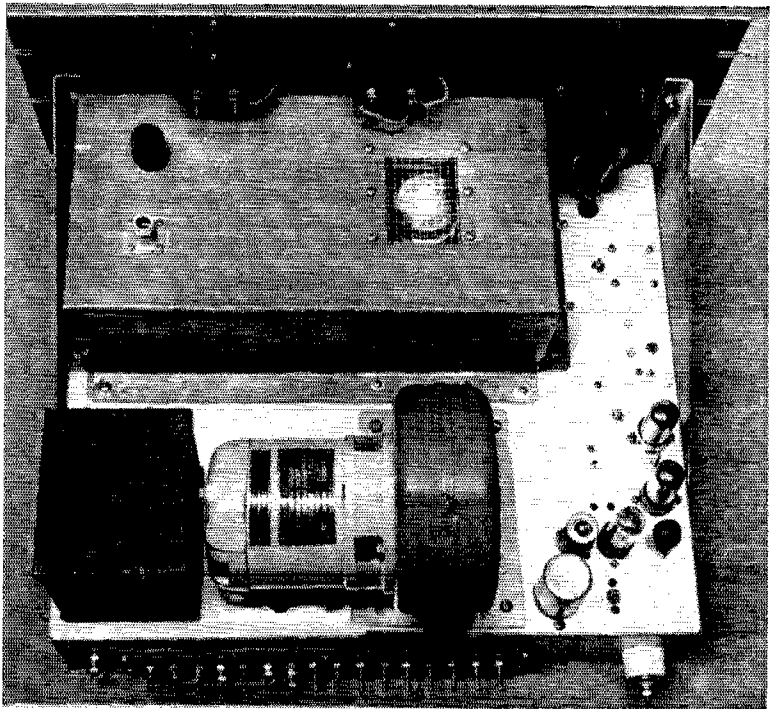


The transmitter used for the K6QNY v.h.f. repeater runs 500 watts input to a pair of 4X250Bs, modulated by 811As.

teristic of f.m. eliminates the need for complex speech-processing equipment. The present availability of used commercial equipment at moderate cost brightens the f.m. picture.

In an a.m. receiver the amplitude of the audio output is dependent upon the amount of power in the sidebands of the received signal. In a.m. repeater work the sideband power and percentage of modulation run the gamut. Signals range from down in the mud to those that block the receiver.

Top view of the r.f. portion of the repeater transmitter. The 6146 driver stage is mounted underneath the chassis. Much higher safety factors must be built into a transmitter for relay purposes than is customary in amateur service.



Maximum repeater efficiency occurs when the receiver background noise, with no signal, modulates the repeater transmitter 100 per cent. As a result, the tremendous range of signals above the noise level must be compressed to the maximum amplitude level of the noise. The only answer to this problem found thus far is an extremely good a.v.c., and a broadcast-type volume compressor.

Receivers

Very few available receivers will function effectively in a repeater station. The first r.f. amplifier stage lacks the selectivity needed to reject the repeater transmitter operating on a nearby frequency. The transmitter energy develops several volts of bias on the r.f. amplifier grid, forcing the stage to draw grid current. The modulation of the transmitter is superimposed on the received signal, and feedback and reduced receiver sensitivity result. A well-shielded receiver with additional front-end selectivity is necessary. Coaxial tuned circuits or re-entrant cavities will provide sufficient selectivity.

The receiver i.f. selectivity determines the repeater bandpass. A broad i.f. channel provides a "fudge factor" for stations not exactly on frequency. With a sharp i.f., stations using the repeater must be very close to the input frequency of the repeater. Generating a precise frequency in a v.h.f. band and then holding it for an extended period of time is quite difficult. The only recourse is crystal control, with a thermostatically-controlled oven. The alternative, a broader repeater passband, is usually employed. A compromise must be reached. With the wider passband, the added noise is of little consequence, but

the repeater will be more prone to adjacent-channel interference.

Transmitters

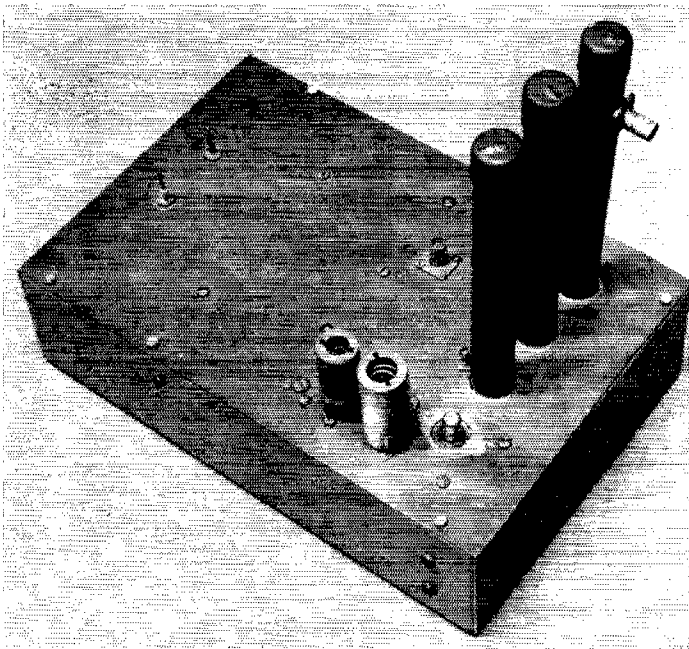
The v.h.f. amateur bands are both harmonically related and adjacent to frequencies widely used by other services, so exceptional care must be taken to prevent radiation of spurious signals. This problem can best be solved by complete shielding and filtering, and the installation of an external low-pass or bandpass filter. Selection of a frequency whose harmonics do not fall in commercial channels in local use is a must. Special care should also be taken to prevent receiver local oscillator radiation.

The transmitter should run fairly high power. Mobile stations contend with high noise levels much of the time, so repeater power in excess of that normally needed for reciprocity is helpful. An effective radiated power of 1000 watts is a good starting point. Taking into account transmission line loss and circuit efficiency, 500 watts input and an antenna having 6-db. gain will meet this requirement easily.

The heavy duty cycle of repeater equipment requires that it be extremely rugged. Test it under the worst possible overloads. Run the transmitter continuously for a day or so into a dummy load, with full modulation applied. Circuits showing abnormally warm components after such treatment should be redesigned.

Antennas and Site Selection

Antennas for the repeater station are usually designed for omnidirectional pattern and low radiation angle. The latter can be obtained by



Converter for use in the v.h.f. repeater. The three copper pipes, $\frac{3}{4}$ by 8 inches in size, are loosely-coupled coaxial circuits, preceding the first r.f. stage. Their purpose is to provide high r.f. selectivity, to reject the signal of the repeater transmitter, operating in the same band.

stacking elements vertically and feeding them in phase. Separate transmitting and receiving antennas are used unless a duplexer is built to permit transmission and reception on the same antenna. They should be one above the other, and oriented for minimum coupling. Both should be high enough to clear all trees, wires and buildings nearby. Vertical polarization is generally used, to simplify the antenna problem for the mobile station.

The repeater site should be determined from topographical maps of the area to be covered. Select a point which is high, but close to the area to be served. Foothills often block the path to higher mountains to the rear of them, so a nearby hill may serve better than a distant mountain, if the former is clear of obstructions. Most good sites will already have commercial users. Ask them for space. They generally will let you in, if you agree to pay for power used and guarantee freedom from interference.

Legal Hurdles

Putting a repeater on the air is not merely a matter of solving the problems outlined above. You have to satisfy FCC, which may be even harder. Operation by radio remote control is covered in Section 12.64 of the FCC Regulations. You must obtain special authorization before operating a repeater, and to do this you will have to show clearly how you will maintain control over the system, prevent unauthorized operation, and keep a complete and adequate log. Bowles and Dyce covered this well in 1953,¹ the principal variation now being that radio control is permissible on all amateur frequencies above 220

¹ Bowles and Dyce, "Remote Control with a 420-Mc. Link," *QST*, July, 1953, p. 32.

Mc., instead of 420 Mc., as it was at the time of their work.

Control equipment need not be too elaborate, if the radio link is only a few miles long, but in my case the repeater is located on 5700-foot Mt. Palomar, 47 miles north of the control point in the city of San Diego. Over this distance, crystal-controlled equipment of advanced design is required.

FCC requires that (a) the call sign and the in and out times of every station using the repeater be logged, and (b) the repeater call sign be sent at least once every ten minutes. With a large number of stations using the repeater, logging becomes a laborious chore. Fifty or more entries are often made in a 24-hour period. The only answer is a tape recorder.

The log of the K6QNY repeater is kept at one inch per second, on a two-channel recorder at the home station. This is actuated by a squelch relay each time the repeater goes on the air. On one channel is everything that is said over the repeater. The other records time signals from CHU simultaneously. CHU gives time signals in voice once each minute. The recorder has a minimum run of one minute. Tapes of the repeater must be dated and retained for at least one year, before they can be destroyed or used again.

A low-cost solution to the tape problem can be found in 2400-foot reels of 1-inch Mylar tape available from industrial users at around one dollar per reel. This tape is used, and is sold for scrap, but it is suitable for the purpose. It can be used as is, or split into four $\frac{1}{4}$ -inch tapes with a razor blade jig.

Identification can be either code or voice. In my installation the words "RPT DE K6QNY"

sent on m.c.w. from the home-station master control serve to identify both transmitters.

A Conelrad receiver at the repeater will put the station off the air if there is a warning. Repeaters for RACES or other CD purposes might be arranged to do just the opposite.

Representative Equipment

Some of the equipment is shown in the photographs. The final amplifier, rated at 500 watts input, has a pair of 4X250Bs, modulated by 811As. The transmitter frequency is 145.008 Mc.² The equipment is booby-trapped with protective overload circuits which can be recycled from the home station. The receiver converter, with its three loosely-coupled coaxial-tuned tanks in the output circuit, is also shown. The input frequency to key the repeater is 146.97 Mc. Commercially-made antennas having 5.6-db. gain are mounted one above the other on a 120-foot tower.

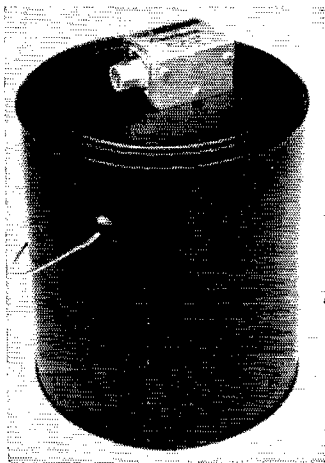
²Some change in frequency might be in order here, in view of the selection of 145 Mc. as the nominal frequency for the Oscar program. — *Editor.*

• New Apparatus

Kilowatt Dummy Load

LIGHT bulbs and resistors make good dummy loads but they have their limitations when it comes to power capacity and frequency response. The Heath Company of Benton Harbor, Michigan has brought out a dummy load that should fit the needs of every amateur, including the v.h.f. man who up to now has had to regard high-power nonreactive dummy loads for use above 50 Mc. as an expensive item reserved for commercial or military budgets.


The dummy load, dubbed "Cantenna," is rated for powers up to 1000 watts (ICAS) and has an impedance of 50 ohms with an s.w.r. of less than 1.5 to 1 all the way up to 300 Mc., and less than 2 to 1 on up to 400 Mc. The special 50-ohm ceramic type resistive element used in the dummy load is suspended from a lid assembly

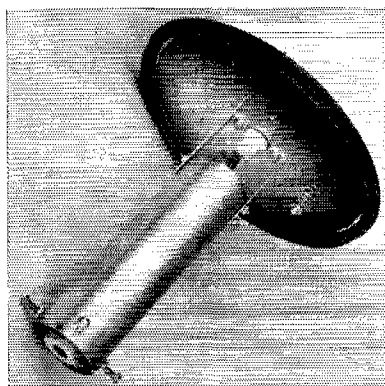


Results and Possibilities

Mobile-to-mobile contact between the Los Angeles area and stations in southern San Diego County were maintained easily through this system. The distances were on the order of 100 to 125 miles. Communication was solid at all times, not subject to the whims of an inversion layer. Recent personal commitments have prevented continued use of the repeater, but observations indicated the possibility of much greater range, perhaps even to well-equipped fixed stations in Arizona.

The range of the system could be extended by the use of additional repeaters, and a reliable tie-up of stations from San Diego to San Francisco seems not beyond the realm of possibility, though use of more than two repeater links multiplies the problems of extra equipment and frequency channels.

Valuable support for our project came from many sources. A few of the many contributors were WA6ATN, WA6FJF, K6QPV and W6NDW who also made the photographs. 



The 50-ohm resistive element is suspended inside the aluminum tube and is centered by the four adjusting screws at the end of the tube. These screws are also used to make electrical connection to the resistor. The other end of the resistor is supported by a ceramic feed-through insulator which connects to the input connector and the power-measurement circuit. The spring affair on the lid is a relief valve which will open if any pressure builds up inside the can.

which is attached to a can filled with oil. The oil carries away the heat generated in the resistor. Transformer oil is recommended, although common mineral oil will work. Automotive crankcase oil should not be used because of its low vaporizing temperature.

On top of the can lid is a small box with a standard coax connector for the transmitter, and also a phono jack. A semiconductor rectifier and filter circuit are built in the box so that a v.o.m. or v.t.v.m. can be connected to the phono jack for relative power measurements. The Cantenna measures 8 $\frac{7}{8}$ inches high, 7 inches in diameter, and has an oil capacity (oil is not furnished with the kit) of one gallon.

— E. L. C.



Those certificates and DX QSLs reveal that WV6SBO had quite a Novice career. In 8 months as a Novice, Bill received WAC, WBE, plus 17 other choice DX certificates, and had 60 countries confirmed . . . besides topping all other entries in the 1962 ARRL Novice Roundup.

1962 Novice Roundup Results

Soapbox

"My wrist was aching, my eyes bloodshot, and I almost fell asleep many times, but it was fun. My old SX-25 blew up after 10 hours, and we replaced a whole bunch of stuff that should have been done long ago, so it profited, too. Many old-timers were in there helping us Novices contact California, Texas, etc., and getting as big a bang out of it as we were. I'll soon be a General and the c.w. practice and message handling that was pounded into me during this roundup will stay with me for a long time." — *WV2SVY*. . . "My greatest thrill was working the ARRL station, W1AW, in the contest." — *KNITKS*. . . "Planned for this contest when I got my Novice ticket—then received my General opening day!" — *K0JUU*. . . "I don't think I would have ever gotten my code speed up for the Conditional without the NR." — *WN0ASJ/7*. . . "Overall, much fun handling out Nevada section reports and making out many QSLs for WAS credit." — *KN7RBM*. . . "I really messed up when I forgot all about the NR until I heard a 'CQ NR' on 40 meters Feb. 7. This was a very good contest." — *WN4APG*. . . "I had the best time ever in the Novice Roundup and thanks to those I contacted." — *WV2VLM*. . . "I can't think of a better way than the NR to boost your code speed up for the General." — *WV2UKC*. . . "Worked seven new states and thanks to all the Generals who helped me out so much." — *W1ZYCI*. . . "Enjoyed the NR very much. My best band to the South and East was 40 meters, while 15 was good to the West coast." — *KN9PPM*. . . "The Novice Roundup was great fun, even though at first, it was a bit nerve racking." — *KN8BAB*. . . "I was first West Virginia contact for a number of stations, but couldn't work my own section!" — *K8TBR*. . . "My General class license is on its way due largely to the fact that I took the exam on the Tuesday after the first week end. The code practice was invaluable. I'm sure it helped myself and many of the newer Novices acquire many new operating skills." — *W8SADH*. . . "I felt I should help out the Novices with some contacts. It began to get nerve racking after working all those KN3s and WV2s with calls so similar." — *K1QPN*. . . "Hope to see some of these fine ops in the SS and wish 'em luck on the General." — *WA2JIS*. . . "It was a bang-up contest. I'm sure looking forward to the SS." — *WN4AQV*. . . "Man, what a contest this NR was. I was on the air only three days while home from the University of Florida during semester break. I'll never forget the NR and my Novice days. It sure is fun to be a Novice." — *WN4BYW*. . . "It was great to work the Novices. Believe me, the Novice career of any ham's life is the most fun of the whole thing." — *K4WUN*. . . "Worked 11 new states in just one and a half weeks." — *KN7QFO*. . . "Worked at least 15 new states. Looks like this year should have some real fine scores. I am really interested to see who has the high score in Ohio which had quite a race." — *WV6SWV*. . . "I must compliment WV6SBO on his excellent Novice Roundup work. It seemed that any hand I went to there he would be with his *fb* fist." — *WV6VIM*. . . "During the contest I called 'CQ NR' and was answered by a General. After giving him my exchange, he came back and said: 'Sorry OM, thought NR stood for Naval Reserves.' Hi." — *WV6RUS*. . .

THE 11th ARRL Novice Roundup was a lulu. This contest, held February 3-18, 1962, was the time for Novices to participate in a contest geared to our newer hams. The objective was to work as many stations in as many different ARRL sections as possible . . . with the side effects of helping build up the code speed for the General/Conditional examination, as well as gain proficiency and skill in operating procedures. The NR combines fun and learning. This year 228 Novice reports were received. A hearty thanks to the Generals who helped out with the contacts and multipliers, including the 66 who reported results.

California has had its share of Novice Roundup winners in the past, and this year the Golden Bear state produced San Diego's WV6SBO with 20,345 points with 313 contacts in 65 sections, *f.b!* These contestants showed real operating ability with these scores over 10,000:

WV6SBO	20,345	KN5KWG	13,560
KN7OVJ	17,446	WN4CBF	13,000
KN7OWD	15,732	WN4CGI	11,988
KN1SMT	15,680	KN9FRC	11,100
WN4AKK	15,000	WV6UCF	10,340
	WV2WCG		10,080

The Code Proficiency desk at ARRL did a booming business during the January and February CP runs, with many happy contestants earning extra points for contest credit. Section winners' certificates will be mailed July 16.

— *J. F. L.*

Non-Novice Scores

K1QPN 9503, W1AW (W1s QIS UED WPR oprs.) 6600, K1RJV 2002, W1PLJ 189, K4OYJ/1 36, KITBD 1, WA2JTU 4672, WA2JZM 3317, K2DNW 2616, W2N1Y 1166, WA2HLH 850, WA2ODA 440, WA2JIS 420, WA2PZD 418, WA2CCF 34, K3DPA 10,857, K3GJQ 3180, K3JLW 1722, W3UTU 630, K3OJK 490, K3OWE 418, K3PCE 312, K3LSX 308, K4RIN 2400, K4LRX 2079, W4LYV 1596, K4FRM 1440, K4GMR 1344, W4EJP 950, K4WUY 903, W4ADSM 816, K4NVJ 490, W4A4WP 432, K4WUN 300, W5ARJ 3156, K5FQJ 2100, K5BQS 1632, K5FPU/5 672, K5BAJ 338, W6OEO 1170, W6NML 160, W6GQM 8, K7JRE 100, K7CWO 99, W8CXS 6063, K8TBR 3570, K8VAK 3552, K8BXT 3200, W8AIS 1541, K8UJH 96, W9CLH 1340, K9QKY 1050, K9YEL 646, K9UCP 104, K9GDF 74, K9APK 47, K9HIS 28, K0ZTU 6342, K0JUU 810, VE3BIR 1380, VE3LZ 756, VE3BYO 24.

"There were some good ops, but wish more Novices entered." — *K8UHF*. . . . "I worked *W1AW* and really treasure that beautiful QSL. Most of the time I was working at the contest, I was also keeping my three brothers and sisters, hi, I ran across some really good operators, especially *WV6SBO* and *KN7OVJ*; they were really tearing up the numbers." — *KN5KWG*. . . . "My one regret is that I missed out on all the fun when I was a Novice." — *W4ZPZD*. . . . "I worked several new states and finally learned how to use *AR*, *KN*, *SK*, and other operating procedures." — *WN5AGJ*.

SCORES

Scores are grouped by ARRL Divisions and Sections. The operator of the station listed first in each section is award winner for that section. Example of listings: *KN3QNY* 3685-96-35-13, or, final score 3685, number of stations 96, number of sections 35, total operating time 13 hours.

ATLANTIC DIVISION

Eastern Pennsylvania

KN3QNY . . . 3685-96-35-13
KN3RBN . . . 2340-90-26-14
KN3QGO . . . 1608-67-24-19
KN3OMB . . . 1512-56-27-14
KN3QMP . . . 1298-59-22-33
KN3QDA . . . 1081-87-23-9
KN3QNC . . . 774-43-18-13
KN3QPF . . . 544-32-17-6

Md.-Del.-D. C.

KN3PKI . . . 8319-167-47-28
KN3QNH . . . 3200-100-32-19

Southern New Jersey

WV2WCG . . . 10,080-210-48-40
WV2TFA . . . 4278-138-31-40
WV2WLM . . . 1601-64-25-32
WV2WCM . . . 1044-58-18-12
WV2WLN . . . 374-34-11-11

Western New York

WV2UJM . . . 6600-165-40-31
WV2SSB . . . 3968-128-31-40
WV2UKC . . . 3051-103-27-30
WV2WGH . . . 1992-83-24-26
WV2RBJ . . . 1752-73-24-18
WV2YCI . . . 1125-45-25-16
WV2TLA . . . 1050-40-18-5
WV2TUA . . . 700-40-19-15
WV2SEY . . . 420-20-12-9

Western Pennsylvania

KN3QEW . . . 6006-139-39-18
KN3PPX . . . 4416-128-32-20
KN3PJX . . . 4148-107-34-12
KN3QHO . . . 3193-103-31-14
KN3QEQ . . . 2325-65-31-13
KN3SAW . . . 1872-78-24-17
KN3OVX . . . 1752-73-24-13
KN3OVU . . . 1596-66-21-23
KN3QWY . . . 1363-64-25-8
KN3PBN . . . 168-21-8-8
KN3PLX . . . 20-5-4-1

CENTRAL DIVISION

Illinois

KN9FRC . . . 11,100-222-50-39
KN9HIQ . . . 9408-196-48-8
KN9HWI . . . 7755-131-55-8
KN9GMZ . . . 5520-100-32-18
WN9AMV . . . 3936-123-32-40
WN9ADJ . . . 3330-90-37-13
KN9HYE . . . 2820-79-30-37
WN9ABD . . . 1878-63-26-23
KN9DVK . . . 252-13-9-8
WN9BGM . . . 234-11-9-7
WN9BKW . . . 98-14-7-8
KN9ILJ . . . 36-6-4-2

Indiana

KN9EDW . . . 2336-146-16-40
WN9ADM . . . 756-36-21-14
WN9ADK . . . 740-37-20-8

Wisconsin

KN9IME . . . 2650-91-25-92
KN9HAN . . . 1782-81-22-23
KN9FFM . . . 1708-51-28-12
KN9FHB . . . 1058-36-23-11
KN9GAD . . . 731-28-17-14

DAKOTA DIVISION

North Dakota

WN9AAD . . . 1776-96-16-19
WN9AQA . . . 748-44-17-23

South Dakota

KN9GSY . . . 6072-123-44-39
KN9IKC . . . 1825-73-25-31
KN9FVV . . . 1200-50-24-13
KN9HPS . . . 273-21-13-6

Minnesota

KN9IUZ . . . 5808-121-48-40
KN9JTA . . . 1738-79-22-28
KN9JOA . . . 1710-114-15-23
KN9JFV . . . 1035-45-23-21
WN9ADX . . . 931-49-19-20
WN9AOI . . . 667-29-23-14
WN9ALE . . . 518-37-14-31

DELTA DIVISION

Mississippi

WN5ALL . . . 3465-84-35-19

Tennessee

WN4CBF . . . 13,000-250-52-38
WN4CJL . . . 11,938-222-54-31
WN4CGA . . . 6480-144-45-35
WN4DCP . . . 5368-122-44-8
WN4EAS . . . 3906-99-40-29
WN4CCP . . . 128-16-8-6

GREAT LAKES DIVISION

Kentucky

WN4CFA . . . 2511-71-31-11

Michigan

KN8DRZ . . . 1824-76-24-40
KN8CGD . . . 1794-59-26-16
WN8AEK . . . 280-20-13-12

Ohio

KN8DPB . . . 7956-194-39-32
KN8BBH . . . 7300-184-40-38
KN8ZJD . . . 6752-196-32-39
KN8XFP . . . 5456-124-44-10
KN8CKM . . . 4653-141-33-35
WN8ADJ . . . 3706-99-34-36
KN8ZHA . . . 3549-76-39-20
KN8AIQ . . . 3320-83-40-28
KN8BAH . . . 2821-91-31-37
WN8ADH . . . 2610-87-30-11
KN8ZSZ/8 . . . 2480-65-31-14

KN8DBW . . . 2210-70-26-15
WN8AJZ . . . 1890-70-27-16
WN8AOK . . . 1560-50-24-38
KN8BSN . . . 1189-41-29-13
KN8BQY . . . 1092-42-21-17
WN8AGH . . . 756-42-18-19
WN8AGY . . . 643-17-9-13
WN8CAL . . . 530-26-10-13
WN8ADU . . . 126-14-9-8
KN8ZBI . . . 35-7-5-10
WN8BNS . . . 15-5-3-5

HUDSON DIVISION

Eastern New York

WV2VYS . . . 7728-169-42-40
WV2WGS . . . 5586-147-38-36
WV2SVY . . . 5256-136-36-39
WV2JVJ . . . 825-45-15-10
WV2UMD . . . 714-27-17-25
WV2URL . . . 360-21-10-18
WV2RXO . . . 228-19-12-7
WV2RUD . . . 77-11-7-5

N. Y. C.-L. I.

WV2UWJ . . . 3872-121-32-40
WV2VEV . . . 3534-114-31-29
WV2RTR . . . 3330-111-30-33
WV2SRV . . . 1518-66-23-25
WV2RUB . . . 1428-68-21-18
WV2URD . . . 1364-43-22-16
WV2VJB . . . 1120-41-20-13
WV2SJC . . . 702-39-18-5
WV2WIO . . . 200-20-10-0
WV2VFW . . . 30-15-2-5

Northern New Jersey

WV2VUL . . . 3542-144-23-20
WV2SIB . . . 3213-119-27-28
WV2VRQ . . . 1870-75-22-24
WV2UOA . . . 1785-85-21-36
WV2TOA . . . 480-20-16-2
WV2UDT . . . 476-34-14-9
WV2YYV . . . 162-18-9-10
WV2VYN . . . 42-21-2-21

MIDWEST DIVISION

Iowa

KN9GLQ . . . 8517-167-51-36
WN9AJG . . . 126-21-6-3
KN9HSB . . . 80-10-8-5
WN9ABN . . . 25-5-5-6

Kansas

KN9JLL . . . 1968-103-16-23

Missouri

KN9HMQ . . . 2208-69-32-16
WN9AJV . . . 1980-56-30-25

Nebraska

WN9AKK . . . 286-26-11-31
KN9GAY . . . 187-17-11-10

NEW ENGLAND DIVISION

Connecticut

KNITKS . . . 735-49-15-6
KNITVF . . . 648-26-18-15
KNISDF . . . 390-20-13-10

Maine

KNITMM . . . 220-22-10-0
KNISWG . . . 216-12-8-7

Eastern Massachusetts

KNISMT . . . 15,680-265-56-29
KNINWV . . . 4003-136-37-37
KNITRK . . . 4061-121-31-20
KNIRMR . . . 705-37-15-7
KNISHY . . . 532-23-14-3
KNIRZL . . . 396-36-11-11
KNIVHS . . . 40-10-4-3

Western Massachusetts

KNITTTJ . . . 6552-148-39-39
KN18SH . . . 5379-143-33-39

(Continued on page 158)

New Hampshire

WV2QZM/7 . . . 4580-120-35-33
KN1TMD . . . 3069-108-26-0
KN1SPN . . . 2071-109-19-20

Rhode Island

KN18WK . . . 7448-176-38-37

NORTHWESTERN DIVISION

Idaho

WN9ASJ/7 . . . 6672-139-48-38

Montana

KN7REJ . . . 528-36-23-31
KN7RBY . . . 816-34-24-13

Oregon

KN7OVJ . . . 17,446-276-61-40
KN7QXJ . . . 2176-68-32-24

Washington

KN7PIG . . . 7440-140-48-37
KN7RIF . . . 2268-81-28-18
KN7QWC . . . 1350-54-25-17
KN7QMF . . . 144-18-8-9
KN7QWE . . . 1-1-1-1

PACIFIC DIVISION

Hawaii

WH6EFR . . . 1232-44-28-20

Nevada

KN7RBM . . . 2015-65-31-16

Santa Clara Valley

WV6TKC . . . 4170-139-30-38
WV6TQK . . . 2548-88-26-15
WV6REH . . . 1071-51-21-14
WV6TKE . . . 319-29-11-20

San Francisco

WV6UHN . . . 736-46-16-27

Sacramento Valley

WV6RKKW . . . 1848-88-21-38
WV6TQM . . . 988-38-26-13
WV6VCX . . . 300-30-10-16

San Joaquin Valley

WV6SBG . . . 1288-46-28-13
WV6VCQ . . . 546-39-14-27

ROANOKE DIVISION

North Carolina

WN4CXR . . . 6118-118-46-26
WN4DLF . . . 180-10-9-9

South Carolina

WN4BRY . . . 448-18-16-4

Virginia

WN4AKK . . . 15,000-270-50-33
WN4BIX . . . 3182-102-31-7
WN4APG . . . 2910-87-30-27
WN4DUW . . . 1134-44-21-5
WN4CHJ . . . 495-33-15-8

ROCKY MOUNTAIN DIVISION

Colorado

WN9RAZ . . . 420-30-14-17
KN9IRH . . . 108-12-9-9

SOUTHEASTERN DIVISION

Alabama

WN4AQV . . . 3220-72-35-23
WN4BQH . . . 1988-66-28-16
WN4AWX . . . 1100-60-22-22

No doubt the most popular Novice Roundup contestant was *WP4BBN*, who scored an impressive 170 contacts in 41 sections with this Challenger to a beam on 15-meters and HQ-170 receiver. Luis was probably the first DX for many Novices. Luis passed his General in April.



• Technical Correspondence

FIRST BIOLOGICAL CELL APPLICATION POWERS SIX-METER TRANSMITTER

Richeraft Electronic Eng. Co.
Sterling, Va.

Technical Editor, *QST*:

At a recent press conference held in Washington, D. C., the author demonstrated the first practical application of bacteriologically-generated electric power, using it to operate a small 50-Mc. transmitter. As may be seen in the accompanying photograph, this transmitter was powered solely by bacterial organisms in a test tube only $\frac{3}{4}$ inch in diameter and 7 inches high. Approximately a milliwatt was generated on the six-meter band with a crystal-controlled tunnel diode unit.

The first on-the-air QSO was held the afternoon of April 8, 1962, between the author's station, W4UCH, Sterling, Virginia, and K3CPA, Washington, D. C., over a distance of approximately 35 miles. This QSO was accomplished using a new series of diffused-based transistors in the crystal oscillator, buffer amplifier, and final-output r.f. amplifier, which gave a signal at K3CPA's location in Washington, D. C., of some 20 decibels above the noise. The modulator for a.m. phone used low-level audio transistors for the speech amplifier and modulator functions. Both the r.f. section and modulator were powered entirely by the small bio-cell batteries shown in the enclosed photograph.

The living world converts sunlight into chemical energy; and men have often wondered how this energy might be tapped in ways other than as food or as firewood. For example, there has been research on the use of bacteria to convert waste organic material into methane gas. Another way has now appeared and been confirmed by this practical application described above; i.e., that of obtaining electrical energy directly from biological processes in a "biochemical fuel cell." This is in reality "a living electrical battery" which draws its energy through bacterial action on common organic material. This organic material (fuel) may be provided by such things as saw-dust, corn cobs, septic tanks, etc., which the bacteria convert into useful energy.

There exist in nature many counterparts to man-made bio-cells. The ocean environment for example, may be considered to be a gigantic natural bio-cell. The bacteriological cell, which Dr. Frederick D. Sisler of the General Scientific Corporation of New York first developed, was convinced by him through observation of electro-chemical processes in marine sediments. Dr. Robert I. Sarbacher, also of the General Scientific Corporation, improved upon the original bacteriological cell, making it feasible for the author to use it with the transmitter shown on the enclosed photograph. At this time, the actual construction and type bacteria utilized in the bio-cell are still classified, but it is expected that the information will be released in a matter of months, at which time construction and use of these cells for amateur applications may be described.

What is really important to us as amateurs is the far-reaching implications that bacteriologically-generated power may have for us in the immediate future. It is possible that a forthcoming revolution in this field is nearly upon us.

— Robert M. Richardson, W4UCH

IMPROVING PERFORMANCE OF NUVISTOR 144-MC. CONVERTERS

708 Anderson Blvd.
Geneva, Illinois

Technical Editor, *QST*:

You might like to know how much your series of articles on v.h.f. gear was appreciated.¹ I promptly incorporated the s.w.r. bridge in my antenna/speaker/control box; but more to the point, I built the Nuvistor converter.

I had been using a 416-B converter for several years, and spent many hours sorting tubes and retuning, with the aid of a noise generator, for best noise figure. Also, professionally, I have been engaged in work on satellite transmitters for several years. Consequently, it was not unexpected that I incorporated a few ideas that came to me along the way:

1) The converter, complete with power supply, was built on a $5 \times 7 \times 2$ -inch aluminum chassis. All connections are made to the rear side of this chassis, a futile gesture directed toward preserving the myth of "wireless" in the shack.

2) The power supply consists of a half-wave silicon rectifier working off a Stancor P-8181 transformer which is rated at 150 v. a.c. at 25 ma. and 6.3 v. at 0.5 amp. With a capacitor-resistor-capacitor filter, this gives about 175 volts d.c. under load.

3) A worthwhile improvement (approaching 1 db.) in noise figure resulted from replacing the 10,000 resistor in series with the cascade stages with 470 ohms and eliminating the 100-ohm cathode bias resistor on the first tube. The object of this, of course, is to increase the plate current of the first stage as much as can be done safely with the available voltage. Along with a bit of tube selection, these changes raised the current in the cascade tubes from 4.5 ma. to 8.5 ma. Incidentally, RCA has raised the maximum allowable plate dissipation on types 6CW4 and 6DS4 to 1.5 watts, so this is still conservative operation.

4) In order to provide additional protection to the first tube when the 4X250 is fired up, I have incorporated a miniature d.c. relay alongside the first stage. This interrupts the d.c. cathode return circuit and grounds the hot end of the grid coil.

5) To facilitate noise-figure adjustments, a ceramic variable capacitor has been added between the input coax connector and the tap on the first stage grid coil.

6) Lastly, while it is not generally catalogued, Cinch does make a Nuvistor socket with conventional mounting ears. It bears their catalog No. 133 65 10 003.

I do not want to enter into any controversy on noise-figure measurements, but I have been able to duplicate within the limits of experimental error, measurements over a period of three or four years on the 416-Bs and recognize their inherent capabilities. However, on 144 Mc., the 6CW4 is much easier to handle and the 5722 diode current runs 1.1 ma. (70-ohm line) for what I consider a 3-db. increase in receiver output.

All in all, I am more than a little pleased with this converter and wish to express my thanks for the article that started this off.

— Al Horst, W9CUX

(Continued on page 150)

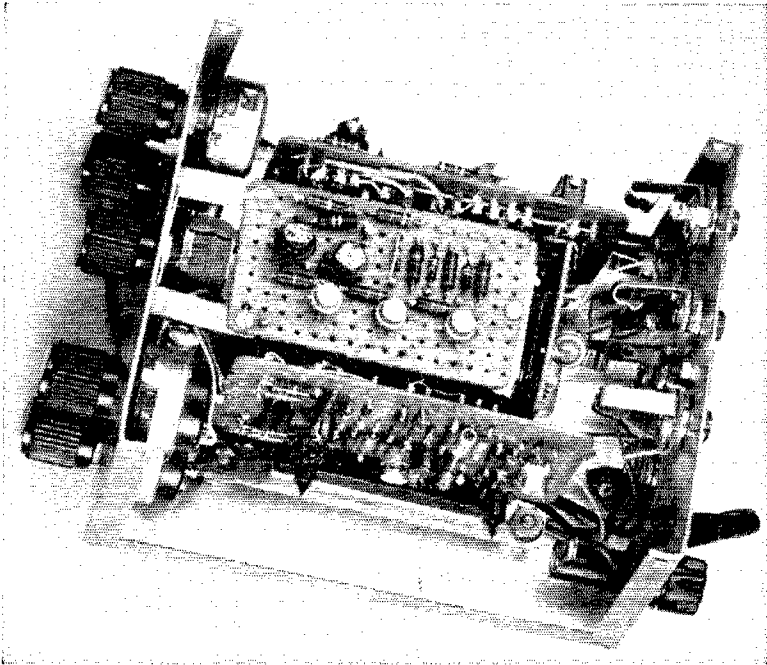
¹ Tilton, "A Two-Band Station for the V.H.F. Beginner," Part 4, *QST*, October, 1961.



Robert M. Richardson, W4UCH, center, demonstrates the first practical application of biologically-generated electric power, a small tunnel-diode 50-Mc. transmitter mounted directly above the recently-developed experimental cell. Developers of the biochemical cell are Drs. Robert I. Sarbacher, left, and Frederick D. Sisler, right, of the General Scientific Corporation.

While you may not be able to do anything with transistors that can't be done with tubes, it's certain that you can do it in less time and in a fraction of the space with semiconductors. A constructional feature of this multifunction control unit is the plug-in sections which permit individual testing and servicing of a circuit section without disturbing others.

An All-Transistor Keyer and C.W. Control Unit



Inverted view of the all-transistor control and keying unit, showing the mixer/muter plug-in section in the foreground, the block-grid keyer section on top. The plug-in electronic-key section is on the other side. Power transformer T_1 is hidden inside the "box" formed by the perforated cards.

Electronic Key, Monitor, Receiver Muter and Grid-Block Keyer in One Small Package

BY STEWART D. LYON,* KSUIJ

THE c.w. control and keyer unit shown in the photographs is an entirely solid-state unit for break-in control and automatic keying of a grid-block-keyed transmitter. The unit is composed of four distinct sections — electronic key, grid-block keyer, monitoring oscillator, audio muter and mixer, and power supply. The various functions are accomplished by the use of 19 transistors and 7 diodes (including the power-supply rectifier).

* 420 Ash, S.E., Albuquerque, New Mexico.

Electronic Keyer

The electronic-key section is similar to that described by W5LAN,¹ except that the relay has been replaced by an electronic switch. The circuit of the switch is shown in Fig. 1. This circuit is driven by Q_7 in the W5LAN key, the original relay in the collector circuit being replaced by a 6200-ohm resistor. Q_1 and Q_2 are d.c. amplifiers. The three keyer transistors, Q_3 , Q_4 and Q_5 , are in

¹ Old, "Transistorized Electronic Key and Monitor," *QST*, May, 1959.

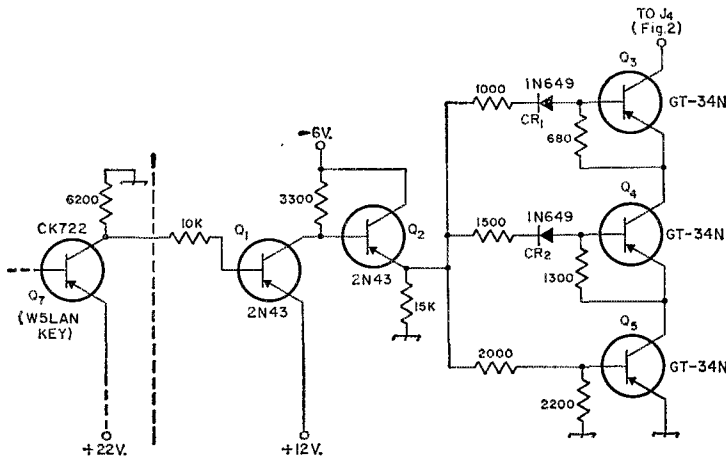


Fig. 1—Circuit of the electronic keyer. Unless indicated otherwise, resistances are in ohms and fixed resistors are 1/2 watt, Q_7 , to the left of the dashed line, is in the W5LAN electronic key mentioned in the text. The keying relay of that circuit has been replaced by the 6200-ohm resistor. Q_1 and Q_2 are G.E.; Q_3 , Q_4 and Q_5 are General Transistor.

series and are able to key transmitter blocking voltages up to approximately -210 volts. When keying -110 volts, the key-down drop across the series combination is about 0.3 volt.

Muter-Monitor

The diagram of the monitoring and muting section is shown in Fig. 2. Q_6 and Q_7 combine in a free-running multivibrator oscillating at about 750 cycles. The frequency can be varied over a reasonable range by adjustment of R_1 . The oscillator is keyed through Q_8 . Normally, the emitter of Q_8 is at -5 volts while the base is at -6 volts, thus keeping Q_8 in the "off" condition. Negative

potential from the transmitter key circuit is isolated by CR_1 . When the keying line is grounded through either the hand key or the electronic keyer (with S_1 closed), the -6 -volt bias is shorted out through CR_1 and R_4 . Since the emitter remains at -5 volts with respect to the base, base current flows through R_5 , and the collector-emitter circuit of Q_8 is conductive, thus turning on the monitor oscillator. Audio output from the oscillator is taken from R_2 where it is fed to Q_9 . The capacitor across R_2 reduces the harmonic content of the signal fed to Q_9 . Audio output from the receiver is fed to Q_{10} . Q_9 and Q_{10} have a common load, mixing the audio output from the receiver

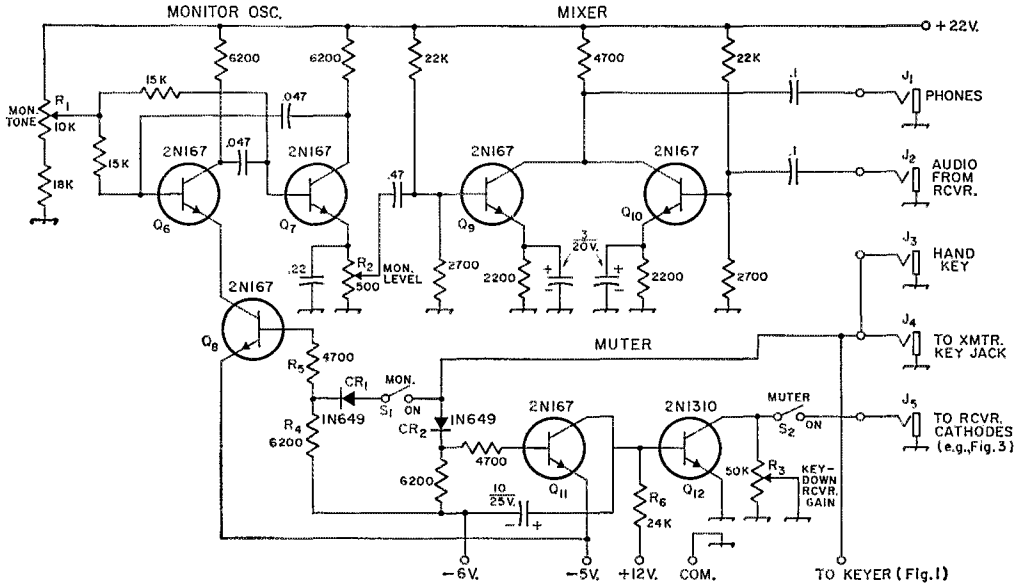


Fig. 2—Circuit of the monitor-muter section. Capacitances are in μf . and capacitors are ceramic or miniature paper, except for those marked with polarity which are subminiature electrolytic.

Resistances are in ohms and fixed resistors are 1/2 watt.

J_1 - J_5 , inc. — Miniature open-circuit jack.

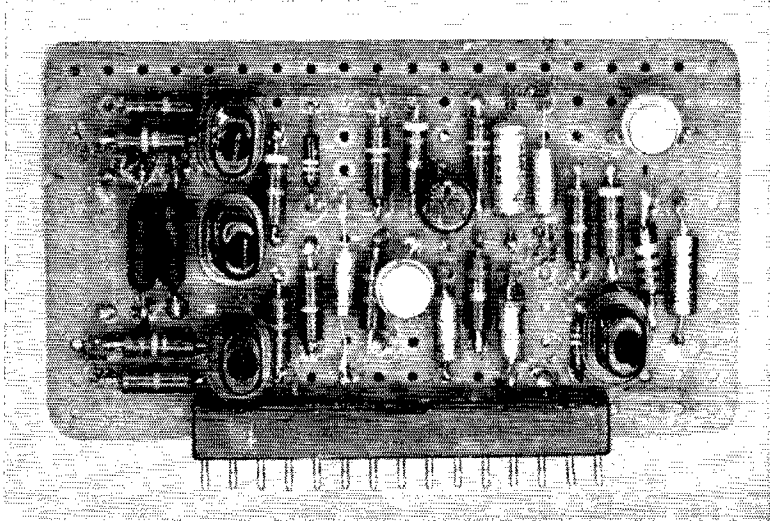
S_1 , S_2 — S.p.s.t. switch on R_2 and R_3 , respectively.

R_1 , R_2 R_3 —Linear-taper control.

Q_6 - Q_{11} , inc.—G.E.

Q_{12} —General Transistor.

Other component designations are for text-reference purposes.



A close-up view of the mixer/muter card. Q_6 , Q_7 and Q_8 are at the left, Q_9 and Q_{10} at the center, and Q_{11} and Q_{12} at the right.

and the signal from the monitor oscillator at the headphone jack J_1 .

Q_{11} and Q_{12} comprise the muter section. The basic principle of this circuit is the same as that of muting circuits using relays shown in the *A.R.R.L. Handbook* for several years. A high resistance (R_3) is inserted in the receiver cathode gain-control circuit when the key is closed, and shorted out in the key-open condition. Q_{12} acts as the shorting switch, controlled by Q_{11} . With the key open, Q_{11} is biased essentially to collector cutoff. CR_2 isolates the base of Q_{11} from the transmitter blocking voltage. Base current is supplied to Q_{12} from the 12-volt supply through R_6 , and the resistance across the output of Q_{12} is reduced to about 200 ohms. When the key is closed, Q_{11} is biased "on" in a manner similar to Q_8 . With Q_{11} conducting, there is a virtual short from the base of Q_{12} to -5 volts, and Q_{12} is cut off, removing the short across R_3 . The 10- μ f. capacitor "softens" the switching of the receiver. R_3 is adjustable so that the key-down receiver gain may be set at the desired level for monitoring. Fig. 3 shows how the system is applied to the Heath RX-1 receiver.

Power Supply

The circuit of the power supply is shown in Fig. 4. The transformer T_1 is a rewound filament transformer. The low-voltage secondary of a Stancor P-6134 6.3-volt 1.2-amp. transformer was removed and was replaced with a winding of 350 turns of No. 30 enameled wire in five layers of 70 turns each. Output from the capacitor-resistor filter is applied across a 25-ma. voltage divider with taps to supply the required voltages. Although there is some small variation in the several voltages between key-up and key-down conditions, the fluctuation is not great enough to affect the operation of the unit.

Construction

As the photographs show, the unit is made up in discrete sections, roughly corresponding to the preceding diagrams. All small components (which comprise about 90 per cent of the total) are mounted on a series of perforated cards. The cards for the electronic key and mixer/muter sections are 2 by 4 inches and are fitted with miniature plug-in mountings (Cannon or similar) which facilitate assembly and servicing. The blocked-grid keyer is on a smaller card at the bottom of the unit, supported on metal brackets. The power-supply resistor network and filter capacitors are mounted on a still smaller card toward the rear of the unit. The power transformer is mounted within the "box" formed by the four perforated cards. All jacks are mounted on the rear wall of the enclosure (which is a 4 x 5 x 6-inch Minibox cut down to a height of 3½ inches) and all switches and controls are at the front.

Operation

Again it is stressed that the keyer portion of

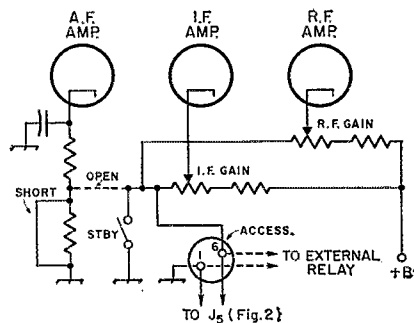


Fig. 3—Circuit showing modification of standby circuit in Heath RX-1 receiver for use with the muter. The same general principle will apply to other receivers.

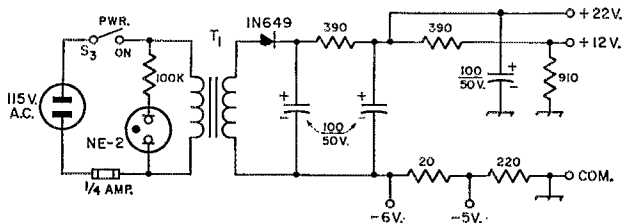


Fig. 4—Circuit of the power supply. Capacitances are in μf . and capacitors are miniature electrolytic. Resistances are in ohms and resistors are $\frac{1}{2}$ watt. S_3 is a s.p.s.t. rotary snap switch. T_1 is a filament transformer with rewound secondary as described in the text.

the unit is designed only for grid-block keying systems where the blocking voltage at the transmitter key jack does not exceed -210 volts. When receiving and transmitting c.w. on the same frequency, I prefer to shut off the audio monitor oscillator (S_1 open) and monitor the transmitter signal directly by adjusting R_3 to give the desired signal level with the key closed. If the monitoring oscillator is used, R_3 should be set at maximum to eliminate the signal from the transmitter.

For a.m. operation, either the muter may be used, or an external relay may be used in the conventional manner as indicated in Fig. 3. If the muter is used, R_3 is turned down for minimum key-down gain, and S_1 is opened to cut off the monitor oscillator. If the external relay is used,

S_2 is opened. Use of the muter requires that the stand-by switch on the transmitter short the key jack on transmit and open it on receive. In some transmitters, the key jack is disconnected from the circuit when the mode switch is in the a.m. position. In most cases a jumper at the switch will take care of this.

Most of the transistors and diodes used in the original model are rather high-priced industrial types. For those who are experimentally inclined, the following is a suggested list of possible less-expensive substitutes:

Q_1, Q_2 — Raytheon 2N363.

Q_3, Q_4, Q_5 — RCA 2N398.

$Q_6, Q_7, Q_8, Q_9, Q_{10}, Q_{11}$ — G.E. 2N1102.

Also, Lafayette SP-197s may be used as substitutes for the 1N649 diodes. QST

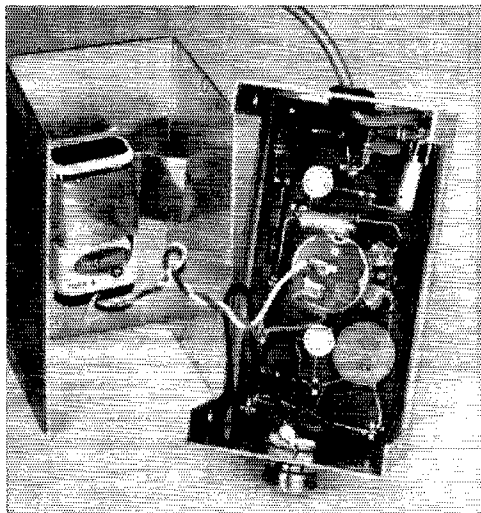
• New Apparatus

Transistorized Preamplifier-Compressor

THE "gadget" shown in the accompanying photograph is a transistorized audio preamplifier and compressor which is inserted between a high-impedance microphone and the speech section of a radio transmitter. When properly adjusted, the "Compreamp," as it is called by the manufacturer, acts as a voice-level regulator which prevents overloading the transmitter by

the peak-energy portions of speech and boosts the lower-level portions. This tends to keep the average modulation percentage up near the maximum with the boosted low-amplitude permissible level. The manufacturer rates the Compreamp as capable of giving a 10-db. (10 times power) increase in output for the low-amplitude speech components.

Included with the compressor unit is a 13-inch cable with an attached microphone fitting for connection to the transmitter. The microphone is connected to the fitting on the Compreamp box, which measures 4 by $2\frac{1}{4}$ by $2\frac{1}{4}$ inches. Power for the unit is furnished by a built-in 9-volt battery. The Compreamp is manufactured by the Metrodynamics Corp., 8 Westover Ave., Caldwell, New Jersey. — E. L. C.



FEEDBACK

On page 35 of June QST, "Novice 150-Watter," the article was shown a being continued on page 156. This was an error; the article was continued on the next page (36). The following text should have preceded the first line on page 36 "If it does, turn off the power and reduce the resistance . . ."

Combination Fundamental and Overtone Crystal-Oscillator Circuit

BY WILLIAM L. NORTH,* W4GEB

WHILE planning construction of an s.s.b. transmitter, the writer conducted some experiments with various crystal-oscillator circuits in an effort to find one that could be switched easily from one frequency to another.

It was found that in using the circuit shown in Fig. 1, an operating condition quite unlike any ever experienced before took place. The triode section of a 6CX8 was used, but it is likely that other triode-type tubes could be used.

R_1 is a cathode resistance that is quite lightly bypassed with C_2 . C_1 and C_2 form a capacitance dividing circuit so that if the grid of the tube were grounded for r.f. the circuit would resemble a grounded-grid Colpitts oscillator. In fact, if the grid is grounded through a 0.005- μ f. or larger capacitance, the oscillator will take off at a frequency determined by L_1 and C_3 . Without the grid being grounded, the oscillator will not work with the crystal removed.

The unusual feature in this circuit is the fact that when using FT-243 crystals between 2.1 and 8.7 Mc., the oscillator will operate *only* on odd harmonics when L_1C_3 is tuned to such a harmonic. When L_1C_3 is not tuned to an odd harmonic the crystal oscillates at its fundamental frequency. Experimental results indicated that for the crystal to continue oscillating on its fundamental frequency between odd harmonics (overtones) the L/C ratio needs to be rather high. If too much C is used the oscillator may take off only on the third, fifth or possibly the seventh overtones, depending on the natural resonant frequency of L_1C_3 . With about a dozen surplus type FT-243 crystals, and with a wide range of plate tuning between 2.1 and 26 Mc., it was found that each crystal, when tuned to the fundamental, started to oscillate immediately. Each one continued to oscillate at the fundamental until the third harmonic was approached. At this time the crystal suddenly popped out of its fundamental mode and started to oscillate only on the third harmonic. Tuning L_1C_3 somewhat higher than the third harmonic caused the crystal suddenly to pop back to its fundamental mode. The same condition took place for the fifth overtone with about two-thirds of the surplus crystals tried. In the case of two

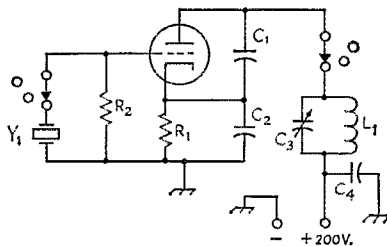


Fig. 1—Crystal-oscillator circuit.

- C_1 —27- μ f. silver mica.
- C_2 —180- to 500- μ f. silver mica.
- C_4 —0.005- μ f. ceramic.
- L_1 , C_3 —Tuned to desired frequency.
- R_1 —470 to 2200 ohms, 1/2 watt.
- R_2 —68,000 ohms, 1/2 watt.
- Y_1 —See text.

crystals in the 2.5–3.2-Mc. range the same type of operation occurred as the seventh overtone was reached. In these two cases it was necessary to substitute an r.f. choke for R_1 . Frequencies higher than 26 Mc. were not tried. When L_1C_3 is tuned to even harmonics, and if the L_1C_3 ratio is favorable, the crystal continues to oscillate at the fundamental frequency, but the plate circuit of the triode doubles, quadruples, and so on.

Values for C_2 between 180 μ f. and 500 μ f. all seemed to work satisfactorily over the 2–26-Mc. range. Values of R_1 between 470 and 2200 ohms were tried. The higher resistance resulted in less power input and less output. A 1-mh. r.f. choke was substituted for R_1 and this also operated satisfactorily. C_2 needs to have a smaller value than that indicated when an odd overtone is desired from a sluggish crystal. On the other hand, it appears that too small a value of C_2 tends to make fundamental-frequency oscillation between overtones more difficult. One 8.45-Mc. crystal tried to oscillate on its fundamental at the same time that oscillation took place on its third overtone. This caused modulation to appear on the signal.

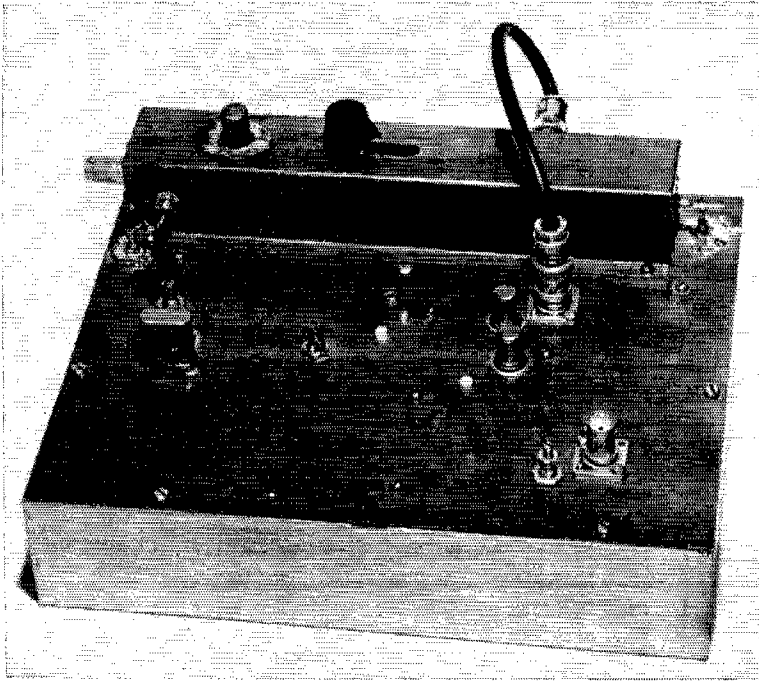
If output is taken from the cathode, grid or plate, it appears that a two-pole, multiple-position tap switch can be used to cover a wide range of frequencies with various crystals. **QST**

*712 Hallwood Ave., Falls Church, Virginia.

Strays

Going to jolly old England this summer? The RSGB London Members Luncheon Club has as its primary purpose the entertainment of overseas hams who can arrange to be in London on the dates of the meetings. The visitors get a free lunch, a chance to meet the London gang, and the opportunity to pass along info about ham radio

back home. During the last 12 months some 60 visitors have attended. The Club meets the third Friday of the month, at half past noon, in the Bedford Corner Hotel, Bayley St., Tottenham Court Rd., London W.C.1. Let 'em know in advance if you plan to attend, by phoning RSGB headquarters at HOLborn 7373.



The 220-Mc. Nuvistor converter, with trough-line r.f. preamplifier in place. The antenna is connected to the BNC fitting at the left end of the amplifier trough. The fitting at the lower right is for i.f. take-off. Just above and to the left are the series-cascade Nuvistors. The crystal at the left hides the 6CW4 oscillator.

Nuvistor Converter for 220 Mc.

Improved Reception on Our Top V.H.F. Band

BY J. M. FILIPCZAK,* K2BTM

THE converter above is an adaptation of the 220-Mc. model shown in recent *Handbooks*, following that basic design but using Nuvistors in place of the glass miniature tubes of the original. A 6CW4 trough-line amplifier is followed by two more 6CW4s in series-cascade. The mixer is the new 7587 Nuvistor tetrode. A 6CW4 crystal oscillator and a 7587 quadrupler furnish injection at 208 Mc., for mixer output at 14 to 19 Mc.

The high- Q trough-line amplifier provides more selectivity than is obtainable with coils at 220 Mc. This makes retuning of the stage necessary as one tunes across the band, but it is helpful in reducing interference from television and other services near the 220-Mc. band edges, or at the image frequency. The grid of this stage is not grounded directly. The 10-ohm resistor in the grid lead corrects a tendency toward oscillation. Direct grounding may be possible if the stage operates with a nonreactive load, and noise figure may be perceptibly better with the resistor eliminated.

The two following stages are not critical in adjustment. Precise setting of the neutralizing coil, L_4 , is not required, as the noise figure of the converter is largely determined by the trough-

line stage. The only critical item is the bypass capacitor, C_4 , on the grid of V_3 . Use a silver-mica button or other good v.h.f. bypass here, and at the cathode of V_2 .

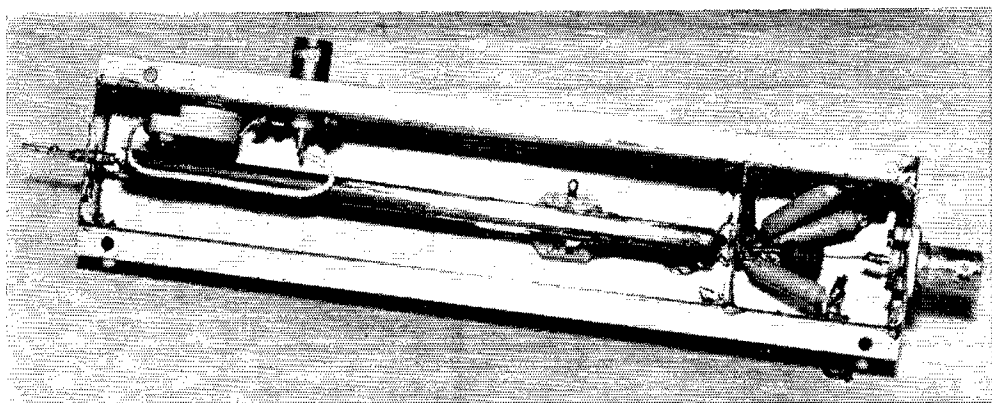
The tetrode Nuvistor mixer delivers more conversion gain than a triode, with lower oscillator injection and less pulling. The 7587 also gives lower mixer noise figure than conventional tube equivalents, so better over-all converter performance is more readily obtained. The series-tuned link, L_9 - C_{10} , may be used to set the injection level for optimum mixer performance. Other i.f. ranges than 14 to 19 Mc. may be used by changing the crystal and the inductance of L_{10} .

Construction

The converter is built on a flashing copper plate 7 by 9 inches in size, mounted on a 2-inch chassis of the same dimensions. The copper can be polished with steel wool, and then coated with Krylon spray to keep it bright. This will have no effect on the ease of soldering to the copper. With a copper plate, the Nuvistor sockets may be soldered in place, insuring good grounding.

The r.f. and injection stages are isolated by a copper shield. Another copper shield perpendicular to this isolates the power wiring. No dimensions are given, as layout may vary somewhat,

*RCA Electron Tube Division, Harrison, N. J.



Bottom view of the trough-line amplifier. The output coupling system is at the left. Dimensions for the flashing-copper assembly are given in Fig. 1.

depending on available parts. The oscillator and multiplier stages are at the left side of the bottom view. The visible r.f. circuitry begins with the cascode input coil, L_3 , just above the shield, at the lower right. The mixer tube is at the upper right, with its plate cap adjacent to the plate coil, L_{10} . The sockets for both tetrode Nuvistors are mounted on small copper brackets. The quadrupler is in the lower right portion of the injection compartment, with its plate circuit and output coupling near the shield at the center of the picture.

Dimensions of the trough line are given in Fig. 1. A shield is placed across the trough between the heater and plate lugs. Clearance is small here; use care to prevent a short. The plate line is $\frac{1}{4}$ -inch tubing, cut as shown. The $\frac{1}{2}$ -inch end is bent down, for soldering to the plate pin of the socket, and the $\frac{1}{4}$ -inch end solders to the feed-through, C_5 . An elongated hole at the center of the trough, for the tuning capacitor, C_1 , permits adjustment of the point of connection to the line. This is critical because of the small capacitance involved. Heater and plate voltages are brought in on feed-through capacitors. The output is taken off through L_2 and the BNC fitting, J_2 , both visible at the left end of the trough in the bottom view.

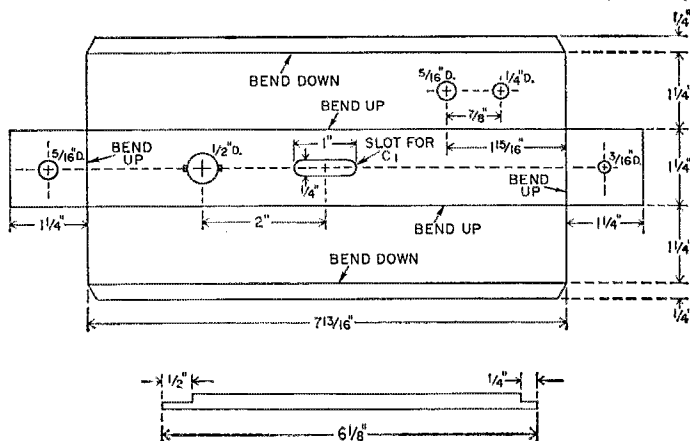
Shielded wire for all power leads, feed-through bypasses, and the copper shielding help to eliminate unwanted oscillation and reduce the tendency to spurious responses.

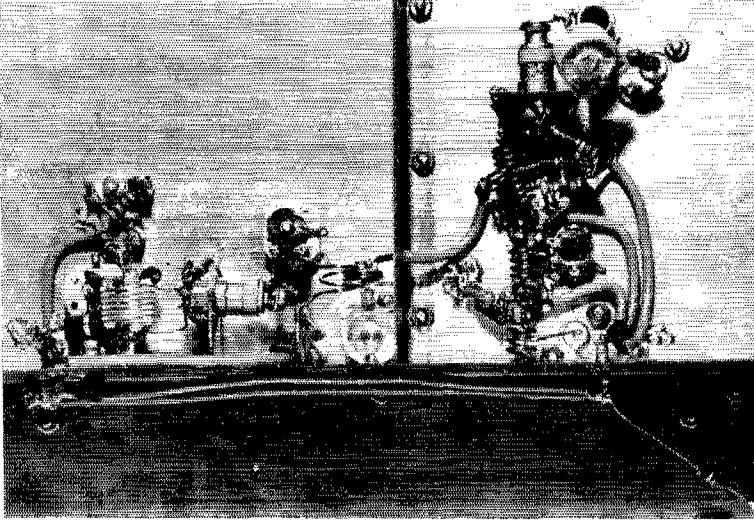
Adjustment

The converter requires 6.3 volts at 0.85 amp., and 120 to 150 volts d.c. at about 30 ma. The oscillator should be put in operation first. Remove all Nuvistors from their sockets except V_5 . Connect a 10-ma. meter in series with the 4700-ohm resistor in the oscillator plate supply lead. Apply plate voltage, and tune U_3 until a dip in plate current to about 3 ma. indicates that the stage is oscillating. Check the frequency at L_7 with a wavemeter or grid-dip meter, to be sure that oscillation is on the crystal frequency, and no other. Insufficient plate-circuit Q , or tuning the circuit off resonance, may result in oscillation at one-third of the marked frequency, with output on 51.5 Mc. too low to drive the quadrupler properly. Some variation of the oscillator grid resistor may be required, depending on crystal activity, but do not go below 22,000 ohms.

Now insert the 7587, and tune C_9 for maximum output at 206 Mc. Put V_2 , V_3 and V_4 in their sockets, apply power, and feed a 220-Mc. signal into J_3 . A noise generator or a local signal may

Fig. 1—Details of the trough-line metal work. The housing is cut from flashing copper and then bent to form a rectangular trough $1\frac{1}{4}$ inches square and $7\frac{13}{16}$ inches long. The elongated hole at the center of the top surface provides for adjustment of the position of the tuning capacitor. The inner conductor is made from $\frac{1}{4}$ -inch copper tubing. The $\frac{1}{2}$ -inch end is bent down for soldering to the plate pin of the amplifier tube socket.





Looking at the bottom of the 220-Mc. converter we see the injection stages at the left, the cascode circuit and mixer at the right.

be used, if a signal generator is not available. Adjust the quadrupler tuning, the setting of C_{10} , and the coupling between L_5 and L_6 , for maximum signal. Adjust the turn spacing in L_3 and L_5 similarly.

Now connect a short coaxial cable between J_2

and J_3 , and the signal source to J_1 . Insert V_1 , and tune the line for maximum signal. Be sure that C_1 really tunes, and does not merely begin to peak up the signal at maximum or minimum capacitance. Adjust the point of connection of C_1 to the line, if necessary, to assure full coverage

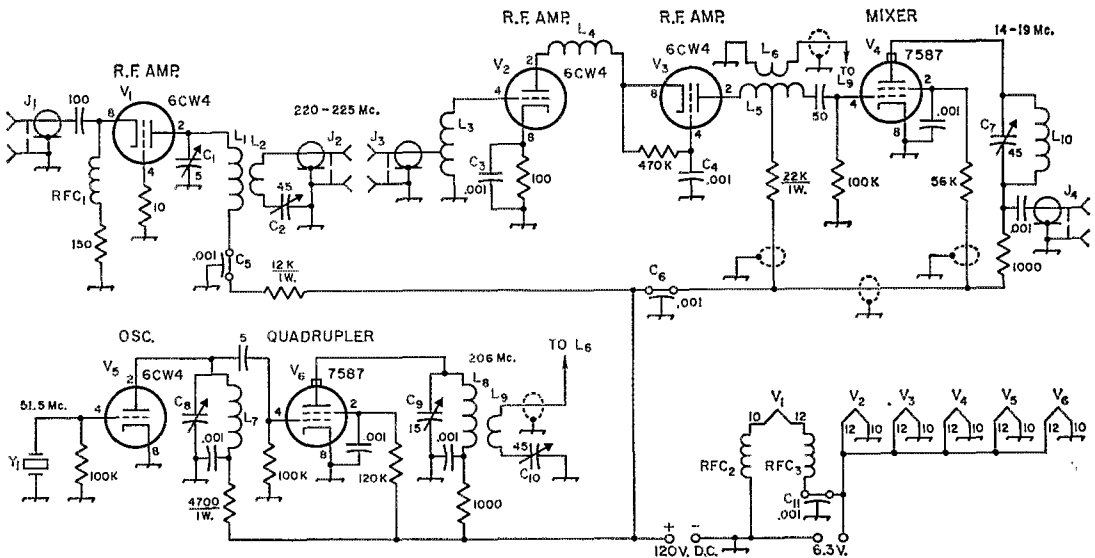


Fig. 2—Schematic diagram and parts information for the 220-Mc. NuVistor converter. Decimal values of capacitance are in $\mu\text{f.}$, others are in $\mu\mu\text{f.}$ Capacitors are ceramic unless specified. Resistors are $\frac{1}{2}$ -watt composition unless specified.

- C_1 —5- $\mu\text{mf.}$ miniature variable (Johnson 160-102 or 5M11).
- C_2, C_7, C_{10} —7-45- $\mu\mu\text{f.}$ ceramic trimmer.
- C_3, C_4 —0.001- $\mu\text{f.}$ silver-mica button (Centralab ZA-102).
- C_5, C_6, C_{11} —0.001- $\mu\text{f.}$ ceramic feedthrough.
- C_8 —20- $\mu\text{mf.}$ miniature variable (Johnson 160-110 or 20M11).
- C_9 —15- $\mu\text{mf.}$ miniature variable (Johnson 160-107 or 15M11).
- J_1, J_2, J_3, J_4 —Coaxial fitting, BNC (UG290/U).
- L_8 —Inner conductor of trough line; see Fig. 1.
- L —Approx. 2 inches insulated hookup wire in loop adjacent to L_1 , as shown in photograph.
- L_3 —3 turns $\frac{1}{4}$ inch long, center tapped.

- L_4 —4 turns $\frac{3}{8}$ inch long.
- L_5 —8 turns $\frac{5}{8}$ inch long.
- L_6 —2 turns $\frac{3}{4}$ -inch diam., inserted between turns at center of L_5 .
- L_7 —6 turns No. 20 tinned, $\frac{1}{2}$ -inch diam., 16 t.p.i. (B & W No. 3003).
- L_8 —2 turns $\frac{3}{8}$ -inch diam., $\frac{1}{4}$ inch long.
- L_9 —2 turns $\frac{3}{8}$ -inch diam., coupled to L_8 . All coils No. 18 enamel, $\frac{1}{4}$ -inch diam., unless specified.
- L_{10} —20 turns No. 26 enamel, close-wound on $\frac{3}{8}$ -inch iron-slug form.
- RFC1, RFC2, RFC3—0.84- $\mu\text{h.}$ r.f. choke (Ohmite Z-235).
- Y_1 —51.5-Mc. crystal.

of the band. Adjust the position of the coupling loop L_2 , and tune C_2 for best signal. Retune C_1 each time a change is made.

Set the injection level at the lowest that will give satisfactory results. Excessive injection may increase spurious responses. Optimum noise figure may be checked most readily with a noise generator, though a signal can be used if the operator works carefully for maximum *signal over noise*, rather than merely maximum gain. The setting of C_1 and the coupling to the following stage can be adjusted most readily with a noise generator,

as the noise generator imposes a proper load on the input circuit.

Values of the various dropping resistors in Nuvistor circuits should be set according to the supply voltage available, so that the voltage measured at each plate does not exceed 70. Those shown are for a 120- to 150-volt source, but other voltages can be used if the dropping resistor values are suitably modified. Plate voltage is not critical below 70, and the stages will work with as low as 40 volts. Plate dissipation should be kept under 1 watt. QST

● New Apparatus

The Sprague SK-1 Suppressikit*

INSTALLATION of suitable filters on the voltage regulator, generator and ignition coil terminals is a must in getting electrical noise down to a really low level in mobile communication systems. Shielding of the associated wiring is also helpful. The Sprague SK-1 Suppressikit provides all the parts and wire necessary to do this job, in a form that reduces installation time to a minimum.

The kit consists of two coaxial capacitors, JN-17-243, for installation on the battery and armature leads of the voltage regulator, one JN-17-426 filter assembly for the regulator field terminal, one coaxial capacitor, JN-17-424, complete with shielded cable, for the generator terminal, an ignition coil capacitor, JN-17-907, and suitable shielded cable for the complete installation. Putting it to work merely involves removing the existing wires from the terminals and attaching the harness. Only simple tools are needed, and no soldering is required. The regulator capacitors are fitted with threaded studs for mounting directly in the threaded terminal holes.

It should be emphasized that filtering and shielding for the high-tension portion of the ignition system are not provided in this package. It is essentially a "back-up kit" for use after the primary suppression job has been done. The latter involves installation of spark-plug suppressors, suppressor-type plugs, or resistance-wire cabling, and a suppressor in the hot lead at the ignition coil — or perhaps a combination of any or all of these — and possibly a shielded ignition harness, if you are after absolute quiet.¹ The writer installed the Suppressikit in a new car equipped with Packard resistance-wire ignition leads, but no other noise suppression, and found that only a suppressor in the high-tension coil lead was needed thereafter to bring the over-all electrical noise level in a 2-meter setup down to the point where no troublesome noise was in evidence with the receiver noise limiter on. Driving along the open highway with the receiver squeelch level set just at the point where the Corvair's own noise



does not break it, the squeelch is opened by almost every other car encountered; some of them at distances of 100 feet or more. What little noise remains has no degrading effect on weak-signal reception with the noise limiter operating.

Manufacturer: Sprague Products Company,
North Adams, Mass.
Price: \$17.85, net

— E. P. T.

*Trade Mark registered, U. S. Patent Office.

Strays

The May, 1962, issue of the *Proceedings of the Institute of Radio Engineers* was a mammoth production — some 920 pages! It celebrated the 50th anniversary of the Institute of Radio Engineers, and is full of the most interesting items. For example, copies of pages from the first IRE Record Book, listing the earliest members, show many names that are very familiar to the readers of *QST*. These people, many of them hams, have seen the whole history of radio develop during their lifetime!

¹ Campbell — "Exit Ignition Noise," May, 1959, *QST*, p. 30.

• Beginner and Novice

Plate Modulation for the 150-Watter

Using 6GJ5s as Zero-Bias Class B Modulators

BY LEWIS G. McCOY,* W1ICP

A RECENT issue of *QST* carried the description of a multiband 150-watt c.w. rig¹ and we promised to describe a plate modulator for the transmitter. This article shows how to add a modulator that will permit the builder to operate the r.f. amplifier at approximately 120 watts input with 100 per cent plate modulation.

Modulator Circuit Details

The modulator circuit used here is the same as one described by George Hanchett in February, 1962, *QST*.² It uses a 6AN8A triode-pentode speech amplifier, Fig. 1. The pentode portion of the tube serves as a microphone preamplifier for any type high-impedance microphone — crystal, ceramic, or dynamic. Output from this section of the tube drives the triode section, which is operated as a voltage amplifier. The triode output is transformer-coupled to a 6CG7 push-pull cathode follower, which in turn drives a pair of 6GJ5s. The 6GJ5s are used as zero-bias Class B modulators. These tubes are the same type as is used in the final r.f. amplifier of the transmitter.

Power for the modulator is obtained from the same supply that runs the transmitter. Two volt-

ages are needed, one of approximately 250 volts for the speech amplifier and driver and the other, high voltage for the modulator plates. The value of the high voltage will depend on your particular power transformer, but it should be from 500 to 600 volts, when the transmitter is fully loaded to 120 watts input.

Construction

The original layout of the r.f. portion of the transmitter left adequate chassis space for the later addition of the modulator. The accompanying top- and bottom-view photographs show the layout of the audio components. The microphone connector, J_4 , is mounted just below the key jack. Shielded cable is used to connect the jack to the grid of the 6AN8A. This tube is mounted at the rear of the chassis at one side of T_4 , the modulation transformer. The 6CG7 is installed in one corner of the chassis. Both T_2 and T_3 are mounted below chassis on the side. When mounting T_4 and the sockets for the 6GJ5s, be sure to allow clearance room for the shield cover of the rig.

Fig. 2 shows the wiring changes required for adding the modulator circuit to the r.f. section. Although the circuit may appear complicated, a study of the diagram and the transmitter will show that it is actually quite simple. A four-pole, two-position switch is used to switch the transmitter from phone to c.w. The "A" section of S_8 switches the low voltage (from the low-voltage section of the transmitter supply) either on or off. In the phone position the voltage is fed to the cathode follower and speech amplifier. When going to c.w., the plate voltage is removed from these stages. Poles "B" and "C" feed the high voltage through the secondary of the modulation transformer on phone or bypass the transformer on c.w.

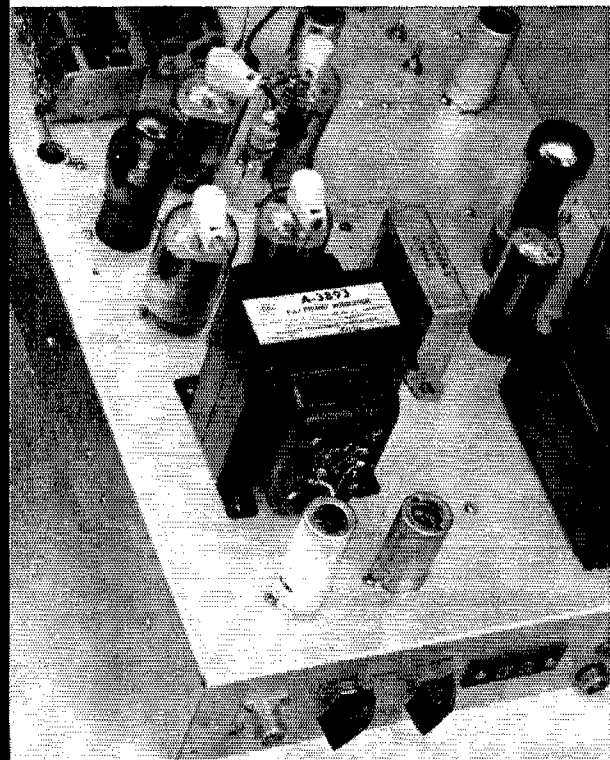
In the original setup, the screens of the oscillator and r.f. amplifier were regulated at 150 volts when the transmitter was used on c.w. This is still true for c.w. work, but a change must be made in the final-amplifier screen supply when going on phone. A 40,000-ohm, 10-watt screen-dropping resistor (R_7 , Fig. 2) is used to supply the screen voltage for phone operation. The screens of the 6GJ5 r.f. amplifiers are switched by the last pole, "D," on S_8 . The lead from the regulated

This view shows the arrangement of the modulator components that are mounted above chassis. At the rear of the chassis are V_1 and V_2 , with V_2 at the left in this view. In front of the two tubes is the modulation transformer and then the modulator tubes, V_3 and V_4 . The c.w./phone switch and gain control are mounted on the rear of the chassis.

* Technical Assistant, *QST*.

¹ "Novice Gallon or General 150-Watter," *QST*, June, 1962.

² Hanchett, "Zero-Bias Sweep-tube Modulators." *QST*, Feb., 1962.



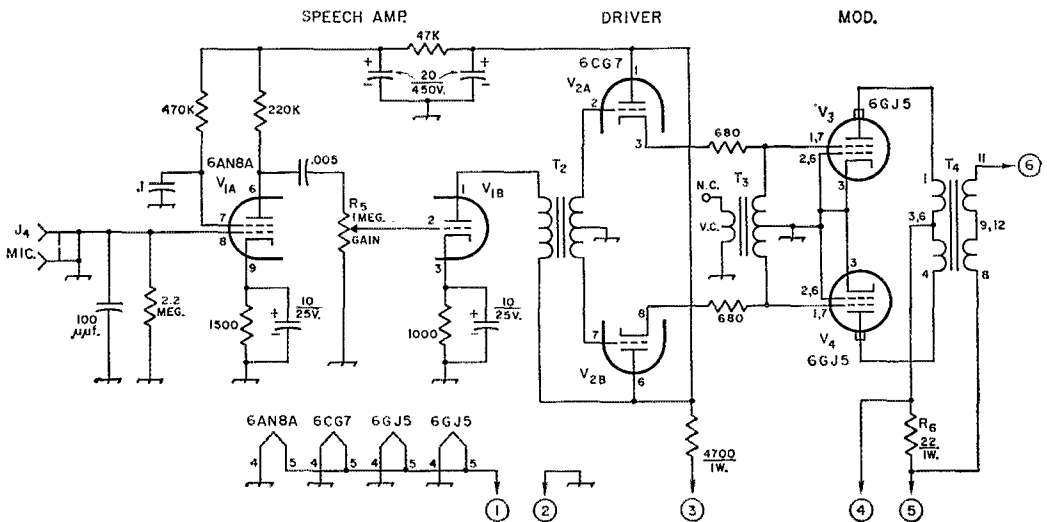


Fig. 1—Circuit diagram of the modulator. Resistances are in ohms, resistors are 1/2 watt unless specified otherwise. Capacitances are in μf. unless specified otherwise; capacitors with polarity indicated are electrolytic; others may be paper, mica or ceramic as available.

J4—Microphone jack.

R5—1-megohm control, audio taper.

R6—22 ohms, 1 watt.

150-volt line that connects to the terminal on S₆ (original circuit) is removed and connected to a terminal on S₈. The now-open terminal on S₆ is connected to the end of the 40,000-ohm screen-dropping resistor.

One word of caution: While the switch specified in Fig. 2 is capable of handling the voltages used in the rig, it is better to be safe and only switch from phone to c.w. or vice versa with the power turned off. This will prevent arcing at the switch contacts.

Incidentally, if you happen to refer to the original Hanchett QST article on the modulator, you may note that the 6GJ5 base connections are different than those given in Fig. 1 of this article. The base connections shown here are correct; the base connections in the original article were from preliminary information which has since been superseded.

The numbers appearing in Fig. 1 at the terminals of T₄ are the connections for the Stancor multimatch transformer specified in the parts list. A 5000-ohm plate-to-plate connection is needed for the modulator tubes, and in our case a 3250-ohm load was used on the secondary side. The actual secondary load will, of course, depend on what your particular high-voltage value will be when the transmitter is loaded to 120 watts input.

Fig. 2—Transmitter modifications for adding the modulator. Items marked with asterisks are added components; all others are original parts shown in Fig. 1, page 32, June QST.

R7—40,000 ohms, 10 watts.

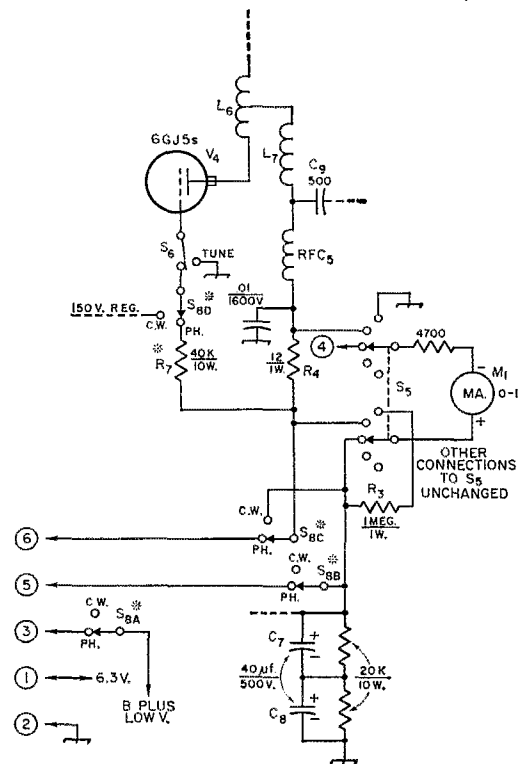
S₈—Four-pole, two-position switch (Centralab 2515, or P-270 index assembly with one ZD switch section; Mallory 177C).

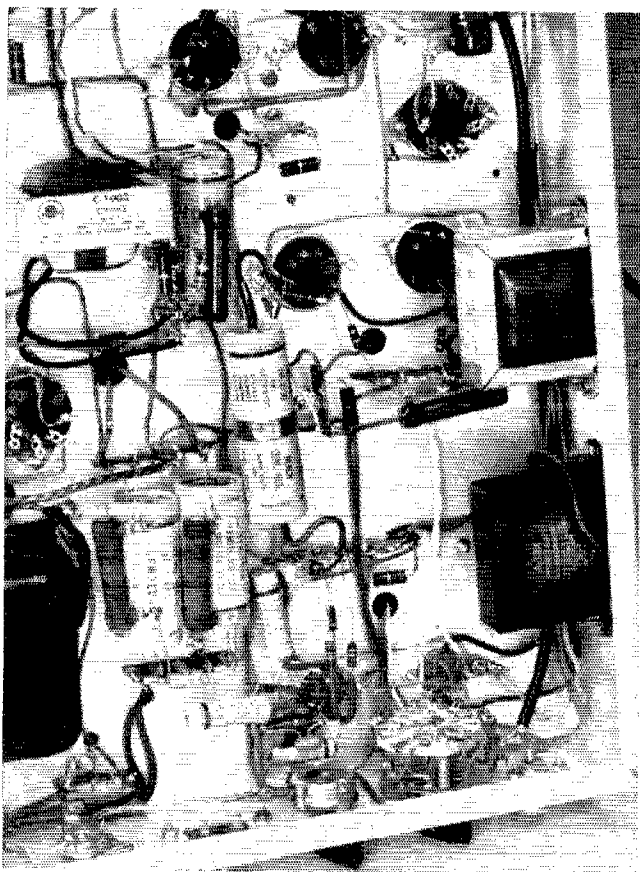
T₂—Interstage audio, 1:3 primary to total secondary; 10-ma. primary (Stancor A-73-C or equivalent).

T₃—Universal output, push-pull primary, voice coil winding not used (Stancor A-3496 or equivalent).

T₄—Multimatch modulation, 60 watts (Stancor A-3893 or equivalent). Adjust ratio for 5000-ohm plate-to-plate load.

These values are not critical, so don't be concerned if you cannot arrive at an exact figure when determining the secondary connections. The amplifier load is figured from Ohm's Law, in





Here is the below-chassis layout of the modulator. The two transformers, T_2 and T_3 , are mounted on the side of the chassis, with T_3 toward the rear of the chassis. Compare this with the bottom view before the modulator was added — see page 34 of *QST* for June, 1962.

this case $R = \frac{E}{I}$.

For example, let's assume your high voltage is 700 volts. At this voltage you would need to draw about 170 ma. for an input of 120 watts to the power amplifier. First, figure the load from the formula above and you'll find the answer is about 4100 ohms. If you look on the chart that comes with the modulation transformer you'll find a column of figures headed "Modulator Stage." Look down this column to where you see a plate-to-plate impedance of 5000 ohms. Next, look across the table under the columns headed "Class C Load Impedance," and find the figure that is closest to 4100 ohms. You'll find that the closest figure will be 4000 ohms, and the transformer connections shown for this load would be the ones you use.

As mentioned before, these values are not critical; in fact, if you happen to have an MD7-ARC-5 surplus unit, you can use the modulation transformer from that for T_4 in this installation, assuming you have a high voltage in the 500- to 600-volt region.

In the transmitter article, you'll remember that one metering position was left open for the purpose of checking the modulator plate current. R_6 is a 22-ohm meter shunt that will provide a full-scale reading of 200 ma.

Testing

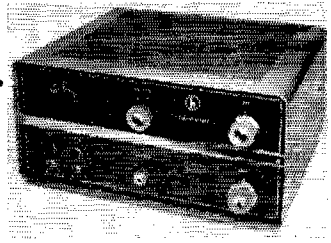
When you are ready to test, connect a dummy load to the rig and tune up on c.w. first (just to make sure it still works in that model). Load the amplifier to about 120 watts input. Next, turn off the power, set the audio gain control, R_5 , at zero, and turn the phone/c.w. switch to phone. Turn the power back on and set the meter switch to read modulator plate current. In our unit the idling current of the modulators (no audio signal input) was between 25 and 30 ma. This figure might vary slightly due to different plate voltages on the modulator tubes. Next, set the audio gain control so that when you talk in the microphone the voice peaks will "kick" the meter up to the 100 ma. level. This gain setting will give you modulation in the 100 per cent area. However, the builder should study the modulation chapters of the ARRL *Handbook* for methods of checking modulation, as a voice test is not too conclusive.

To see how hot the power transformer would get, we ran the rig continuously for 10 minutes, at the 120-watt input level, fully modulated with a tone. While the transformer did get good and warm, it still wasn't as hot as it gets when used in a TV set. This test is more severe than a 10-minute voice transmission, since with voice the average modulator input is considerably lower than it is with tone.

QST

• Recent Equipment —

Hallicrafters HT-41 Linear Amplifier



THE Hallicrafters HT-41 is a table-top 80- through 10 meter amplifier which includes its own built-in power supply. Two fan-cooled triode-connected 7094 tubes are operated Class B in grounded grid. Input power for the amplifier is rated up to 1200 watts p.e.p. on s.s.b., 700 watts on c.w., and 350 watts on a.m.

Although the equipment is designed as a companion unit for the HT-32¹ or HT-37,² it may be used with any 20- to 100-watt exciter. No matching network is needed between the exciter and amplifier, nor is a power-reducing pad required if the voice level in the exciter is set properly.

R.f. drive to the 7094s is applied to the cathodes, which are above ground for r.f., by way of an r.f. choke. The r.f. input circuit is untuned. Although the tube's control grids are at r.f. ground potential, during standby a cutoff bias of around 175 volts is applied to them. Fig. 1 shows the grid circuit and bias supply. The four terminals indicated in the diagram are brought out at the rear

apron of the amplifier. The CUTOFF BIAS terminals must be shorted to ground while transmitting in order to remove the cutoff bias. This can be done by connecting these terminals to the vox relay in the exciter.

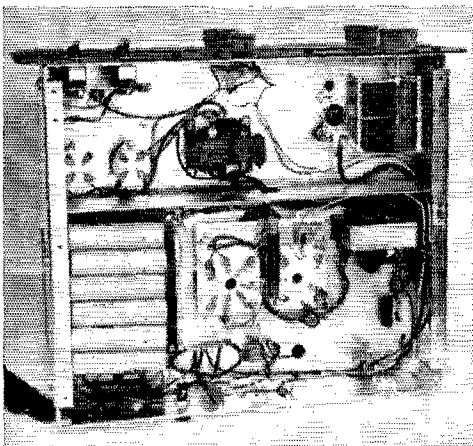
The DRIVE LEVEL terminals connect to an internal 200-ohm 10-watt current-limiting resistor. When the drive power is in the 60- to 100-watt region, the resistor gives protection from too much grid current (grid currents up to 200 ma. can be expected in some conditions). The DRIVE LEVEL terminals must be shorted when drive power of 60 watts or less is used.

The plate circuit of the HT-41 is a conventional pi network with band switching. Additional capacitance is automatically switched in parallel with the variable loading capacitor on the lower frequencies so the tank can handle load impedances from 40 to 75 ohms on all bands.

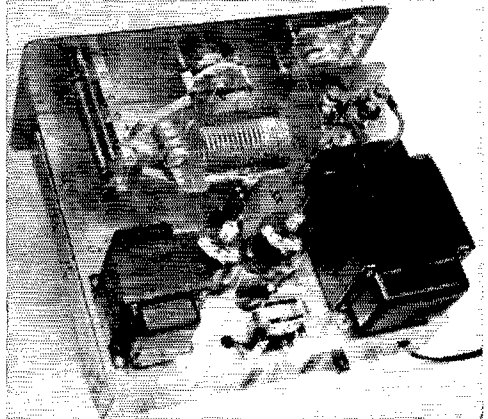
The built-in power supply includes plate, filament and bias voltage supplies. Two 866AXs are connected as full-wave rectifiers in the 2000-volt plate supply, and are followed up by an LC

¹ "Recent Equipment," *QST*, May, 1957.

² "Recent Equipment," *QST*, March, 1960.

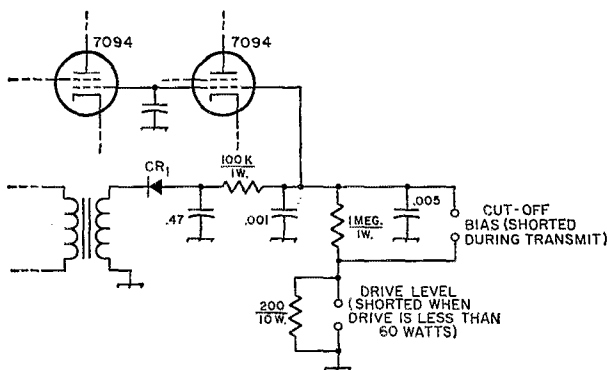


This bottom view of the HT-41 shows that the chassis is divided into two major compartments—the r.f. section at the top and the power supply at the bottom. The tubular objects at the lower left are the electrolytic capacitors used for power-supply filtering. At the upper right is the two-gang variable LOADING capacitor. The cabinet and bottom plate have been removed for this photograph.



The large plate transformer dominates this view of the HT-41. Filament and bias voltages for the 7094 tubes are supplied by the smaller transformer at the left of the photograph. Rear-apron connections are from left to right: Antenna connector (mates with PL-259), cutoff bias terminals (these terminals must be shorted during transmit), input connector (mates with PL-259), drive level strip (these terminals must be shorted when drive power is less than 60 watts), fuse holder, ground stud, and line cord.

Fig. 1—Grid circuit and bias supply of the HT-41 linear amplifier. All capacitances are in $\mu\text{f.}$, resistances are in ohms.



filter composed of a swinging choke and 17 $\mu\text{f.}$ of filter capacitance. The bias supply (see Fig. 1) furnishes about 175 volts of cutoff bias for the 7094s. R.f. chokes and filter capacitors are used in the a.c. line circuit for minimizing TVI problems.

Operating controls on the front panel of the HT-41 include two toggle switches with lamp indicators for controlling the FILAMENT and HIGH VOLTAGE.

There is a three-position rotary METER SWITCH for monitoring the amplifier GRID current (0-400 ma.), PLATE current (0-800 ma.) and relative r.f. output volts. The illuminated meter is mounted in the upper left-hand corner of the front panel.

There are also the usual BAND SELECTOR, TUNING and LOADING controls.

— E. L. C.

Hallicrafters HT-41 Linear Amplifier

Height: 12 $\frac{1}{8}$ inches.
 Width: 21 $\frac{1}{2}$ inches.
 Depth: 19 inches.
 Weight: 95 pounds.
 Power requirements: 117 volts, 60 cycles, 1500 watts maximum.
 Price class: \$400.
 Manufacturer: Hallicrafters, Chicago 24, Illinois.

National NC-155 Receiver

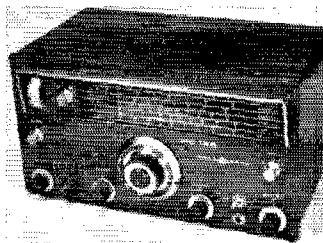
THE NC-155 is a double-conversion amateur-band (80 through 6 meters) receiver that can be considered an economy version of the National NC-270 described about a year ago in this column.¹ The difference in price between the two models is about eighty dollars, yet a comparison of the block diagrams and photographs of the two receivers will show that the NC-155 is basically the same receiver as the NC-270. There are some differences, of course — the NC-155 does not have a built-in crystal calibrator (one is available, however, as an accessory), nor a crystal-controlled second converter, T-notch filter and a fancy a.g.c. system as does the NC-270. However, it does have essentially the same front end, ferrite filter i.f. selectivity, power supply and audio stages.

The slide-rule dial on the NC-155 is calibrated in the six amateur bands between 80 and 6 meters in the following ranges: 3.5 to 4.0 Mc., 7.0 to 7.3 Mc., 14.0 to 14.4 Mc., 21.0 to 21.5 Mc., 28.0 to 29.7 Mc., and 50 to 54 Mc. The tuning control

mechanism is a combination pinch drive and panel planetary vernier. It is string-coupled to a red dial pointer which moves behind the calibrated plastic dial.

The block diagram in Fig. 1 shows the tube line-up of the receiver. The proper coils in the receiver's front end are selected by a panel BAND switch which, along with the three-gang tuning capacitor, tunes the circuits to the proper frequency. An ANTENNA trimmer is in the secondary of the antenna coil and allows for peaking up the input circuits to the r.f. amplifier, V_1 , a 6BZ6.

Signals are heterodyned to the first i.f. of 2215 kc. in the converter tube, V_2 . The oscillator is always 2215 kc. above the incoming signal frequency. This signal is coupled through a double-tuned transformer to the second converter, V_3 . The oscillator section of V_3 operates at 2445 kc. and beats with the incoming 2215-kc. signal to produce the second i.f. signal of 230 kc. The second converter oscillator is not crystal controlled as it is in the NC-270 and so the over-all receiver stability will not be the same. However,



^{1, 2, 3} "Recent Equipment," QST, January, 1961.

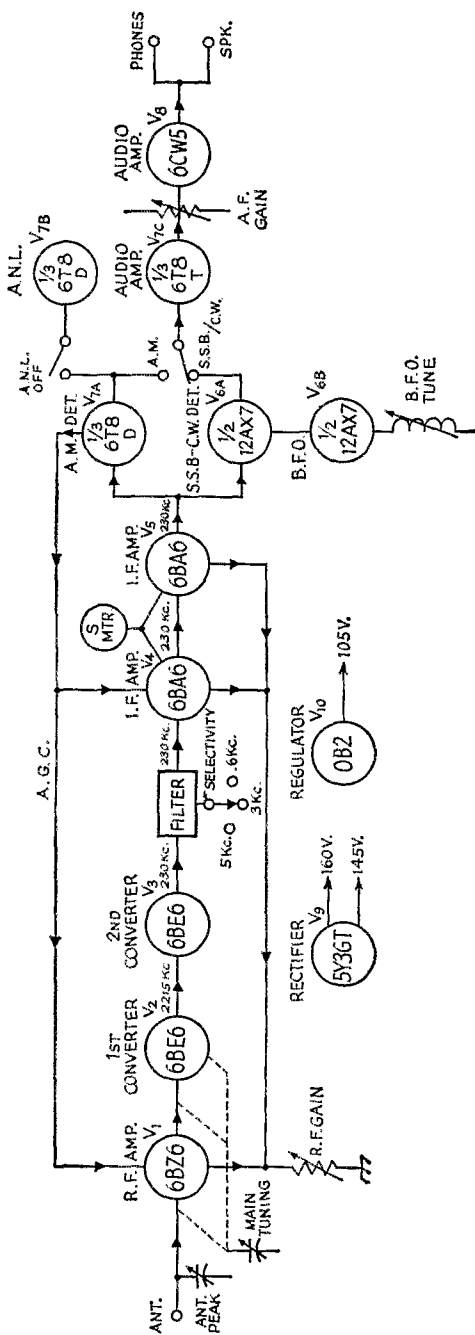


Fig. 1—Block diagram of the NC-155 receiver.

the frequency at which this oscillator operates is low enough so that getting good stability is not particularly difficult.

A ferrite filter² operating at 230 kc. provides three steps of selectivity: 5 kc., 3 kc., and 0.6 kc. (at 6 db. down). The different steps are selected by a front-panel SELECTIVITY switch. The filter circuit is inserted between the 2nd converter, V₃, and the 230-kc. i.f. amplifier, V₄.

After passing through the filter, the 230-kc. signal is amplified in V₄ and V₅. Both of these i.f. amplifiers, along with the r.f. amplifier, have their cathodes returned to ground through the RF GAIN control.

The S meter is connected between the plates of the two i.f. amplifiers, V₄ and V₅, in a sort of bridge circuit. Since there is no a.g.c. applied to V₅, its gain remains more or less constant, but the gain of V₄ depends upon the a.g.c. bias developed by the incoming signal. The difference in the plate currents of the two tubes (one tube is conducting more than the other in the presence of a signal) unbalances the bridge, causing the S meter to indicate the relative signal strength. Of course, the S-meter circuit is inoperative with the a.g.c. off.

A diode section of V_{7A}, a 6T8, is used as a conventional a.m. detector and also supplies the a.g.c. that is applied to the grid of the first i.f. tube, V₄, and to the grid of the r.f. amplifier, V₁. Another diode section of the 6T8, V_{7B}, operates as an automatic noise limiter and can be switched in or out of the circuit by the front panel FUNCTION switch.

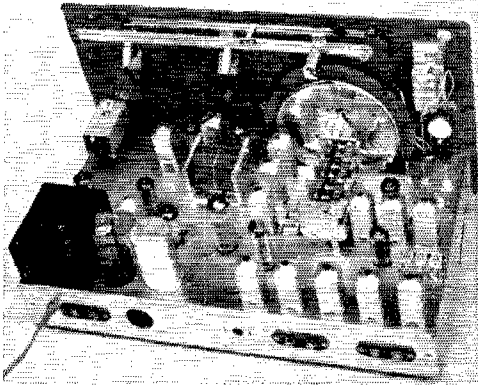
The FUNCTION switch also selects the desired reception mode, either straight a.m., a.m. with a.n.l., or c.w./s.s.b. All of these modes are marked in duplicate on the switch — one group for a.g.c. on, and the other for a.g.c. off.

When in the c.w./s.s.b. mode, output is taken from a triode product detector, V_{6A}. Extremely small coupling (5 μf.) is used between the last i.f. amplifier stage and the cathode of the product detector, probably to reduce the chance of the b.f.o. signal feeding back into the i.f. stages and thus affecting the a.g.c. Injection for the product detector is provided by another triode section, V_{6B}, the b.f.o. A panel b.f.o. control adjusts the frequency of the oscillator.

Following the detectors, the audio signal is fed into the triode section of the 6T8, V_{7C}, and then is further amplified in the 6CW5 power stage, V₈. About 3 watts of maximum output power is available from the amplifier, or about 1½ watts with 10 per cent distortion. Output from the transformer in the audio stage is designed to match a 3.2-ohm speaker. Output is also available through a shorting phone jack on the front panel that silences the speaker when an earphone plug is inserted.

The NC-155 power supply employs a 5Y3GT in the full-wave c.t. rectifier circuit and also has an 0B2 regulator to furnish 105 volts regulated to the first converter oscillator and to the b.f.o. There is a panel STBY-REC switch that removes high voltage from most of the tubes during STBY. An accessory socket at the rear of the receiver is wired in parallel with this switch for remote control of the receiver.

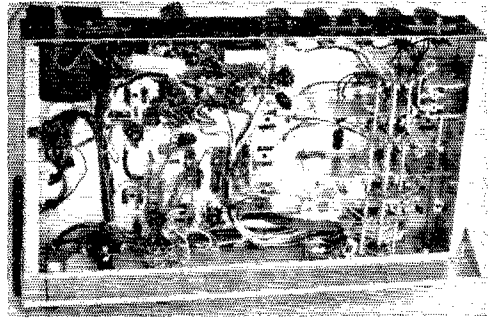
The receiver tried out here had an a.c. hum which was quite noticeable on the headphones. However, it has been our experience that objectionable headphone hum is present even in some of the Cadillac line receivers nowadays, probably because the receiver manufacturers are leaving



With its cabinets removed, most of the major components of the NC-155 receiver can be seen. The ferrite filter is located near the center of the chassis to the left of the three-gang tuning capacitor. Antenna input coils are in the cans along the rear edge of the chassis. Rear-apron connections include from left to right: line cord, relay terminals (these terminals are shorted when a panel STBY/REC switch is positioned to STBY), calibrator accessory socket, S-meter zero adjust, speaker terminals, and antenna/ground terminals.

out the filter choke in the power supply and are relying on simple RC filters. Apparently, they assume that most operating involves the use of a speaker where the hum isn't so noticeable.

WIHDQ's comments concerning the NC-270's performance on 6 meters³ generally apply to the NC-155. The sensitivity is good. However, in the model we tested the antenna trimmer and r.f. gain adjustment swung the frequency somewhat, so that these controls are not independent in 6 meter c.w. and s.s.b. work. The same con-



Bottom view of the NC-155 receiver.

dition exists when a.g.c. is used in the c.w./s.s.b. mode — strong signals “pull” the frequency. The image responses will be from signals 4430 kc. below the indicated dial settings and the image in the second mixer falls 460 kc. below the dial setting.

The NC-155 is finished in traditional National Blue and has the “Flip Foot” feature for tilting up the front of the receiver.

E. L. C.

National NC-155 Receiver

Height: 8 3/8 inches.

Width: 15 3/8 inches.

Depth: 9 inches.

Weight: 25 pounds.

Power requirements: 105-205 volts, 50-60 cycles, 75 watts.

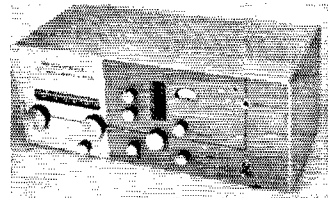
Price class: \$200.

Manufacturer: National Radio Company, Inc., Melrose 76, Mass.

The Gonset GC-105 2-Meter Communicator

IN writing about the Communicator IV¹ we used an automotive analogy, calling the Models I and II of this line the Model T's, the Communicator III the Model A, and the IV the V8. If we carry this one step farther, the newest of the Communicator family must be the Falcon. Perhaps there is an even more exact parallel from the automobile industry in the case of the company that reintroduced its 1954 model almost without change, but under a new name, and thereby started the current rush to the “compacts.”

The GC-105 2-meter transmitter-receiver is the Communicator III,² in a new dress, with only minor electrical differences, and probably quite a few v.h.f. enthusiasts will welcome this reversion to the simplicity and moderate price

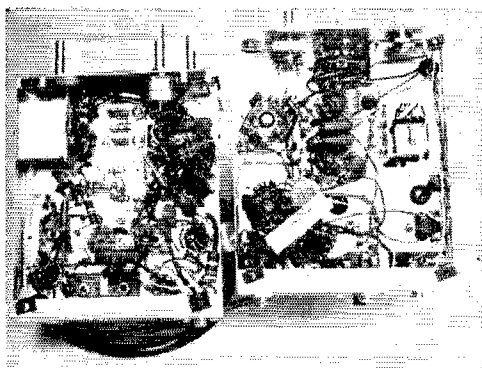


that characterized the first three Communicators. The horizontal arrangement of the familiar Communicator subassemblies may also be advantageous in mounting the new version under the dash of a car, which is where a good many “Gooney-birds” go.

The receiver section of the GC-105 tunes 143.75 to 148.25 Mc. and is practically identical to that in the Communicator III: 6BZ8 cascade r.f. amplifier for a noise figure of around 5 db., 6CG8 mixer oscillator, three stages of 6-Mc. i.f. using 6BH6s, 6AV6 detector-audio-a.v.c. and

¹ “Recent Equipment,” the Communicator IV, *QST*, April, 1961.

² “Recent Equipment,” the Communicator III, *QST*, March, 1958.

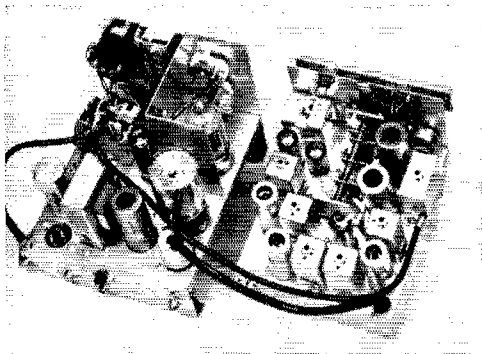


Bottom of the GC-105 units, with the receiver at the left. Since there are only minor differences, these detail pictures are almost identical to those made for the Communicator III. It's the outside that is different.

6AL5 noise clipper-squelch. The receiver selectivity is rated at 10 kc. and 150 kc. at 6 and 60 db.

The principal change in the transmitter is the substitution of a 6CX8 pentode-triode for the 6BK7 dual triode formerly used in the frequency-multiplier stages. The 12BY7 crystal oscillator and 2F26 amplifier are carried over from the III, but the circuits have been modified slightly. A pi-network is used in the amplifier output, and the grid circuit is also this type. Presumably these circuit changes, and the substitution of the 6CX8, have upped the grid drive to the final amplifier and the output power that it is capable of delivering to the antenna, which averages about 6 watts. Increased multiplier effectiveness made it possible to do away with gang-tuning of the exciter stages, and only the final grid, plate and loading controls are brought out to the front panel for adjustment in changing frequency. As before, 8-Mc. crystals are recommended, though we found operation satisfactory with crystals in the 6- and 12-Mc. ranges as well. The transmitter frequency range is 143.5 to 148.5 Mc.

The 9006 diode modulation clipper used in earlier Communicators is missing from the GC-



Top-rear view of the transmitter and receiver subassemblies of the GC-105. Transmitter is at the left.

105. Either a carbon or high-impedance microphone can be used with the equipment.

The meter serves for tuning up the transmitter, as well as a receiver S meter. And it is an S meter now — the calibration is in S units, and the beloved “db. over S9” can now be read off to impress owners of earlier Communicators, who must rely on the famous Green Eye, or a meter that merely reads arbitrary units from 1 to 10. The writer remains to be convinced that this is an engineering improvement, however.³

Still lacking: a beat oscillator and a keying jack. The GC-105, by reverting to type, does make c.w. reception of a sort possible. As in the I, II or III, you can put a 6-Mc. crystal (exact frequency not important) in one of the crystal positions, and run the meter switch on “spot,” for b.f.o. effect. Though the crystal oscillator output partially blocks the receiver under these conditions, it does provide a nice T9 note on c.w. signals not too close in frequency to its 24th harmonic. It can also be used for transmitter frequency control, and with the switch in any but the “spot” position, it will not cause any trouble in receiving. — E. P. T.

³ Tilton, “The S Meter — False Idol,” *QST*, November, 1961.

Gonset GC-105 Transmitter-Receiver

Height: 6½ inches.

Width: 15½ inches.

Depth: 8 inches.

Weight: 22 pounds.

Power requirements: 100 watts, 6 or 12 volts d.c., or 117 volts a.c.

Price class: \$210.

Manufacturer: Gonset Division, Young Spring & Wire Corp., Burbank, California.

Strays

In the April 1917 issue of *QST*, an article entitled “Some Excellent Spark Coil Work in Kansas” mentioned an unknown station in the Kansas City area that “came in QSA” during the day 10 miles north of Lawrence. The only clue to the identity of the station was the call “X” signed by the unknown operator. The author of the article asked for help from *QST* readers in identifying station “X”.

Now, forty-five years later, the mystery may be solved. Mr. E. L. Campbell, who now lives in Wichita Falls, Texas, comes forth with information that perhaps he was the originator of the signals. Quite active in the Kansas City area during that period, Mr. Campbell says he frequently signed the call “X”.

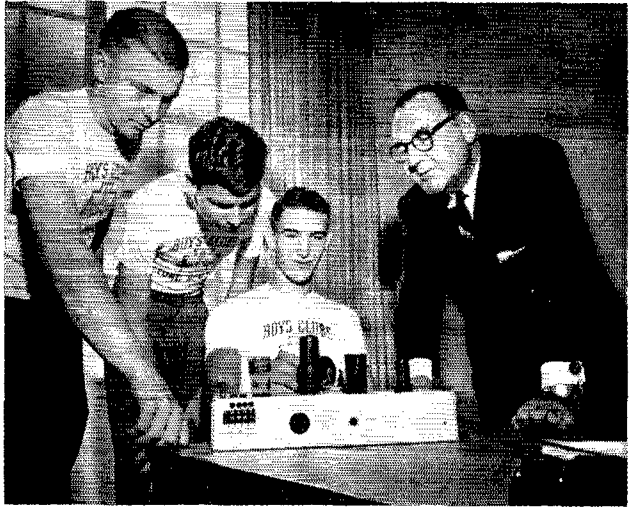
Mr. Campbell is no longer active in amateur radio but, heredity being what it is, his son, WICUT, picked up the radio bug and is now on the ARRL Headquarters staff!

Project Boys

A Public Service by Radio Amateurs

BY RALPH STEINBERG,* K6GKX

Governor Edmund G. Brown opening the Microwave Society of Long Beach drive for ham gear to be donated to the Boys' Clubs of Long Beach.



THE Microwave Society of Long Beach, in looking for a project for better public relations, decided that an important civic problem was that of juvenile delinquency and that the Society should make plans to assist in the training of boys to be radio amateurs. A committee was formed to investigate and plan for a project in which to assist youth organizations of this city. The Boys' Clubs of Long Beach, with five branches, was selected because they had the physical facilities to set up classes and work shops. The next step was to meet with the officials of the Boys' Clubs of Long Beach and propose a plan to equip and staff these branches. It was decided that a drive would be conducted for two months, to secure donations of ham gear.

Governor Edmund G. Brown opened the drive, and publicity in the newspapers was gratifying. Civic and state leaders sent messages of praise and encouragement, while radio amateurs, radio clubs and radio suppliers gave their support and assistance. The Long Beach Civil Defense Mobile Unit helped in collecting gear from radio amateurs who did not have transportation to the drive headquarters.

The second part of the plan was to staff the radio classes, and so the committee called for volunteers. Enough members of the Society signed up as instructors to staff all of the branches of the Boys' Clubs of Long Beach. These classes were scheduled to start in June.

At the close of the drive, an inventory was taken and it was found that the radio amateurs of this area had donated many fine pieces of gear

*C/o Microwave Society of Long Beach, Inc. P. O. Box 3303, Long Beach, Cal.

plus various components. The members of the Microwave Society of Long Beach are checking over the transmitters and receivers and putting them in working order. The parts will be used for construction of ham gear necessary to the training of the boys. Future plans call for building a ham station for the new Lakewood branch of the Boys' Clubs of Long Beach and, if successful, there will be stations installed at the other branches.

The Boys' Clubs of Long Beach are a member of the Boys' Clubs of America, the national organization chartered by Congress. It has over six hundred branch clubs and affiliates in the United States. This organization is part of the Community Chest in your town or city. If your club is looking for a worthy project, this is a good way to start.

The Microwave Society of Long Beach wishes to thank the Associated Radio Amateurs, Inc., Southern California VHF Club, Long Beach Civil Defense Mobile Unit, and many others for their participation and assistance in this fine cause. A vote of thanks to Ev Mosking, WA6HXT, Sunday Editor, *Press-Telegram*, for his help with publicity.

QST

Strays

The Northeast High School Radio Transmitting Society has been re-issued a call that it held in 1921 — W3YC. The school also reports that it held the call 3GN in 1912, and so lays claim to being the oldest licensed high school station in the United States.



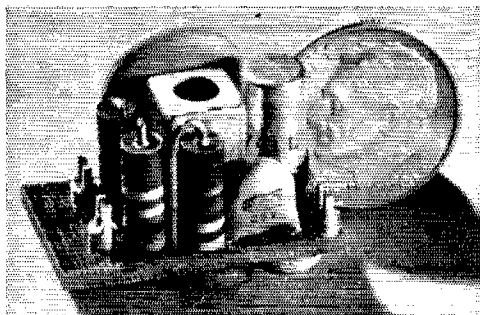
Hints and Kinks

For the Experimenter



TRANSISTOR B.F.O.

THE accompanying photograph shows a miniature 455-kc. b.f.o. that I built to go along with



a pocket-sized receiver. A diagram for the unit is shown in Fig. 1. The oscillator is tuned by ad-

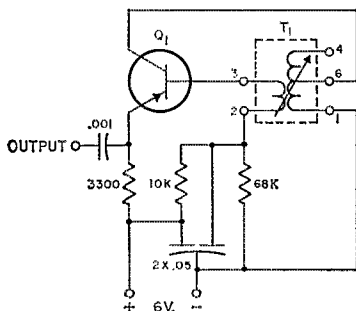


Fig. 1—W0CXN's miniature b.f.o.
 Q1—2N1525 transistor.
 T1—455-kc. i.f. transformer (Zenith No. 95-1879).

justing the screwdriver slot slug on the miniature transformer, T₁. This transformer is a replacement part for a Zenith b.c. receiver and is available through any Zenith dealer or distributor.

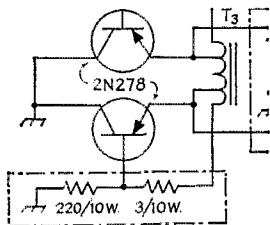
— Vern V. Holmes, W0CXN

TRANSISTOR POWER SUPPLY NOTE

TO reduce the audible noise produced in the transistor power supply described on page 499 in the 1962 edition of *The Radio Amateur's Handbook*¹, make one of the 3-ohm, 10-watt base starting resistors variable and adjust it for minimum noise. In the case of the *Handbook* circuit, the value should fall somewhere between 1.5 and 5 ohms.

— Robert L. Karl, W3QPH

¹ Ed Note: In Fig. 19-50 (1962 *Handbook*) there is an error in the circuit concerning the 3-ohm, 10 watt resistor and the transformer, T₃, at the bottom left of the schematic diagram. The partial circuit shown in Fig. 2 is the corrected portion of the schematic diagram.



----- Sub Assembly

Fig. 2—Corrected circuit diagram of the triple transistor power supply.

EXTENDED COVERAGE FOR THE DRAKE 2-B RECEIVER

A GREATER frequency coverage than that specified can be obtained from the set of amateur-band crystals in the Drake 2-B receiver. The 20-meter and three 10-meter crystals are overtone types and, if plugged into other sockets will oscillate at their fundamental, which is 2 or 3 kc. higher than one-third the marked frequency¹. By turning the PRESELECTOR either above or below the crystal frequency, the following ranges can be covered in addition to the amateur bands. Included in the new range is WWV at 5, 10, and 15 Mc.

Crystal	Socket and Band Switch	Preselector	Tuning Range (Mc.)	
10 (1)	A	6	4.668	4.068
10 (2)	A	8	4.835	4.235
10 (3)	A	10	5.035	4.435
20	B	7	9.502	10.102
10 (1)	C	5	11.668	12.268
10 (2)	C	6	11.835	12.435
10 (3)	C	6	12.035	12.635
40	C	7	14.5	15.1
10 (1)	10 (1)	7	21.0	20.4
20	20	9	21.5	22.1
10 (3)	10 (3)	8	22.1	21.5

— A. K. Head, VK3AKZ

¹ Ed Note: It should be noted that while many overtone crystals function quite well in their fundamental mode, many others do not. Which crystal will and will not oscillate on its fundamental frequency does not seem to depend upon its make, frequency, or activity in the overtone model. Therefore, the only way to find out is to try and see.

TRANSMISSION LINE SPREADERS

OLD Polaroid film spools make inexpensive spacers for open-wire feed line. The flanges around the ends of the spools are snapped off with pliers; the remaining tube is used as the spacer.

— Al Brogdon, K3KMO/W4UWA

IMPROVED NOISE LIMITER FOR THE MOHICAN

THE a.n.l. in the Heathkit Mohican is not automatic in the same sense as is the common series-gate type found in many tube receivers. In order to include the automatic feature, whereby the clipping level is determined by the carrier amplitude, the circuitry was revised as shown in Fig. 3. The transformer, T_1 , inverts

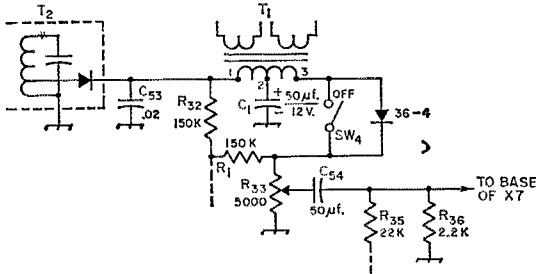


Fig. 3—Noise limiter for the Heathkit Mohican receiver.

C_1 —50- μ f, 12-volt electrolytic capacitor.

R_1 —150,000-ohm, $\frac{1}{2}$ -watt resistor.

T_1 —Miniature audio transformer (available from Arrow Electronics, Inc., 65 Corlandt St., New York 7, N. Y. See ad on page 147 of June QST).

the polarity of the detected audio current, but not the d.c. carrier component which flows through the diode into the 5000-ohm audio gain control. Audio noise pulses exceeding 100 per cent modulation are clipped off by the diode as long as the switch, SW_4 , is open. The switch mounting must be reversed if the ANL panel markings are to be correct. The value of R_1 is approximate and is dependent upon the diode characteristics.

Only a few extra parts are needed for the conversion: the transformer, T_1 , the resistor, R_1 , and the capacitor, C_1 . They are mounted in the space below the printed circuit board.

— Carl F. Buhner, *K2OHF*

CURING BUZZY RELAYS

ALMOST any a.c. relay can be adjusted to give a hum-free operation, but operating it on d.c. will insure buzz-free operation. The circuit in Fig. 4 shows a typical d.c. supply for use with an a.c. relay. A half-wave rectifier, CR_1 , rated 80 ma. or so, a 30- μ f. 150-volt capacitor, C_1 , a 7-watt Christmas-tree lamp, I_1 , and a 2000-to 4000-ohm resistor, R_1 , are the necessary components. Most 117-volt 60-cycle relays have a d.c. resistance of around 500 ohms. It takes about

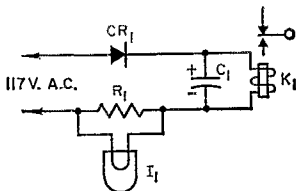


Fig. 4—Circuit for operating a.c. relay on d.c. See text for information on components.

20 to 30 volts d.c. to operate the relay and the lamp, I_1 , drops the 117 volts to the proper value and protects against short circuits. The 1-watt resistor, R_1 , shunted across the lamp may be needed to vary the voltage drop for a particular relay.

— Roland D. Zehr, *W6BFZ*

TRANSISTOR C.W. FILTER

THE transistor c.w. filter shown in Fig. 5 was suggested to me by Lawrence Carver, ex-W3ND. With the capacitance values shown connected to switch S_1 , signals will peak at about 150 cycles, 250 cycles, 500 cycles and 1000 cycles. To use the filter, plug P_1 into the receiver's phone jack and connect the headphones to jack J_1 . The headphones provide the collector load for the transistor, Q_1 , and so eliminate the need for an on-off switch. Removal of the phones turns the unit off.

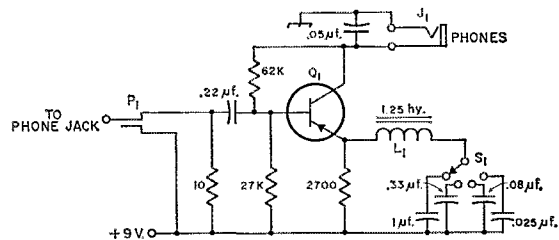


Fig. 5—Transistor c.w. filter.

Q_1 —2N466, 2N43 or equivalent.

S_1 —Single-pole, four-position rotary switch.

The circuit operates as an amplifier and is degenerative at all frequencies, except for those tuned by L_1 and the capacitors. Inductor L_1 should have as high a Q as possible and a low resistance. Its value may range from 250 mh. to as high as 2 henrys. Of course, the capacitor values will have to be changed accordingly in order to resonate at the desired frequency.

— Nicholas Lefor, *W2BIQ*

VACUUM TUBE FILE

A HANDY inventory control and locator system for junk-box vacuum tubes can be set up by utilizing the numerical tube listing in *The Radio Amateur's Handbook*. A supply of shoe boxes or any kind of small boxes is necessary to store the tubes. Mark the boxes in numerical sequence. As the tube is inventoried, mark the type in the *Handbook* list and indicate which numbered box contains the tube. As tubes are added or taken out, don't forget to mark the list accordingly!

— Dick Ackerman, *WA4FIJ*

CONSTRUCTION HINT

IF a chassis is first covered with wide draftsman tape, the marking and drilling operations will be greatly simplified. The surface is easily marked for hole positions and drills will not slip or slide. When the project is completed and the tape removed, the chassis will be clean of any marks or scratches.

— Harley L. Christ, *W9ALU*

So You Know the Q-Code?

BY J. PATRICK HAWKER,* G3VA

THE international Q-code has been kicking around for a long time now, but there is still room for better use to be made of it by the amateur fraternity. Its history stretches back almost fifty years — even longer if the “Q” is dropped. For the original Q-code, adopted internationally in 1912 at an International Radiotelegraphic Convention in London, first appeared in 1908 in the form of two-letter abbreviations in the series RA - RZ and SA - SF, devised by the British Post Office for use by ships communicating with coast stations.

Some of the 1912 code signals have stayed much the same through the years — QSA meant “your signals are strong,” and QRK was “I am receiving well.” But mostly the meaning of the various signals have changed, some more than once. The original QRL was “I am receiving badly, transmit VE twenty times so that I can adjust my apparatus.” The currently unpopular QSD then had the innocuous meaning “The time is . . .” But best known of all the 1912 signals, which were introduced “for the purpose of giving and asking for information concerning the radio telegraph service,” was the “general call to all stations” — you know it as QST!

The international Q-code has never been a static, fixed-for-all-time, code. It is regularly reviewed and revised at the conferences of the International Telecommunication Union. Thus the present official code dates only from the Geneva Conference of 1959 and covers code groups in the QR-, QS-, QT- and QU- series: these Q-signals are available to all radio services, including amateur radio. There are exactly 100.

“One hundred Q sigs” you may be thinking, “but the average amateur does not use more than about 20. What are the remaining 80 all about?”

Many of these lesser known code signals, though important for maritime working, have little application to amateur radio. Distress, urgency, search and rescue operations account for more than twenty, and are unlikely to be needed. But there is a good sprinkling of straight radio-operating Q signals which deserve to be much better known on the amateur bands than they are now, particularly for DX working where the other fellow may not know any English.

Take for example QSR. The official definition is: “Repeat your call on the calling frequency; did not hear you (or have interference).” Surely this is exactly what we often need to say when asking the DX station to give us another call. Then QSN? — “Did you hear me on . . . ke.?” — another little-heard signal but useful for the operator making a frequency change to another band or even within the same band.

At Geneva, old regulars QRM and QRN were given a face lift by the addition of a five-step code: 1, nil, 2, slightly, 3, moderately, 4, severely, 5, extremely. Thus QRM3 indicates moderate

interference, QRM1 the happy state of no interference, and QRM5 the usual shindig on 14 Mc.

Another newcomer to the list is QUE. The full definition of this is: QUE? “Can you use telephony in (language) with interpreter if necessary; if so, on what frequencies? And QUE: “I can use telephony in (language) on ke. (or Mc.)” Suppose we forget all about interpreters and use these signals to mean: QUE? “Can you use phone?” and QUE: “I can use phone” or “I can use phone on ke.” Now we have just the signals needed for adding new countries to our list of phone DXCC.

With break-in operation showing a slow but steady increase, it is surprising that more use is not made of QSK and QSI. QSK? means “Can you hear me between your signals and if so can I break in on your transmission?”; QSK “I can hear you between my signals, break in on my transmission; and QSI, “I have been unable to break in on your transmission.” These three signals thus cover all the most needed items for successful break-in operation.

The following selected list gives some of these lesser known Q signals with the official definitions freely “translated” into terms which show their immediate usefulness to amateur operating. They are all additional to the very useful list which comes from ARRL with our membership certificates, for posting up in the shack.

QRB — How far away are you? I am about miles away.

QRD — (This one for mobile working.) Where are you going and where from? I am heading for from

QRH — Does my frequency vary? Your frequency varies.

QSI — I have been trying to BK you.

QSK — Can you work BK? I can work full BK.

QSM — Shall I repeat my last transmission? Please repeat your last over.

QSN — Did you hear me on I heard you on

QSR — Shall I repeat my call? Please call again as I cannot hear you.

QSU — Shall I go ahead on this freq.? Go ahead on this freq. (or go ahead on ke.)

QTX — Will you keep listening for me? I will keep listening for you.

QUA — Have you news of? Here is the dope on

QUE — Can you work phone? I can work phone on ke.

It would take only a few operators regularly using these signals to start the ball rolling. But this should be done in a helpful spirit and not so as to spread confusion among those who have not yet latched on to these useful procedure signals. Why not give these Q signals a fair work out as one way of getting added pleasure from good c.w. operating?

QST

*37 Dovercourt Road, London S.E. 22, England.

Happenings of the Month

Comm Act Changes ARRL Files on License Fees Exam Schedule Board Meeting Minutes

CANADA OKAYS HAM BULLETINS

The Department of Transport has issued a notification to its Regional Superintendents allowing them to consider favorably requests from associations and clubs to conduct code practice sessions and send League or club bulletins over the air. Either club stations or stations sponsored by the clubs can be used for these purposes. The text of the notice follows:

Amateur Transmission of Bulletins and Code Practice

Under section 52 of the General Radio Regulations, Part II, "broadcasting" by amateur radio stations is prohibited.

Recently the Department received representations to permit the transmission by amateur club stations of code practice to supplement a course which was being conducted in amateur radio theory and operation. The question also arose with regard to permitting amateur stations to transmit bulletins originated by the A.R.R.L. and bona fide Amateur Club stations.

While the Regulations do not explicitly provide for such operations it was not intended that they should be prohibited as being within the meaning of "broadcasting" as defined in the Radio Act. It will be recalled that the old Instructions to Inspec-

tors provided that favourable consideration could be given to requests from Clubs and Associations to provide amateur station code practice transmissions. Likewise there does not appear to be any objection to the amateur station transmission of bulletins to other amateur stations. However, appropriate supervision is necessary to confine such transmissions within reasonable limits.

Therefore, Regional Superintendents, Radio Regulations, may give favourable consideration to requests on behalf of amateur radio associations or local clubs to permit their amateur stations, or amateur stations sponsored by them, to transmit code practice and bulletins or notices of interest to their members.

It is not proposed to restrict times and duration of such transmissions if they are kept within reasonable limits. However, should conflict arise which can not be resolved by the amateurs themselves, the Regional Superintendent of Radio Regulations should take whatever action he considers necessary for the orderly control of such operations."

IMPORTANT CHANGES IN COMM ACT

Congress has enacted three changes in the Communications Act of 1934 of interest and impor-

A new display has been developed at League Hq., to be used, where shipping schedules permit, at ARRL conventions. The display made its debut at the New England Division Convention, Swampscott, Mass., on April 7 and 8. Visitor W1GUC finds one of the League's publications of interest. Convention participants will be interested to learn that the official guessing-game answer was 445,544 ohms. The closest guess was 456,000 ohms, submitted by W2UZF. Other winners were K1UAB, K1LOT, K1GGI, K2KKC and W1TCH. Guesses ranged from less than an ohm through several billion ohms, and on to infinity!



tance to amateurs. The act was amended to allow early renewals of licenses in the Safety and Special Services (including, of course, the amateur service). Effective immediately, therefore, any amateur filing a change of address who indicates that he has fulfilled the renewal requirements¹ will be issued a new five-year license. Similarly, an amateur who still has two years to run on his license but is heading overseas for a three-year stretch may renew his license before he goes.

The second amendment does away with the need for a notary public signature and seal on amateur applications. Though applications which are notarized will be accepted, it is no longer necessary for FCC to return applications received without the notary seal. Both these changes are designed to reduce FCC paperwork, and thus speed up the issuance of licenses.

The third change permits FCC to levy small fines (up to \$100) on holders of Safety and Special licenses (again including amateurs) who are found to have violated the rules. Previously, the Commission had no disciplinary action available to it other than suspension or resort to federal court action. The administrative procedures to carry out the new rules still have to be set up by FCC. There will be, however, all of the usual forms of appeal should a licensee feel he is being treated unjustly. Further information on the practical application of the "Small forfeitures Act" will be reported in this department as it becomes available.

EXAMINATION SCHEDULE

THE Federal Communications Commission will give Extra and General Class amateur examinations during the second half of 1962 on the following schedule. Remember this list when you need to know when and where examinations will occur. Where exact dates or places are not shown below, information may be obtained, as the date approaches, from the Engineer-in-Charge of the district. *Even stated dates are tentative and should be verified with the Engineer as the date approaches.* No examinations are given on legal holidays. All examinations begin promptly at 9 A.M. except as noted.

Albuquerque, N. M.: October 6, 11 A.M.
 Amarillo, Texas: September 12.
 Anchorage, Alaska, 53 Federal Bldg.: By appointment.
 Atlanta, Georgia, 718 Atlanta National Building, 50 Whitehall St. S. W.: Tuesday and Friday at 8:30 A.M.
 Baltimore, Md., 415 U. S. Customhouse, Gay and Water Sts.: Monday and Friday between 8:30 A.M. and 10 A.M. and by appointment.
 Beaumont, Texas: 301 P. O. Bldg.: By appointment.
 Birmingham, Ala.: September 5, December 5, 11:00 A.M. September 5, December 5, 1 P.M.
 Boise, Idaho: Sometime in October.
 Boston, Mass., 1600 Customhouse: Wednesday through Friday 9:00 A.M. to 10 A.M.
 Buffalo, N. Y., 328 P. O. Bldg.: First and third Fridays.
 Charleston, W. Va.: Sometime in September and December.
 Chicago, Ill., 826 U. S. Courthouse: Friday.
 Cincinnati, Ohio: Sometime in August and November.
 Cleveland, Ohio: Sometime in September and December.
 Columbus, Ohio: Sometime in July and October.

¹ Two hours of operation in the last three months, or five hours in last year; code speed according to the class of license being renewed.

Corpus Christi, Texas: September 6, December 6.
 Dallas, Texas, 401 States General Life Ins. Bldg.: Tuesday.
 Davenport, Iowa: Sometime in July and October.
 Denver, Colo., 521 New Customhouse: 1st and 2nd Thursdays, 8 A.M.
 Des Moines, Iowa: Sometime in September and December.
 Detroit, Mich., 1029 Federal Bldg.: Wednesday and Friday.
 Fort Wayne, Ind.: Sometime in August and November.
 Fresno, Calif.: Sometime in September and December.
 Grand Rapids, Mich.: Sometime in July and October.
 Great Falls, Mont.: Sometime in September.
 Hartford, Conn.: September 12.
 Hilo, Hawaii: October 9, 9:30 A.M. to 4:30 P.M.
 Honolulu, Hawaii, 502 Federal Bldg.: Monday through Friday.
 Houston, Texas, U. S. Courts & Federal Office Bldg., 515 Rusk Ave., Tuesday.
 Indianapolis, Ind.: Sometime in August and November.
 Jackson, Miss.: December 5.
 Jacksonville, Fla.: October 18-19.
 Jamestown, N. D.: October 17, 10 A.M.
 Juneau, Alaska, 6 Shattuck Bldg.: By appointment.
 Kansas City, Mo., 3100 Federal Office Bldg.: Thursday and Friday, 8:30 A.M. to 11 A.M.
 Knoxville, Tenn.: September 19, December 19, 1 P.M.
 Lihue, Hawaii: October 23, 9:30 A.M. to 4:30 P.M.
 Little Rock, Ark.: August 8, November 7, 1 P.M.
 Los Angeles, Calif., 849 So. Broadway: Wednesday, 9 A.M. and 1 P.M.
 Louisville, Kentucky: Sometime in August and November.
 Memphis, Tenn.: July 11, October 3, 8:30 A.M.
 Miami, Fla., 312 Federal Bldg.: Thursday.
 Milwaukee, Wisconsin: Sometime in July and October.
 Mobile, Ala., 439 U. S. Courthouse and Customhouse: Wednesday, by appointment.
 Nashville, Tenn.: August 8, 1 P.M., November 7, 1 P.M.
 New Orleans, La., 608 Federal Office Building, 600 South St.: Monday through Wednesday, code tests Monday only at 8:30 A.M.
 New York, N. Y., 748 Federal Bldg., 641 Washington St.: Tuesday through Friday.
 Norfolk, Va., 405 Federal Bldg.: Friday.
 Oklahoma City, Okla.: July 20, October 19.
 Omaha, Neb.: Sometime in July and October.
 Philadelphia, Pa., 1005 New U. S. Customhouse: Monday through Wednesday, 8:30 A.M. to 10 A.M.
 Phoenix, Ariz.: Sometime in July and October.
 Pittsburgh, Pa.: Sometime in August and November.
 Portland, Maine: October 9.
 Portland, Ore., 201 U. S. Courthouse: Friday, 8:45 A.M.
 Roanoke, Va.: October 6.
 St. Louis, Mo: Sometime in August and November.
 St. Paul, Minn., 208 Federal Courts Bldg.: Friday, 8:45 A.M.
 Salt Lake City, Utah: September 7, December 7, 1 P.M.
 San Antonio, Texas: August 2-3, November 8-9.
 San Diego, Calif., Fox Theater Bldg.: Wednesday, by appointment.
 San Francisco, Calif., 323-A Customhouse: Friday.
 San Juan, P. R., 323 Federal Bldg.: Friday.
 San Pedro, Calif., 556 W. 5th Street, Wednesday, 8 A.M.
 Savannah, Ga., 214 P. O. Bldg.: By appointment.
 Schenectady, N. Y.: September 12-13, December 5-6, 9 A.M. and 1 P.M.
 Seattle, Wash., 806 Federal Office Bldg.: Friday.
 Sioux Falls, S. D.: September 18, December 18, 10 A.M.
 Spokane, Wash.: Sometime in October.
 Syracuse, N. Y.: Sometime in July and October.
 Tampa, Fla., Rm 201, 221 No. Howard Ave.: By appointment.
 Tulsa, Okla.: July 18, October 17.
 Tucson, Ariz.: Sometime in October.
 Wailuku, Hawaii: October 16, 9:30 A.M. to 4:30 P.M.
 Washington, D. C., 1101 Pennsylvania Ave., N. W.: Tuesday and Friday. Code test 9:30 A.M. and 1 P.M.
 Wichita, Kansas: Sometime in September.
 Williamsport, Pa.: Sometime in September and December.
 Wilmington, N. C.: December 1.
 Winston-Salem, N. C.: August 4, November 3.

NOTE: Only General Class and Amateur Extra Class license examinations are given at FCC offices and examining points listed above. All examinations for Novice, Technician and Conditional Class licenses are conducted by volunteer supervisors.

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington 25, D. C.

In the Matter of
Establishment of fees for the Com-
mission's licensing and regulatory
activities } DOCKET NO. 14507

OPPOSITION OF THE AMERICAN
RADIO RELAY LEAGUE

The American Radio Relay League, Incorporated, a non-profit corporation organized under the laws of the State of Connecticut and having as voting members more than 80,000 amateur radio operators licensed by the Federal Communications Commission, urges the Commission not to impose fees upon the Amateur, Radio Amateur Civil Emergency (RACES) and Disaster Radio Services as proposed in the Notice of Proposed Rule Making released February 16, 1962.

When the Congress enacted Section 140 of the Independent Offices Appropriation Act of 1952, which expressed the view that the many Federal agencies should be self-sustaining insofar as is possible, it recognized that there are some services rendered by agencies for which fees should not be imposed. For example, the Congress specifically exempted "those engaged in the transaction of official business of the Government" and stated that any fee must be "fair and equitable taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts." (Emphasis supplied). The Congress clearly intended that fees not be imposed upon the amateur radio service.

The Nature of the Service

Amateur radio occupies a most unique position among the services licensed by the Commission. Part 12 of the Commission's Rules defines an amateur as "a person interested in radio technique solely with a personal aim and without pecuniary interest." The amateur is self-trained and constructs, maintains and operates his equipment on his own time and at his own expense. As stated by the Commission on page 82 of its annual report for fiscal year 1961, "Public service is the keynote of amateur radio operation."

The public service record of the amateur over the years in providing emergency communication is so well known that it is mentioned only to point out once again that the amateur performs on a volunteer basis, on his own time and expense, frequently at severe inconvenience and discomfort, and sometimes at risk of personal injury and life. At the present time, more than 250 emergency networks are in existence, with an estimated 35,000 amateurs participating.

Amateur radio has played a most important part in almost every technical improvement in the radio art. The contributions of the amateur are so well known as to not require recounting. Of extreme importance, however, is the fact that the contributions have been strictly accomplished without pecuniary interest. One recent example is Project OSCAR (Orbital Satellite Carrying Amateur Radio) which successfully placed in orbit late in 1961 an amateur radio transmitter and which, in the immediate future, will place additional amateur transmitters in orbit.

Amateur radio is a prime source of personnel for the electronics industry. A very high percentage of yesterday's and today's leaders in the field chose electronics as a career because of an early interest, usually in the teens, and self-training through amateur radio. The leadership of the United States in the electronics field derives to a considerable extent from what may be termed "the amateur spirit in research" — the thorough devotion to one's work which the amateur acquires early and carries through his career when employed in the professional field.

Amateur radio is a prime source of skilled personnel for the defense services in time of national emergency. Each of the services supports and encourages amateur radio as a basic policy.

These services, and many others, each rendered on behalf of the general public without remuneration or other compensation other than the pride of accomplishment, are in themselves good and sufficient reasons to exempt the amateur radio service from the imposition of a license fee payable to the Government of the people the amateurs serve.

Amateur Radio is Exempt

As noted above, Section 140 of the Independent Appropriation Act of 1952 specifically exempts "those engaged in the transaction of official business of the Government." The amateur service is unique in that it voluntarily and at



The ARRL Board of Directors and League officials at their meeting in Hartford on May 11. Seated, left to right: West Gulf Director Best, Delta Director Teetson, Southwestern Director Meyers, Pacific Director Engwicht, First Vice President Groves, Northwestern Director Roberts, Dakota Director Compton, Midwest Director Denniston, Vice President and Communications Manager Handy, General Counsel Booth, retiring President Dosland, General Manager Huntoon, Assistant Secretary Williams, Treasurer Houghton, Vice President Reid, Canadian Director Eaton, New England Director Chaffee, Rocky Mountain Director Smith, Great Lakes Director Cartwright, Atlantic Director Crossley, Central Director Doyle and Hudson Director Kahn. Standing, left to right: Southwestern Vice Director Shepherd, Technical Director Grammer, Southeastern Director Born, Roanoke Director Anderson, Hudson Vice Director Dannels, Central Vice Director Haller and New England Vice Director Green.

its own expense provides numerous services for, on behalf of, and at no cost to the Commission, which otherwise would be provided at most substantial expense to the Government. In proposing a schedule of fees for the amateur service, the Commission obviously overlooked the many and most valuable unique services rendered by amateurs.

Conduct of Examinations

With the continued growth of amateur radio, and the heavy upswing in the last few years of applications brought about by the establishment of the Novice and Technician Classes of amateur authorizations and the increased interest in science and technology, the Commission's workload and expense in supervising and conducting the required examinations, both the code test and the written portions on theory and the law, became crucial. In cooperation with the League, the Commission adopted procedures delegating to any amateur 21 years or older holding a General Class (or higher) license authority to supervise and administer both the code and written tests for applicants for Novice and Technician Class licenses. As the result, examinations for these classes no longer are conducted at Commission offices and field examination points. When consideration is given to the fact that approximately half of all amateur examinations are for Novice, Technician and Conditional Class licenses, it is obvious that the Commission, the Government and the general public have been saved tens and indeed, hundreds of thousands of dollars over the last ten years. Thus, the amateur service actually is "engaged in the transaction of official business of the Government."

Self-policing

The amateur service has an outstanding record in the field of self-enforcement of the Commission's rules, the Communications Act of 1934, and international treaties. In no small measure this derives from the establishment by the League many years ago of a corps of volunteer Official Observers, who spend much of their time monitoring the amateur bands and advising stations, either by direct radio contact or by mail, when major or even minor infractions are observed. Thus, for many years the Commission has been able to conduct its supervisory and monitoring responsibilities with fewer personnel and at less cost to the Government than would have been required if close attention to the amateur service had been required. Because this procedure has existed for so many years, this aspect of the amateur service helping to pay its own way may not always be fully appreciated in the examination of regulatory costs.

Interference Committees

The Commission has the responsibility for the investigation and solution, insofar as possible, of mutual interference problems between the services under its jurisdiction. Particularly with the advent of the television broadcast service, interference problems compounded to the point where, if normal measures had been employed, the Commission would have been put to great expense in administration of such matters. The amateur service, and the League, in cooperation with the Commission, established "TVI" (television interference) committees on a community basis to investigate and correct interference problems. More than 600 of these committees have been established, organized and staffed largely by amateurs under Commission sponsorship. Their work is not limited to interference from amateur stations but includes all other radio services, including the recently reactivated Citizens Service, as well as electrical and industrial equipment and systems. The results have been outstanding. Thus, on a purely volunteer basis, the amateur service has relieved the Commission of an unmeasurable amount of investigative work. The savings in dollars to the Commission and the Government has been and continues to be most substantial.

RACES

Another service which the amateur provides for the Government is RACES (Radio Amateur Civil Emergency Service). In order to be prepared for any eventuality, the Commission and the Office of Civil and Defense Mobilization, in collaboration with the League, have promulgated RACES. It is a temporary amateur service, intended primarily to serve civil defense and provide emergency communications during any extreme national emergency, such as an armed attack upon the United States. During peace-

time, the amateurs participating in RACES constantly are training for any possible emergency. All of the time and much of the equipment of the participating amateurs are provided at no cost to the Government.

Disaster Service

The Disaster Service, to a large extent, is built upon amateur radio and is the newest of the three services here under consideration. Although the growth and development of this service has not been as rapid as anticipated and desired by the Commission and the League, the imposition of fees will severely retard its further development.

The Public Interest Would Be Adversely Affected

Section 303 (g) of the Communications Act directs the Commission, as the "public convenience, interest or necessity requires", to "Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest." The imposition of fees upon the amateur radio service would defeat the basic objectives of Section 303 (g).

A very high percentage of applicants for original authorization in the amateur radio service are of high school and college age and have very limited financial resources for the purchase of the parts and equipment necessary to communicate with other amateurs. Many others are handicapped persons and shut-ins. Because many have limited resources, the imposition of any fee will result in a significant decrease in the number of applications from persons who otherwise would join the amateur ranks. Thus, the basic objectives of the Communications Act and the civil and defense agencies in encouraging and sponsoring amateur radio would be largely nullified.

Although the proposal is to impose a fee of \$5.00 for each amateur application filed with the Commission, the actual burden upon a newcomer to the amateur ranks would be far greater. When the Commission created the Novice and Technician Classes, it expected that most persons would enter the amateur ranks through one of these classes. That expectation has been fulfilled. An applicant taking the Novice route to amateur radio would be charged at least \$10.00, the second \$5.00 for his subsequent examination for a permanent grade, as a Novice license cannot be held for more than one year and is not renewable. In an extreme case, fees might cost an amateur \$35.00 or more within a year's time — e.g., (1) he fails an exam; (2) he qualifies for Novice; (3) he moves up to Technician; (4) he moves up to Conditional or General; (5) he changes address to another location; (6) he participates in RACES; and (7) he participates in the disaster service. The military man, the student away from home, and others on the move could be penalized even more severely. The end result will be to substantially reduce the number of persons entering amateur radio, thereby defeating the basic objectives of amateur radio which have led all Government agencies and organizations, Federal, State and local, to support and encourage the growth of amateur radio.

Other Matters

Section 140 of the Independent Offices Appropriation Act directs the Commission to consider the "value to the recipient" of any license authorized. Many, and indeed most, of the services have ceilings upon the number of stations which may be authorized. As the result, licenses have substantial value. In the amateur service, however, there is no ceiling or limit upon amateur authorizations, with the result that an amateur license has no intrinsic "value to the recipient." The value of an amateur license is to the public through the public service which may and will be offered under the license.

The first sentence of Section 140 refers to "any work, service, publication, report, document, permit, certificate, registration, or similar thing of value or utility performed, furnished, provided, granted, prepared or issued by any Federal Agency." (Emphasis supplied). The very language clearly shows that the Congress intended that the imposition of fees and other charges is to be limited to commercial activities and enterprises. Once again, it is apparent that the Congress did not intend that fees or charges of any kind be imposed upon the amateur radio and allied services.

A further illustration of the manner in which the League has reduced the workload of the Commission is the suggestion that League members forward their comments on the instant fee proposal to the League for consideration in pre-

paring the League's comments rather than directly to the Commission. As shown by Appendices A and B, attached hereto, more than 610 amateurs and 145 affiliated clubs have urged the League to oppose the fee proposal.

Conclusions

The amateur radio service is unique in many ways. As the Commission stated in its last annual report, "Public Service is the keynote of amateur radio operation." The policy of the United States Government, both domestically and internationally, always has been to encourage and support amateur radio. The imposition of fees and charges upon amateur radio would be the first action ever taken by any agency which would have the practical effect of discouraging and retarding the growth of amateur radio. The general public receives so many benefits from amateur radio that any action which would have an adverse effect upon amateur radio would have an adverse effect upon the public interest. For the reasons stated above, the Commission is urged not to impose fees and charges upon amateur radio.

Respectfully submitted,

THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED
By ROBERT M. BOOTH, JR.
Its General Counsel

1735 DeSales Street, N.W.
Washington, D. C.

May 16, 1962

MINUTES OF 1962 ANNUAL MEETING OF THE BOARD OF DIRECTORS

The American Radio Relay League, Inc.
May 11, 1962

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Shoreham Hotel, Hartford, Connecticut, on May 11, 1962. The meeting was called to order at 9:35 A.M. EDT, with President Goodwin L. Dosland in the Chair and the following directors present:

P. Lanier Anderson, Roanoke Division
Roemer O. Best, West Gulf Division
James P. Born, jr., Southeastern Division
Dana E. Cartwright, Great Lakes Division
Milton E. Chaffee, New England Division
Charles G. Compton, Dakota Division

Gilbert L. Crossley, Atlantic Division
Robert W. Denniston, Midwest Division
John G. Doyle, Central Division
Noel B. Eaton, Canadian Division
Harry M. Engwicht, Pacific Division
Morton B. Kahn, Hudson Division
Raymond E. Meyers, Southwestern Division
R. Rex Roberts, Northwestern Division
Carl L. Smith, Rocky Mountain Division
Floyd C. Teetson, Delta Division

Also in attendance, as members of the Board without vote, were Wayland M. Groves, First Vice President; Alex Reid, Vice President; F. E. Handy, Vice President; John Huntoon, General Manager. Also in attendance, at the invitation of the Board as nonparticipating observers, were Hudson Division Vice Director Harry J. Dannels, New England Division Vice Director Bigelow Green, Central Division Vice Director Philip E. Haller and Southwestern Division Vice Director Howard F. Shepherd, Jr. There were also present Treasurer David H. Houghton, General Counsel Robert M. Booth, jr., Technical Director George Grammer and Assistant Secretary Perry F. Williams.

2) Moved, by Mr. Roberts, that the Minutes of the 1961 Annual Meeting of the Board of Directors be approved in the form in which they were issued by the Secretary. Mr. Meyers noted that the Minutes had failed to record his objection to the report of the Committee for the Revision of the Articles of Association and By-Laws, wherein several proposals attributed to Mr. Meyers were in fact not solely his. The Chair RULED that Mr. Meyers' objection should be entered in the 1961 Minutes. Thereupon the Minutes were unanimously APPROVED.

3) On motion of Mr. Denniston, unanimously VOTED that the Annual Reports of the Officers to the Board of Directors are accepted and the same placed on file.

4) Mr. Chaffee, as Chairman, read the report of the Finance Committee. Mr. Crossley, as Chairman, stated that the Planning Committee had no assignments and therefore no report. Mr. Meyers, as Chairman, read the report of the Membership and Publications Committee. At the request of Mr. Cartwright, as Chairman, Mr. Smith read the report of the Public Relations Committee. At the request of Mr. Groves, RULED by the Chair that the report of the Merit and Awards Committee is deferred until later on the agenda. Mr. Kahn, as Chairman, read the report of the Housing Committee.

5) On motion of Mr. Teetson, unanimously VOTED that the Annual Reports of the Directors to the Board of

A MESSAGE FROM OUR PRESIDENT

One of the greatest honors that can come to any radio amateur is to serve as President of the American Radio Relay League. I most deeply appreciate this honor.

Amateur radio has had a unique history of public service. Since its earliest days, almost half a century ago, it has contributed a steady stream of breakthroughs in radio communications, many of them of major significance. It has furnished untold thousands of key personnel to our armed services in times of national emergency. It has helped immeasurably in periods of local disaster to save lives and alleviate suffering. And it has made many other contributions toward the public welfare — always on a voluntary basis and without financial reward of any sort. It is a record of which we may all be proud.

The future will bring many interesting challenges to amateur radio — and undoubtedly many difficult problems, too. But I am confident we can meet them successfully if we will continue to dedicate ourselves in the future, as we have in the past, to the ideal of performing a real and useful public service.



Herbert Hoover, jr., W6ZIH

Directors are accepted and the same placed on file.

6) At this point, supplementary oral reports were rendered by the officers of the League.

7) Moved, by Mr. Crossley, that a new section be added after Section 35 of the present By-Laws to read: "All standing committees shall have the power to originate recommendations to the Board." After discussion, the yeas and nays being ordered, the question was decided in the affirmative. Whole number of votes cast, 16; necessary for adoption, 11; yeas, 16; nays, 0. All the directors voted in favor. So the By-Law was ADOPTED.

8) Moved, by Mr. Crossley, for conformity, to delete the special provision in the present By-Law 35 giving power to the Public Relations Committee to originate recommendations to the Board. The yeas and nays being ordered, the question was decided in the affirmative. Whole number of votes cast, 16; necessary for adoption, 11; yeas, 16; nays, 0. All the directors voted in favor. So the By-Law was AMENDED.

9) On motion of Mr. Doyle, unanimously VOTED that General Manager Huntoon is directed to attend the dedication of the new amateur radio station at the headquarters of the International Telecommunications Union in Geneva in June of 1962.

10) On motion of Mr. Denniston, unanimously VOTED (Mr. Eaton abstaining) that the League file comment in Docket 14507 opposing any fees for amateur license applications.

11) Moved, by Mr. Roberts, to stay further action on the proposed new headquarters building in Newington pending full investigation of moving our headquarters nearer the geographic center of the United States. But there was no second, so the motion was lost.

12) Moved, by Mr. Engwicht, that the ARRL adopt the ICAO phonetic alphabet to be the official ARRL alphabet. But there was no second, so the motion was lost.

13) On motion of Mr. Smith, unanimously VOTED that the Board commend the General Manager, the General Counsel and the Executive Committee for their efforts in the preparation of the petition to the FCC concerning amateur radio operation on frequencies between 1800 and 2000 kc., and that the General Manager be instructed that all efforts to regain additional frequencies are to be continued.

14) Moved, by Mr. Meyers, to appoint a committee to consider an adjustment in the salary of our General Manager, and to report their findings prior to adjournment. After discussion, on motion of Mr. Crossley, unanimously VOTED that the matter is laid on the table.

BOARD THANKS VOLUNTEER A.R.R.L. OFFICIALS

In reviewing the work of the League for the past year the ARRL Board of Directors again found that much of our progress is due to the volunteer efforts of elected and appointed officials in the administrative and field organization of our association. By unanimous action the Board has again expressed its sincere thanks to the Vice-Directors, assistant directors, SCMs, SECs and QSL Managers — an action which we know all amateurs will heartily endorse.

15) Moved, by Mr. Best, to amend Article 7 of the Articles of Association to read as follows: "During the intervals between meetings of the Board of Directors, the affairs of the corporation shall be administered by an Executive Committee consisting of the President, the First Vice President, the General Manager and four members of the Board of Directors to serve for fixed terms between regular meetings of the Board of Directors." After discussion, on motion of Mr. Compton, unanimously VOTED that the matter is laid on the table.

16) On motion of Mr. Best, after discussion, unanimously VOTED that a Section Emergency Coordinator, in order to qualify for reimbursement of expenses incurred by attendance under the regular rules at an official ARRL convention, must have submitted regulation reports (on Form 8) for his

section to the National Emergency Coordinator for the month prior to the convention and in not less than sixty per cent of the months during the previous half year, provided, however, that this shall not bar reimbursement for an SEC attending a director-called officials meeting, nor prohibit the reimbursement of newly appointed SFCs for their attendance within the normal rules for such.

17) The Board was in recess from 10:42 A.M. to 10:55 A.M.

18) On motion of Mr. Engwicht, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1962 in the proper administration of ARRL affairs in their respective divisions, up to amounts as follows:

Canadian Division Director.....	\$1500
Atlantic Division Director.....	2400
Central Division Director.....	2600
Dakota Division Director.....	800
Delta Division Director.....	1500
Great Lakes Division Director.....	1700
Hudson Division Director.....	2000
Midwest Division Director.....	900
New England Division Director.....	1000
Northwestern Division Director.....	1500
Pacific Division Director.....	2400
Roanoke Division Director.....	750
Rocky Mountain Division Director.....	1500
Southeastern Division Director.....	2300
Southwestern Division Director.....	2300
West Gulf Division Director.....	2000

19) On motion of Mr. Compton, unanimously VOTED that, to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1962 a total amount not to exceed \$12,500 under terms prescribed by the Communications Manager following the general pattern established by the Board.

20) On motion of Mr. Born, unanimously VOTED that, to continue the Board's policy of reimbursing Section Emergency Coordinators for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1962 a total amount not to exceed \$7500, under terms prescribed by the Communications Manager following the general pattern established by the Board.

21) On motion of Mr. Roberts, unanimously VOTED that the General Manager is hereby authorized to pay, during the period between January 1, 1963, and the 1963 meeting of the Board, expenses against usual authorizations for administrative and committee operations in no greater amounts than 1962 authorized amounts.

22) On motion of Mr. Chaffee, after discussion, unanimously VOTED that the General Manager is authorized to transfer to the Building Fund, temporarily, such cash operating funds as may be necessary to cover initial costs of building construction if the Building Fund contributions should not keep pace with building construction commitments.

23) On motion of Mr. Meyers, after discussion, unanimously VOTED that the League proceed with a ten-year index for QST which is to be sold at a fixed fee of twenty-five cents per copy.

24) On motion of Mr. Meyers, after discussion, unanimously VOTED that the League proceed with the publication of a VHF handbook to be sold at a nominal price based on cost figures to be determined by the General Manager.

25) Moved, by Mr. Meyers, that the Board consider the advisability of a Beginner Handbook entitled "The Gateway to Amateur Radio" for publication in lieu of four publications now making up this package. But, after discussion, the motion was unanimously REJECTED.

26) On motion of Mr. Cartwright, unanimously VOTED to adopt the report of the Public Relations Committee.

27) On motion of Mr. Groves, unanimously VOTED to adopt the report of the Merit and Awards Committee, and continue the committee for another year.

28) On motion of Mr. Kahn, unanimously VOTED to adopt the report of the Housing Committee.

29) On motion of Mr. Kahn, unanimously VOTED to accept the lowest bid for construction of the headquarters building, providing this is satisfactory to the architects;

otherwise, the second lowest bid; and, in any event, to require a performance bond.

30) On motion of Mr. Anderson, the following resolution was unanimously ADOPTED:

RESOLVED, that the Pension Plan of the League as adopted by the Board of Directors at its 1947 meeting is amended for present employees, but not those receiving benefits under the existing retirement plan, by converting retirement funding to a Deposit Administration Contract, transferring accumulated values to such Deposit Administration Fund and thereafter terminating the present Trust Agreement for such employees; by the continuance of life insurance benefits through a group plan instead of present individual policies; and by recomputing retirement income on a basis of 1 1/4 per cent of present compensation for each year of accredited past service and 1 1/4 per cent for each year of accredited future service.

31) On motion of Mr. Roberts, unanimously VOTED that, pursuant to the terms of the Trust Agreement for the Pension Plan, the following persons are appointed to serve as a Pension Committee from June 2, 1962, to June 2, 1963: George Grammer, David H. Houghton, John Huntton.

32) The Board recessed for luncheon at 11:43 A.M., reconvening at 1:46 P.M. with all directors and other persons hereinbefore mentioned in attendance.

33) On motion of Mr. Compton, unanimously VOTED to take from the table Mr. Best's motion for the amendment of Article 7 of the Articles of Association. With unanimous consent, Mr. Best withdrew his motion. Moved, by Mr. Best, to amend Article 7 of the Articles of Association to substitute the following for the first two sentences of Article 7: "During the intervals between meetings of the Board of Directors, the affairs of the corporation shall be administered by an Executive Committee consisting of the President, the First Vice President and the General Manager. The Board of Directors, in its discretion, may also appoint from amongst its members not more than four additional members of the Executive Committee to serve for fixed terms between regular meetings of the Board of Directors." After extended discussion, the yeas and nays being ordered, the question was decided in the affirmative. Whole number of votes cast, 16; necessary for adoption, 12; yeas, 14; nays, 2. All the directors voted in the affirmative except Messrs. Cartwright and Chaffee. So the article was AMENDED.

34) On motion of Mr. Born, unanimously VOTED that the Board now proceed to the election of four additional members of the Executive Committee. On motion of Mr. Best, unanimously VOTED that John G. Doyle is appointed to the Executive Committee. On motion of Mr. Engwicht, unanimously VOTED that Noel B. Eaton is appointed to the Executive Committee. On motion of Mr. Anderson, unanimously VOTED that Robert W. Denniston is appointed to the Executive Committee. On motion of Mr. Born, unanimously VOTED that Morton B. Kahn is appointed to the Executive Committee.

35) At this point, the Chair announced the following committee appointments for the coming year:

Finance Committee:	Mr. Chaffee, Chairman Mr. Doyle Mr. Best
Planning Committee:	Mr. Meyers, Chairman Mr. Compton Mr. Crossley
Membership and Publications Committee:	Mr. Born, Chairman Mr. Teetson Mr. Cartwright
Public Relations Committee:	Mr. Doyle, Chairman Mr. Eaton Mr. Smith
Merit and Awards Committee:	Mr. Groves, Chairman Mr. Roberts Mr. Engwicht

36) On motion of Mr. Compton, unanimously VOTED that the President again appoint a Housing Committee. Whereupon the President named Mr. Kahn, Chairman, Mr. Anderson and Mr. Compton.

37) On motion of Mr. Roberts, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of ARRL committees during the year 1962, but not to exceed amounts as follows:

Planning Committee	\$1500
Finance Committee	500
Membership and Publications Committee	1000
Merit and Awards Committee	400

OFFICERS' REPORTS AVAILABLE TO MEMBERS

Each year the officers of the League make comprehensive written reports to the directors. The Board has made these reports available to interested members, in a volume which also includes reports of the directors. The cost price is 75 cents per copy, postpaid. A copy of the financial statement only is available without charge. Address the General Manager at West Hartford, Conn.

Housing Committee	750
Public Relations Committee	1000

38) On motion of Mr. Meyers, unanimously VOTED that the General Manager is hereby authorized to reimburse the Southeastern Division Director \$20.93, and the West Gulf Division Director \$45.25, as additional expense for the year 1961.

39) On motion of Mr. Meyers, unanimously VOTED (Mr. Eaton abstaining) that the League file comment in Docket 14610 in support of the proposal to delete the present special power limitation in the 420-Mc. band, except in certain restricted areas.

40) On motion of Mr. Smith, unanimously VOTED that the Board extends its deep appreciation to Senator Barry Goldwater and Representative Elford A. Cederberg, and their staffs, for their efforts toward reciprocal licensing privileges.

41) On motion of Mr. Born, unanimously VOTED that the Board go on record as commending the Field Engineering and Monitoring Bureau, and the Public Safety and Amateur Division, of the Federal Communications Commission for assistance and cooperation rendered amateurs over the past year.

42) On motion of Mr. Smith, unanimously VOTED that the Board hereby expresses its sincere thanks and deep appreciation for the untiring work and devotion of the vice directors, assistant directors, SCMs, SECs and QSL managers of the League.

43) On motion of Mr. Smith, after discussion, unanimously VOTED that, until the next annual meeting of the Board of Directors, the vice director of each division may be reimbursed for expenses incurred in performing duties on behalf of the League, provided (1) each duty or series of duties shall have been specifically authorized in writing by his director prior to their performance, and (2) such expenditures, when added to the other authorized expenditures of the director, do not exceed the amount budgeted for that division by the Board of Directors.

44) On motion of Mr. Cartwright, after discussion, unanimously VOTED that the Board sanctions the holding of a national convention in Cleveland, Ohio, October 4-6, 1963.

45) On motion of Mr. Crossley, unanimously VOTED that Item 26 of the Minutes of the 1959 meeting of the Board, covering publication of Board committee reports in QST, refers only to standing committees and not special committees.

46) On motion of Mr. Anderson, unanimously VOTED that this Board ratifies the action of the Executive Committee in the selection of legal counsel and congratulates the Executive Committee in its choice.

47) On motion of Mr. Born, after extended discussion, unanimously VOTED to refer to the Planning Committee the question of technician class operation on the 28-megacycle band.

48) Moved, by Mr. Teetson, that in an effort to improve the ratio of new League members to new licensees, information regarding the name and address of new licensees be furnished the secretary of the affiliated club in the area of the new licensee at convenient intervals. After discussion, on motion of Mr. Doyle, unanimously VOTED to amend the motion to provide that this information will be made available to division directors upon request. The question then being on the motion as amended, the same was unanimously ADOPTED. During the course of the above action, the Board was in recess from 2:50 P.M. to 2:55 P.M.

49) On motion of Mr. Compton, VOTED, 8 votes in favor to 5 opposed, to reconsider the appointment of Mr. Eaton to the Executive Committee. On motion of Mr. Compton, VOTED, 8 votes in favor to 4 opposed, to reconsider the appointment of Mr. Doyle to the Executive Committee. On motion of Mr. Compton, VOTED to reconsider the appointment of Mr. Kahn to the Executive Committee. On motion of Mr. Compton, VOTED, 9 votes in favor to 5 opposed, to reconsider the appointment of Mr. Denniston to the Executive Committee. On motion of Mr. Compton, unanimously VOTED to elect, by secret ballot, from a common slate of nominations, four directors to the Executive Committee. Whereupon Mr. Roberts nominated Mr. Eaton; Mr. Best nominated Mr. Doyle; Mr. Crossley nominated Mr. Kahn; Mr. Anderson nominated Mr. Denniston; Mr. Teetson nominated Mr. Meyers. On motion of Mr. Cartwright, unanimously VOTED that the nominations are closed. The President appointed Messrs. Houghton and Reid as Tellers. The Tellers announced the result of the balloting as follows:

Mr. Eaton — 15
 Mr. Doyle — 10
 Mr. Kahn — 16
 Mr. Denniston — 16
 Mr. Meyers — 7

Whereupon the Tellers declared Noel B. Eaton, John G. Doyle, Morton B. Kahn and Robert W. Denniston elected as members of the Executive Committee.

50) On motion of Mr. Meyers, unanimously VOTED to take from the table his motion to consider an adjustment in the salary of the General Manager. At the request of the Board, Headquarters personnel left the meeting. The Chair appointed Robert W. Denniston as temporary secretary of the meeting. On motion of Mr. Crossley, unanimously VOTED, at 3:15 p.m., that the Board does now resolve itself into a Committee of the Whole. The Committee rose and reported at 3:32 p.m., Headquarters personnel returned to the meeting, and Mr. Huntoon resumed recording. With unanimous consent, the Chair announced that the recommendation of the Committee was unanimously ADOPTED.

51) Mr. Meyers introduced Southwestern Division Director Howard F. Shepherd, jr., and spoke in praise of his excellent effort as volunteer legal counsel for division amateurs in cooperation with General Counsel Booth. (Applause)

52) Moved, by Mr. Engwicht, that the proposed manual for directors and prospective directors be referred to the Membership and Publications Committee at this time. But there was no second, so the motion was lost.

53) On motion of Mr. Roberts, unanimously VOTED that F. E. Handy and David H. Houghton are appointed special members of the Executive Committee to serve until the next annual meeting of the Board.

54) On motion of Mr. Denniston, unanimously VOTED that the Board commend the Oscar Association for its remarkable achievements in behalf of amateur radio in successfully promoting the idea for, building, and correlating tracking information from the first privately constructed satellite ever orbited.

55) Moved, by Mr. Denniston, that a committee be appointed to study suggestions concerning the use of the high-frequency end of the fourteen megacycle band. But, after discussion, the motion was REJECTED.

56) On motion of Mr. Born, affiliation was unanimously GRANTED to the Georgia Single Sideband Association.

57) Moved, by Mr. Denniston, that, in view of recommendations made to several directors by individual amateurs, clubs and associations, the Board rescind its action taken at the 1961 annual meeting regarding the use of 14,335-14,350 kc. by U. S. amateurs, and that the President appoint a committee to review the whole matter. Moved, by Mr. Doyle, to amend the motion to delete the provision for an appointment of a committee; but the motion to amend was rejected. The question then being on the original motion, the same was unanimously ADOPTED. Whereupon the Chair appointed Mr. Denniston Chairman, and Messrs. Eaton and Meyers as members of the committee.

58) The Chair announced the opening of nominations for President. Mr. Doyle nominated Mr. Dosland. Mr. Dosland spoke briefly in appreciation, and of his pride in and satisfaction with the accomplishments of the League during his tenure, but regretfully announced that he was obliged to decline the nomination because of heavy demands from his

law practice. Mr. Kahn nominated Herbert Hoover, jr. On motion of Mr. Roberts, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot electing Mr. Hoover as president for the new term.

59) At this point, Vice President Groves assumed the Chair. On motion of Mr. Cartwright, the following resolution was unanimously ADOPTED:

BE IT KNOWN, that the Board of Directors of The American Radio Relay League, Inc., in meeting assembled on the eleventh day of May in the year of 1962 A.D., does recognize and appreciate the many years of most distinguished and dedicated service rendered by its President, Goodwin L. Dosland, WØTSN, and in commemoration of this service, upon his retirement from such office, does hereby honor his achievements, guidance and counsel and commends him most highly as one who has faithfully and continuously acted with confidence in all matters affecting the League and the radio amateur fraternity at large. (Applause)

60) On motion of Mr. Doyle, unanimously VOTED that the retiring President is invited to attend the dedication of the new headquarters building in Newington.

61) On motion of Mr. Crossley, unanimously VOTED that the title of President Emeritus is conferred on Goodwin L. Dosland.

62) At this point, Mr. Dosland resumed the Chair, and announced the opening of nominations for First Vice President. Mr. Best nominated Mr. Groves. On motion of Mr. Roberts, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot electing Mr. Groves as First Vice President for the new term.

63) The Chair announced the opening of nominations for additional vice presidents. Mr. Crossley nominated Mr. Reid. On motion of Mr. Denniston, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot electing Mr. Reid as a Vice President for the new term. Mr. Born nominated Mr. Handy. On motion of Mr. Denniston, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot electing Mr. Handy as Vice President for the new term.

64) The Chair announced the opening of nominations for Secretary. Mr. Meyers nominated Mr. Huntoon. On motion of Mr. Teetson, unanimously VOTED that nominations are closed and that the Secretary cast one ballot electing Mr. Huntoon as Secretary for the new term.

65) The Chair announced the opening of nominations for Treasurer. Mr. Compton nominated Mr. Houghton. On motion of Mr. Roberts, unanimously VOTED that the nominations are closed and that the Secretary cast one ballot electing Mr. Houghton as Treasurer for the new term.

66) At this point, Messrs. Shepherd, Green, Haller and Dannels, vice directors, expressed their appreciation for being invited to attend the meeting. (Applause)

67) On motion of Mr. Eaton, unanimously VOTED that the Executive Committee, with the advice and consent of the General Counsel, consider the appointment of a General Counsel in Canada.

68) Whereupon, on motion of Mr. Roberts, the Board adjourned *sine die* at 4:41 p.m. EDST.

69) (Time in session, as a Board, 4 hours, 28 minutes; as a Committee of the Whole, 17 minutes; total authorizations, \$52,745.25.)

JOHN HUNTOON
 ROBERT W. DENNISTON
Secretaries

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 286

May 10, 1962

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the headquarters office of the League in West Hartford, Connecticut, at 2:10 p.m., May 10, 1962. Present; President Goodwin L. Dosland, in the Chair; First Vice President W. M. Groves; Directors Robert W. Denniston, John G. Doyle, Morton B. Kahn and Ray E. Meyers; General Manager John Huntoon; Vice President F. E. Handy and Treasurer David H. Houghton. Also present were Vice President Alex Reid and Directors R. O. Best, James P. Born, jr., Milton E. Chaffee, Gilbert L. Crossley, Noel B. Eaton, Harry M. Engwicht, Carl L. Smith and Floyd C. Teetson.

On motion of Mr. Doyle, unanimously VOTED to ap-

prove the holding of a Michigan State Convention at Saginaw on March 15-17, 1963.

On motion of Mr. Meyers, affiliation was unanimously GRANTED to the following societies:

- Caney Valley Radio Club Caney, Kansas
- Chuburban Radio Mobileers, Inc. Chicago, Illinois
- The Cleveland Amateurradio Convention, Inc.
Cleveland, Ohio
- Copper Country Radio Amateur Association
Calumet, Michigan
- Delta Radio Club Whitehaven, Tennessee
- Desert Radio Amateur Transmitting Society
Palm Springs, California
- Dividing Ridge Amateur Radio Club
Cresson, Pennsylvania
- Ellsworth Amateur Wireless Association Ellsworth, Maine
- Ernest Harmon Air Force Base Amateur Radio Club
New York, New York
- Everglades Amateur Radio Club, Inc. Homestead, Florida
- First State Amateur Radio Club Wilmington, Delaware
- Golden Crescent Amateur Radio Club, East Bernard, Texas
— HP — Amateur Radio Club Palo Alto, California
- Knox County Amateur Radio Club Rockland, Maine
- The Hamburg Amateur Radio Club Hamburg, New York
- Lake Huron Amateur Radio Club Bad Axe, Michigan
- Long Island Tri-Banders Amateur Radio Club
Massapequa, New York
- Martin Amateur Radio Club Denver, Colorado
- Midland High School Amateur Radio Society
Midland, Michigan
- Milton Amateur Radio Club Milton, Pennsylvania
- Minuteman Amateur Radio Club
Burlington, Massachusetts
- Monterey Park Amateur Radio Club
Monterey Park, California

- North Shore Radio Association, Inc. Lynn, Massachusetts
- O.U. Radio Club Athens, Ohio
- Oregon Trail Amateur Radio Club Fairbury, Nebraska
- Queens College Amateur Radio Society
Flushing, New York
- The Saturday Knights of the Round Table Texas
- Sun City Amateur Radio Club Sun City, Arizona
- Thomasville Amateur Radio Club, Inc.
Thomasville, Georgia
- Tioga Amateur Radio Association
Owego, Tioga County, New York
- Veterans Administration Radio Amateur Club
Washington, D. C.
- Walton Radio Association Walton, New York
- Western Pennsylvania Mobileers, Pittsburgh, Pennsylvania
- Williams County Amateur Radio Club Bryan, Ohio
- Wilderness Road Amateur Radio Club, Danville, Kentucky
- Biscayne Amateur Radio Club Miami, Florida
- Virginia Highlands Amateur Radio Club Dublin, Virginia
- Tel. Co. Amateur Radio Club of Manhattan
New York, New York

The Committee was in recess from 2:51 P.M. to 3:05 P.M., at which time the meeting was joined by Mr. Clark of the firm of Jeter & Cook, architects.

Mr. Kahn, as chairman of the Housing Committee, proceeded to open the bids for construction of the new headquarters office building. After discussion, on motion of Mr. Meyers, unanimously VOTED to recommend that the Board of Directors accept the lowest bid, subject to approval of the architects, otherwise the second lowest bid; and in any event to require a performance bond.

There being no further business, the Committee adjourned at 3:33 P.M.

JOHN HUNTOON
Secretary

Editor, QST:

The Tri-Town Radio Amateur Club, Inc., has been ARRL affiliated since March 1932, and for thirty years we have been on the receiving end of the many benefits which ARRL has contributed to the growth and organized efforts of the American radio amateur. For these many years we have received much, and in turn have given little.

Our League affiliation has always been a matter of pride, and we feel, of real benefit to us as a club group. For this reason, and since we have seldom been given the chance to do anything substantial in return, we have unanimously agreed to contribute to the Building Fund for the new League headquarters building.

It's difficult for a club which exists solely on membership dues, as most amateur clubs do, to raise funds readily, or to make commitments or pledges against limited future income. For this reason, we have adopted the annual League membership fee of \$5 as a base, and our contribution will therefore be for one membership for each of the thirty years of affiliation with ARRL. Our check has been sent under separate cover.

We sincerely trust that other ARRL affiliated clubs will follow our lead in making their contributions on a similar basis.

For the Members of
TRI-TOWN RADIO AMATEUR CLUB, INC.
D. L. Warner, W9IBC
Chairman, Board of Directors

Strays

Like to bet on long odds? Then listen to this. A service station operator asked K8CKW to say hello to an old friend that he knew in the Army in World War II, a ham with the call W6PNY, if he worked him sometime. Now K8CKW works only 40 c.w. for 15 minutes or so occasionally and even then only around 5 A.M., EST. Consider the

difference in time zone, the number of hams in the country, the number of different bands and modes, the varying propagation conditions, the many possible operating habits of W6PNY, etc., etc., and make your bet. But, despite the odds, K8CKW heard and worked W6PNY not so long ago. Pure blind luck!

ARRL NATIONAL CONVENTION

Portland, Oregon—September 1-3

From satellites to QSOs, swaps to radar picket ship tours, the 12th National ARRL convention, opening in Portland, Oregon on Saturday, September 1, will have something for everyone.

Stan Loye, K7BHI, executive chairman of the three-day convention, and his committeemen have lined up programs, demonstrations and entertainment insuring a memorable occasion for hams and their families.

An electronics exhibit will include a working model of the "Oscar" satellite and an exact duplicate of Friendship Seven.

Special advance registrations before July 15 will cost only \$1.75 for amateurs and \$2.75 for non-license holders. After July 15, registration will be \$5.75 for amateurs and \$3.75 for non-hams. Registration fee covers admission to all technical sessions, exhibit hall, dance, official business sessions and swap-shop. Ticket requests should be sent to 1962 ARRL National Convention, P. O. Box 1335, Portland 1, Oregon.

Events for the first day of the convention, Saturday, September 1, include an official welcome to Portland, technical discussions and demonstrations, and opening of the three-day swap shop for gear switchers. Saturday evening, the Royal Order of the Wouff Hong, famous amateur radio secret society, will meet for its initiation rites. There will also be technical discussions and a dance.

Sunday starts with RTTY, Novice, YL and DXCC group breakfasts. MARS officials will be on hand for a Sunday luncheon. Mobile exhibits, field strength competitions, movies and technical general interest discussions and DX-peditions reports will take place Sunday afternoon. The ARRL Forum is to be held Sunday evening, along with MARS and FCC presentations.

Monday will open with breakfasts for s.s.b., v.h.f., c.w., QCWA and mobile groups. A hidden transmitter hunt will follow. Tours of a navy radar-picket destroyer in the Portland Harbor and the Oregon Museum of Science and Industry are also planned. The afternoon will be filled with discussions of future developments, new products and a final go-around of the swap shop.

Closing the convention will be the awards banquet, Monday evening. Rear Admiral Bernard F. Roeder, Director of Naval Communications, will be the featured speaker.

Throughout the convention there will be special events for the ladies, including fashion shows, dinners, tours of world-famous Lloyd Center, and the SWOOP initiation. There will be continuous transportation to and from the convention hall and downtown headquarters hotel. A QSL card exhibit is planned. The talk-in station will be operation on 3865 and 3885 kc, plus 6 meters.

More than two-dozen special breakfasts, luncheons and dinners are scheduled: Breakfasts are \$1.50, luncheons, \$1.75 and the Awards Banquet, \$3.75. Junior ops and harmonics will have special activities to keep them interested. Unlimited side-activities are available with ocean beaches, lakes and mountain resorts just minutes away.

Condensed Program Highlights

Saturday, September 1

- Morning:** Registration
Coffee Shop QSO's
Motion Pictures
Special Features
- Afternoon:** Opening Luncheon
Official Welcome to City
A.R.R.L. Officials
Exhibit Hall and Swap Shop
Technical Discussions — Experimenters
- Evening:** Technical Topics
Dance — Entertainment
Wouff Hong Initiation

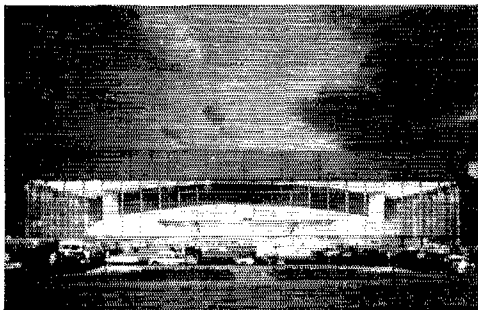
Sunday, September 2

- Morning:** Group Breakfasts — RTTY, DXCC, Ore.
Emergency Net, Novice, Y.L.
Church Services
- Afternoon:** Group Luncheons and Discussions
MARS — DXCC
Mobile Exhibit & Field Strength Competition
Exhibit Hall and Swap Shop
Movies, Technical General Interest and DX-peditions
- Evening:** Dinners, Special Interest Groups
A.R.R.L. Meeting
MARS Presentation
Federal Communications Commission
Exhibit Hall and Swap Shop

Monday, September 3

- Morning:** Group Breakfasts — S.S.B., V.H.F., C.W.,
Q.C.W.A., Mobile
Hidden Transmitter Hunt
Tour to O.M.S.I. and Radar Picket Destroyer in harbor.
C.W. Competition
Exhibit Hall and Swap Shop
- Afternoon:** Group Interest Luncheons
New Products and Future Developments
Technical Discussions and Talks
Exhibit Hall and Swap Shop
- Evening:** Awards Banquet
Featured Speaker . . . Rear Adm. Bernard F. Roeder, Director of Naval Communications

QST



JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

Hamfest Calendar

Idaho — The 30th annual WIMU Hamfest will be held Aug. 4-6 at Mac's Inn, Idaho. This meeting, taking place in the Island Park Playground Area, will feature transmitter hunts, treasure hunts, mobile and home-built equipment contests, and Saturday evening entertainment. Big free breakfast winds up things Sunday morning. Mobile monitors on 3935 and 3580 kc., and on 2 meters. Further info from WIMU, P.O. Box 85, Idaho Falls, Idaho.

Illinois — The annual CIRA picnic will be held on Sunday, July 15, at the 4-H grounds at Allerton Park, near Monticello. Bring your family, lunch, and swapping gear. No registration fee. Transmitters on 1820, 3915, and 145,350 kc. Further info from Charles A. Walters, W9QET, Box 111, Warrensburg, Ill.

Illinois — The annual Shawnee ARA hamfest will be held on Sunday, July 15, at the Sequoia State Fairgrounds. The program will include a swap table and free coffee and doughnuts. Registration \$1.50 in advance, \$2.00 at the gate. Contact Leonard Novara, W9IZE, 1418-20 Walnut, Murphysboro, Ill.

Illinois — The Quad-Co. ARC will sponsor the 5th annual hamfest of the "Breakfast Club" on July 28-29 at Terry Park near Palmyra. All other groups are invited to meet at the hamfest, giving prior notice to the hamfest committee. Square dance Saturday night. Movies for the children at 2100. Bring your own basket lunch. Sandwiches and soft drinks available on the grounds. Mobile talk-in on 3873 and 145,350 kc. from noon Saturday to 1100 Sunday. All sorts of games and contests, including golfing and fishing. Bring your swap gear. Camping facilities open from Friday afternoon until Monday morning. Pre-registration until July 15 is \$1.50, \$2.00 at the gate. Write to "Hamfest" c.o. Quad-Co. Amateur Radio Club, Box 323, Chatham, Illinois.

Indiana — The Indiana Radio Club Council hamfest will be held on Sunday, July 15, beginning at 1000. The location is Highland Park, Kokomo, Indiana. Pre-registration, before June 15, is \$1.25, or \$1.75 at the gate. Contests and prizes for all. Contact Betty Timberlake, W9LYU, 1109 Logan, Lafayette, Indiana, for pre-registration.

Indiana — The Third Annual Wide-Band F.M. Picnic sponsored by the Tri-State College Amateur Radio Club will be held on August 4, three miles northwest of Angola, Ind., at the 4-H Park on the east side of Crooked Lake starting at 10 A.M. Some of the activities include technical talks, swap and shop, ham gear auction, and many others. There is a public beach available for the XYLs and children. Meals will be available by advance registration only, for \$1.25, adults and \$.75, children (Chicken Dinners). Admission is by donation of \$1.00 in advance, or \$1.50 at the gate, XYLs and children free. Bring the family. If you are interested in f.m., don't miss it. There will be mobile check-ins on 52.525 and 146.94 (fm) and 50.25 (am). For advance registration or additional info write to Mary Tyler W8MNP/9, Tri-State College Amateur Radio Club, Angola, Indiana.

Kentucky — The Paducah Amateur Radio Club will hold its annual all day Hamfest on July 8, at Noble Park Community House in Paducah, Ky. For further info, contact E. W. Evans, K4OEN, 220 Mimosa Lane, Paducah, Ky.

Maryland — The 7th annual Graveyard Network picnic and hamfest will be held July 28 and 29, using the facilities of Aberdeen Lodge No. 1450, Loyal Order of Moose, Aberdeen, Maryland. Registration prior to July 15 is \$2.00, after that \$3.00. Banquet and dance on the 28th, \$6.00. Child's ticket for banquet, \$1.25. Program for YLs and non-hams, too. Bring your trading gear. For further info contact Steve Johnson, K3LXN, Box 145, Havre de Grace, Md.

Michigan — The Upper Peninsula Hamfest will be held on Aug. 4-5, at Munising, West Mich. No other details available.

Mississippi — The Jackson hamfest will be held July 29 at Legion Lake. No other info at hand.

Montana — The annual Glacier Waterton International Peace Park Hamfest will be held in Glacier National Park at Apgar on July 20-22. For further info, contact J. T. Woods, W7QCY, P.O. Box 866, Butte, Montana.

Nebraska — The North Platte annual Hamfest will be held on Aug. 5 at Cody Park. No other details available.

New Jersey — The East Coast VHF Society will hold its 4th annual Hamfest and Old Style Picnic on Aug. 5, at Saddle Brook Park, Saddle Brook, N. J., starting at 10 A.M. Games, Contests and displays of interest to all age groups. Free registration and parking, and soft drinks available at nominal prices. Radio facilities will be available on 2, 6, and 10 meters to assist mobilizers in readily locating the park.

New Jersey — The Central New Jersey VHF Society will hold its 2nd annual Hamfest on July 29, at Voorhees State Park, off Route 513 near Glen Gardner. Gate opens at 10 A.M., and tickets are \$2 per call. Bring a picnic lunch. Soft drinks will be provided. Transmitter hunts on 6 and 2 meters, as well as a swap shop, are on the program. For further info., contact Ken Stovel, RD #1, Martinsville, N. J.

New York — The annual ham picnic of the North Country Radio Club will be held on Sunday, July 8, at the Norfolk Rod and Gun Club, Norfolk, N.Y. Auctions, speakers, mobile talk-ins on 75, 6 and 2 meters. Bring your own lunch, or lunches and refreshments available on the grounds. The price of admission is the contribution of a piece of ham gear for the auction. More expensive items will also be sold on a commission basis. For further info contact Emerson W. Babcock, WA2HEC, Box 475, Norfolk, N.Y.

New York — The SWNYVHFA will hold its annual picnic on July 14-15 at Great Valley Fire Tower, 50 miles south of Buffalo on Route 219. No other info at hand.

Quebec — The RAQI will sponsor a picnic and hamfest on July 27-29. No other info at hand.

Tennessee — The Delta Radio Club of Whitehaven, Tenn., will sponsor its annual Hamfest in Whitehaven, Aug. 4 and 5. There will be a barbecue dinner at \$1 a plate, contests and games. Complete details in August *QST*.

Vermont — The annual International Field Day sponsored by the Burlington ARC will be held on Sunday, July 15, at the Cliffside Country Club, Burlington. Treasure hunts on 75, 10, and 2. Auction. Net meetings. Chicken barbecue. Boating, bathing, golfing, Swap shop. Early bird registration \$2.00, at the gate \$2.50. Chicken barbecue for adults \$1.75, children 75c. Contact E. A. Berteau, 333 Dorset St., So. Burlington, Vt.

Virginia — The Shenandoah Valley Amateur Radio Club, Inc. of Winchester, Va., will hold its annual Hamfest on August 4th and 5th. There is to be a banquet on the night of August 4, complete with orchestra and speaker. The swapfest, auction, get-together, eyeball QSOs and MARS meeting will all be on August 5. Brochure and application blanks will be out later. Contact Thomas S. Strickler, K4JNA, RFD 1, Front Royal, Va., for further info.

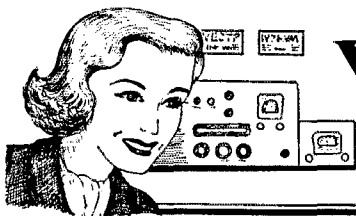
Wisconsin — The WNA picnic will be held on Sunday, July 8, at Hartford, Wis. No other info at hand.

Wyoming — The annual Wyoming hamfest will be held June 30-July 1 at the Pines Lodge, near Buffalo, Wyo. For further info contact Wayne M. Moore, W7CQL, 2000 East 1st St., Casper, Wyo.

Feedback

In the article "Transistor Types Recommended for Amateur Applications," March 1962 *QST*, the 2N1492 was listed as applicable above 10 watts. A re-evaluation of the specifications under ICAS ratings, with a good heat sink, show that two of these devices, in either push-pull or parallel, with adequate drive will work just at the 10-watt level.

The article on receiver front ends (Andrade, "Recent Trends in Receiver Front-End Design,") in June *QST* stated, on page 18, that with two tuned circuits at 28 Mc. the band width would be 1.4 Mc. for $Q = 40$. The correct figure is half that — 700 kc.



YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,* W1QON

"23 23 HM Ogle Died in the Johnstown Flood X AR"

Someone has said that the daily miracles of radio have tended to eclipse, or at least overshadow, the marvels of the telegraph. This is particularly true when it comes to stories of operating under emergency conditions. We have been so steeped in stories of the SOS and the very brave men who operated on the Titanic, Morro Castle, and Republic, that we forget that there was once no such thing as radio, and that only the telegraph handled such events. One of the most famous is the 1889 Flood in Johnstown, Pennsylvania, and the remarkable service performed by telegraphers, commercial and railroad.

Mrs. Hettie Ogle, was manager of the Johnstown Western Union office, and her daughter, Millie, age 19, was her assistant. Both were operators along with a staff of four other telegraphers. Mrs. Ogle, whose sine was "HM" was considered to be a particularly fine operator. Many members of the profession who knew only her sine on the wire were unaware that she was a woman.

When word was sent that the dam at South Fork, Pa., was definitely going to break, Mrs. Ogle ordered the entire office moved to the second floor of the building and kept the wires to Pittsburgh, as well as to stations up and down the Conemaugh Valley, busy with reports. Just after 3:00 p.m. she relayed the last message from Johnstown to the Pittsburgh Western Union office: "South Fork operator says the dam is about to go!" By then the lines to South Fork were down, and the dam did break at the time the message was sent. The operators remained in the office keeping the towns on down the valley informed of flood news. Next day her son found the bodies of his mother and sister in the wreckage of the building, along with those of the other operators. That night, the Western Union operators received the message along the

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

circuit: "HM Ogle died in Johnstown Flood."

But while Mrs. Ogle and her daughter were tragic heroines, there was one other woman in the picture. The operator at the PRR Tower at South Fork, just above the dam, was Miss Emma Ehrenfeld, who sent down the line all reports brought to the village from the dam. Even when the lines into Johnstown went down, she relayed her warning messages to the Mineral Point Tower of the PRR, where they were relayed by other means.

These are only two of the YL stories of operating on the wires. There are many more, but the circumstances are not generally known, and while we are aware that the Western Union operator was a flood victim, not many people, even in Johnstown, are aware that the operator was a woman. (Contributed by W3WRE.)

An Exception!

Not all XYLS are understanding of ham radio and its involvements (most are, we're happy to note). KIMMOC passed along the following little story of his wife, Alice Pillsbury, K1PZB, of North Easton, Mass., "for chuckles!"

Anxious to receive a card to round out her WAS, K1PZB mailed her QSL, on which she had made the following normal ham-type fraternal comment: "I certainly was happy to have this contact with you. I've been working to get into — land (omitted to protect OMI involved) for two months. One more state now and I have my WAS. My usual operating time is from 12-1 P.M. EST, when my 18-month-old has his nap. Also have two girls, 5 and 7 years old. The OMI is a mechanical engineer, and I am a nurse. So far I'm winning the race for the DX— HI, 73, Alice."

Came back Alice's own QSL in two pieces with the following note made presumably by the XYL of the unfortunate ham in the middle: "Don't send any more of this trash to my husband or to our home. We couldn't care less if you had a dozen brats."

Oh well — it would be a dull world if everyone thought alike, wouldn't it? Although she used the pronoun "we," we presume the dear lady was speaking only for herself.

Coming Events

16th ANNUAL AWRTAR — The 1962 All-Woman Transcontinental Air Race will start at Oakland, Calif., July 7 and will end July 11 at Wilmington, Delaware. Carolyn Currens, W3GTC, is chairman of the amateur radio net.

ARRL National Convention — Aug. 31-Sept. 3 at Portland, Oregon. YL-XYL activities will be conducted by the Portland Roses.

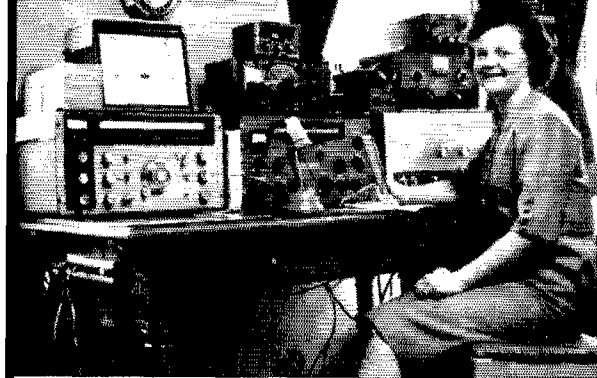
The YL Certificate Hunters Club Chapter 4 has been organized and the following officers elected: Pres. K0GIC, Secy. K7CHA, Treas. W1YPII, Certificate Custodian K0RGU. The chapter now has 37 members in 18 states and 7 countries. Nets will be scheduled and the chapter will issue a certificate shortly.

W4GRXH, Shirley Barnes, will serve as traffic manager for the 1962 Soaring (Sailplane) National Championship Meet at El Mirage Field, California July 21-Aug. 3. Anyone interested in working on the project is requested to contact Shirley for more information at Box 298, Santa Monica, California.

No, K1PZB, hasn't sent a follow-up QSL!

QST for





For winning the 1962 WRONE Week contest, March 19-23, Joyce Garlick, K1OLM, of Tewksbury, Mass., received 100 Miss WRONE QSLs. The XYL of K1OLM and mother of K1RHY (and three other harmonics), Joyce has spent most of her operating time on 20 c.w. since getting her license two years ago.

WIGLA "Wigla" in a Goldfish Bowl

The week of April 1-8 was proclaimed by the Governor of the Commonwealth of Massachusetts as Amateur Radio Week. The Framingham Radio Club decided this was an excellent opportunity to demonstrate amateur radio to the public.

Shoppers' World, a shopping center in Framingham, has a court with a garden area with a completely glass-enclosed, 14 x 4½ x 5 feet showcase in the center. This showcase became our Goldfish Bowl for the week.

There are only three YLs in the Framingham Radio Club. The OMs must have thought we had real cute fins and a very special ability to make like a guppy, because they set up all our equipment, put up the antennas and consented to operate the station evenings. Then they promptly filed off to work. We divided up the hours and took our turn swimming across any band that was open.

The first problem on opening the station any morning was that it must have been some six foot OM who coiled the antennas and laid them on the roof the night before. In high heels, a heavy winter coat and perched on the threshold, we stretched our girdles almost to the breaking point and managed to snag the end of one antenna. Antennas connected and station on the air, the next order of business was always, the coffee pot. No instant for us — the source of water supply was in the lady's room across the court. That was just the first of two pounds of coffee, untear trips rinsing and filling the coffee pot, washing cups and spoons, and so forth!

After about two hours of operation, we discovered the salesman in the store directly to our right waving frantically at us. Upon investigation we found they had been listening to us on a portable receiver and somehow when we changed



WIZEN, K1IZT, and K1EKO peer out of their Goldfish Bowl at passers-by who, oddly enough, walk rather than swim!

hands, they got lost. Our sign language not being as good as our c.w., we made up some cards and hung them in the window when we changed bands. We learned later in the week that those boys spent more time listening to us than selling television sets, so their boss made them look up the receiver, but those TV sets proved to be amateur radio's best salesman that week, for there were 15 of them running at all times and we never once interfered on one of them. Hooray for hams!

A salesman from one of the stores aroused our curiosity when he came over and told us he had just gotten a new transmitter. Naturally, like all good hams, we went dashing over, to hear him tapping out WIGLA on the highest key of an electronic organ. Not all crazy people are hams!

On Saturday morning the Easter Bunny arrived at Shoppers' World, bringing with him Casper the Friendly Ghost. Casper was the cutest thing and the children were not the only ones he captivated. It so happened that the operator of WIGLA at that moment was none other than the YLRL President, Onie, WIZEN. Did you ever hear your president speechless? Well, all we know is that the mike was open, but while Casper was on, Onie for once forgot to talk.

We contacted one ham while he was mobile on the Massachusetts Turnpike, who was so interested in the project that he left the turnpike to visit us. He was a VE3, and we learned that an operation such as ours was completely new to him. This proved to us that our week in the Goldfish Bowl was not only interesting to the general public but to many other hams as well.

For all who visited the station we had a special tag that read "I Have Visited WIGLA". For all stations contacted we had special QSL cards. During the week, besides chatting with hundreds of visitors, the station made 340 contacts, worked 23 states and 7 countries. The biggest thrill of all was our contact with OH5SM, Carola, in Finland. When Carola was in the states for the YLRL convention two years ago, she went with the Framingham Radio Club on Field Day and was made an honorary member. What more fitting climax to a most interesting week in a Goldfish Bowl than to be able to wiggle our fins in the direction of a very special honorary member.

Three little guppies are so glad all those OMs had to file off to work, and we say a great big "thank-you" for setting up the station and letting us operate during the day.

Onie Woodward, WIZEN (President of the YLRL)
Blanche Randles, K1IZT (Secretary of the YLRLP)
Eddie McCracken, K1EKO, (V.P. of WRONE)

Ahoy, Fair Mermaid!

The beguiling mermaid and the attentive OM in the photo (left) were not identified, but they could have been anyone of 80 YLs and OMs who attended the YL Fun Fest at San Francisco in March, sponsored by the Bay Area YLARC. W6QYL, Martha, BAYLARC's Mermaid of 1961, passed on that honor, with an appropriate plaque, to W6BDE, Esther, naming her 1962 Mermaid. A first in California YL history occurred with the presence of the presidents of all of the California YL clubs: WA6-AOE of the LAYLRC; WA6EVU of San Diego's Missiles and Missions; K6ENL of Sacramento's Camellia Capitol Chirps; and WA6ALK of San Francisco's BAYLARC. Past YLRL Presidents W7NJS and W6DXI were also present. The 1963 All California YL Get-Together will be hosted by the Los Angeles YLRC.



Gloria Spears, KZ5GS, is Secretary of the Canal Zone ARA for the third year. Gloria is often heard operating KZ5JW, the armed forces service center station in Balboa, C.Z. Her own station is heard on 20, 15, 10 meters s.s.b. and sometimes on a.m.



More BPL YLs

In our March column we listed YLs who were BPL certificate winners in 1961. Additional YL winners have since been brought to our attention.

OM W3IVS kindly informed us that his XYL, K3GUS, Elaine, made BPL in Dec. '60 and Feb. '61. OM K0FPC advised us that K0ONK made BPL every month in 1961. Attaining BPL honors is an achievement for any amateur, but K0ONK, Ruth Vollrath of Marshall, Mo., is sightless. Hence, perhaps her honors were even harder acquired. Quoting from Ruth's letter:

"I have been a member of ARRL since obtaining my Novice license in 1958. My desire to become a ham started in 1957, a few months before my graduation from the Missouri School for the Blind in St. Louis, where I learned of this hobby from W0ZMR, a classmate of mine. One day the news director of our local broadcast station was describing a Field Day contest, in which three local hams participated. He said that in case of sudden disaster, amateur radio might be the only means of communication. This set me to thinking. Perhaps this was the hobby in which I could do the greatest amount of good for people, and I decided to venture into the world of electronics, aware of the many difficult obstacles which lay ahead. The 1952 edition of *The Radio Amateur's License Manual* served as my textbook, with Bill Williams, W0ZSL, as my teacher. When my call KN0ONK arrived, I was the happiest girl in the world. Within a few months, I received my General Class license.

"I feel proud to tell you that I hold the appointments of RM, ORS, OPS, OBS, and OO, plus a code proficiency certificate for 15 w.p.m., with an endorsement for 20 w.p.m. I can copy up to 40 w.p.m. in my head, but writing it down in Braille on a slate and stylus is another battle to conquer. However, I am doing it, I think, and am hoping to obtain stickers for 25, 30, and 35 w.p.m. very soon. My favorite phase of ham radio is traffic handling, and I have over 50 BPL cards, plus several Traffickers Club certificates.

"The list of hams and their families who have assisted me seems endless. I shall be eternally grateful for their aid, and of course, for discovering amateur radio as my hobby."

BPL YL WA2GPT, Beatrice Dietz, of Valley Stream, N.Y., "became a ham because someone gave my son an old Marconi receiver. I listened one day and found a new world — a quarter-inch of 40 meters and another quarter-inch of

20 meters. The OM, not a ham, later brought home an HQ-110 and I bought ARRL books on *How to Become a Radio Amateur*, etc. One morning I put my qualms behind me and called a nearby ham, K2YSK, and told him I was ready for a Novice test. I passed the Novices in June 1959 and my General in June 1960. I'm on the air four to six hours daily, operating in several traffic nets. I feel that amateur radio has given me so many hours of pleasure that the least I can do is share the pleasure with a little traffic work in return."

Clara Reger, W2RUF, has been a consistent BPL member since 1948. At this point Clara declares that she has lost count of the number of BPL cards she has accumulated. Licensed in 1933, W2RUF is a charter member of the YLRL and originator of the club greeting "33". Preferring c.w.



Clara Reger, W2RUF—outstanding amateur of New York state!

she has a code proficiency certificate for 35 w.p.m. She feels that her greatest experience in amateur radio was the opportunity to aid Lynn Nichols, now K2DGU, after he was nearly electrocuted in an accident. Now outfitted with artificial limbs, Lynn became Clara's "protège" and he was rehabilitated and received his amateur license through Clara's untiring, enthusiastic aid. At the ARRL convention in Buffalo last year, Clara received the Outstanding Amateur Award for the state of New York for, as the plaque reads, "showing great ingenuity and sacrifice in performing service."

YLs all, of whom we can be proud!

Strays

W8KTR bought an older home in Richmond, Mich., and after moving in discovered that it had been the home of the late W8FWU. After choosing which room was to be the "shack," W8KTR discovered that it was the same room that W8FWU used to have for his shack.



WA2GPT found a new world one-half an inch long!

Clubs Are Saying . . .

The Bonner County Amateur Radio Club voted to donate to the Building Fund. We are a small group and while this donation does not break the treasury it puts a severe dent in it — hi! — *W7FL, Sec.-Treas.*

Enclosed is a check from the Mobile Sixers Radio Club. If our bank balance can stand it later, we will probably contribute again. Good luck! — *K3HTU, Sec.*

I have pleasure in sending a check from the Boeing Employees Amateur Radio Society. W7HLP gave a brief talk on advantages of ARRL and recommended that members donate individually in addition. — *K7KYG, Pres.*

Please accept this donation from the Con-tocook Valley Radio Club. Best of luck in going over the top. — *K1MID, Sec.*

Hope this contribution from the Corpus Christi Amateur Radio Club will help and that we can send more later. — *K5HOY, Sec.*

The Ladies Amateur Radio Klub is pleased to contribute and all the LARKS wish you continued success. — *K9ZVW, Treas.*

This check from the Cuyahoga Falls Radio Club unfortunately repays only a small part of the service the League has rendered to our 70-odd members. Without the League, amateur radio could not possibly be the large, satisfying hobby it is today. It was made clear that this club donation did not substitute for individual member contributions. — *K8EIO, Sec.*

The Lancaster Radio Transmitting Society enthusiastically endorsed this gift to the Building Fund, in appreciation for the many fine things ARRL has done for amateur radio. — *W3OY, Sec.*

The Coos Radio Club voted to donate to the Fund. Our club is small and the funds are low, but we wish to help whenever possible. — *W1TP, Sec.-Treas.*

On behalf of our members, officers and directors, I extend best wishes for the success of this campaign. The Milwaukee Radio Amateurs' Club is happy that we can support the cause. — *W9RKP, Pres.*

Enclosed is check from the Loaded Clothesline Net. We are not affiliated, but feel that you do so much to help amateur radio operators that we would like to contribute. — *K5ECP, Pres.*

Enclosed is a check from the Old Faithful Radio Club; sorry we cannot contribute more. Several members will be contributing individually. — *W7RZY, Sec.-Treas.*

The Story County Amateur Radio Club is glad to contribute toward the future of amateur radio. — *W0UGR, Treas.*

The enclosed check has been enthusiastically voted as a contribution to the Building Fund by the members of the Niagara Radio Club. We hope that this will encourage continued support of the fund by other club groups and individuals. — *W4JPT, Pres.*

The Monterey Bay Radio Club wishes you a successful campaign; please accept our preliminary contribution. We plan to get each member of our club to donate to this worthwhile cause. — *W6DWW, Sec.*

The Penn Technical Institute, W3OZE, is contributing since it appreciates and benefits from the hobby of amateur radio. — *W3SMX, Director.*

We of the Treasure Valley Radio Association would like to share in helping this dream come true and so are enclosing a check to apply on the Building Fund. — *Rev. F. L. Pickett, Sec. Treas.*

The Irvington Radio Amateur Club in October will hold an "ARRL Building Fund Auction," all receipts to be applied to the new building. If others will follow suit we believe there will be no problem in putting the fund over the top. — *K2RXH, Club Auctioneer.*

The Communications Club of New Rochelle has voted unanimously to pledge a sum for each of the next two years. This will in all probability not be the last donation; the membership only wished to commit the treasury for two years at present. Best wishes for success. — *K2SJN, Pres.*

The Etna Radio Club is pleased to make its contribution toward the Building Fund. — *K3LKP, Treas.*

The Spud Pickers Amateur Radio Klub has decided to donate to the Fund. Keep up the good work, and Godspeed on the new project. — *K0LWN/1, Sec. Treas.*

Enclosed is check from the Desert Radio Amateurs Transmitting Society which includes two personal donations from club members plus net receipts from a junk-box auction at our last meeting — and we are going to have more to come. — *K6FS, Treas.*

The Clermont County Amateur Radio Club voted to donate to the Building Fund. Wish you success in your project. — *K8ZFJ, Sec.*

The announcement of the new Hq. building met with hearty approval at a meeting of the Tri-County Radio Association and we have set a sum aside from our treasury as our subscription. — *K2TOU, Pres.*

The North Penn Amateur Radio Club has set a goal for a contribution to the Fund, a progressive endeavor until the goal is reached. Passing the hat at the meeting gave us a start of better than 25%. — *K3EZJ, Treas.*

Building Fund Progress

CONTRIBUTIONS to the ARRL Building Fund continue at a steady pace, although a slow one. At this writing (early June) nearly 2,000 individuals have contributed well over \$20,000 approaching one-tenth of our goal.

The subject is one for discussion at nearly every club meeting, hamfest and convention we attend. However, there are hundreds of comments to the effect, "I haven't got around to sending mine in, but will shortly." If you are one of these, won't you please resolve now to use the subscription blank in May *QST* and help the fund along? An extra copy of the blank will be

sent on request if you wish to keep your file of *QST* completely intact.

Club activity in the fund drive has been particularly heavy this past month, resulting from actions at meetings subsequent to the appearance of May *QST*. Typical comments which arrived with donations are excerpted on the opposite page. We only wish we had space to list all donors in acknowledgment. Several older, stronger clubs have sent checks for substantial contributions; one proposes an amount equal to \$5 for each year of affiliation — in effect, buying a "membership" for the years of the club's affiliation. But just as important to the success of the overall program are the items from smaller and newer clubs, where the effort involved is every bit equal.

— . . . —

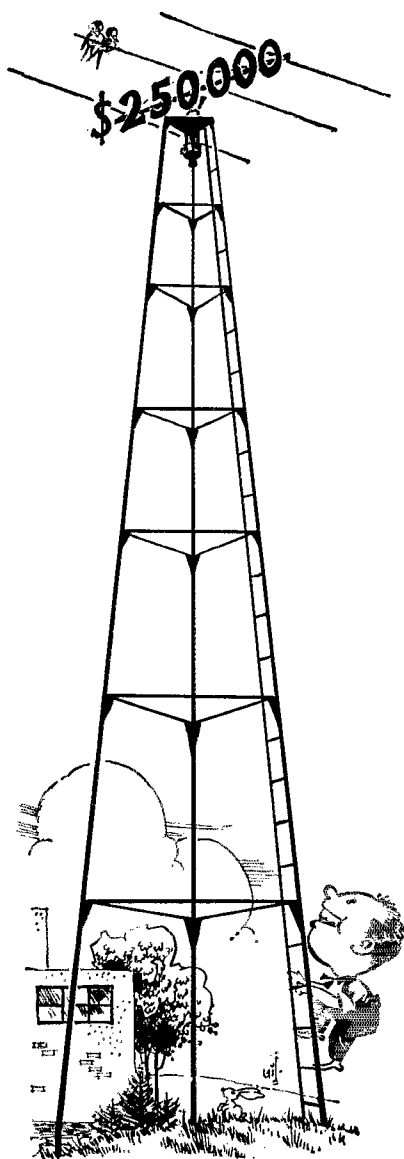
The Housing, Finance and Executive Committees on May 10 opened bids from ten contractors and, after careful examination, recommended acceptance of the low bid of \$390,000 from the Jack Hunter Construction Company of Manchester, Connecticut. The price does not include such things as architectural fees nor special furnishings such as museum showcases, but is otherwise for the complete building and landscaping. The Board at its meeting May 11 adopted the recommendation. At the conclusion of the meeting, members of the Board journeyed to the WIAW site to record the ceremony of turning the first spadeful of earth. The power shovel and bulldozers should be hard at work by the time you read this. We'll continue to bring you monthly reports on the progress of construction.

— . . . —

Meanwhile — support the Building Fund!

QST

While members of the Board of Directors and staff beam approval, retiring ARRL President Goodwin L. Dosland, WØTSN, turns the first spade of earth marking the initiation of a construction program for a new League headquarters building.





Correspondence From Members -

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

10-DAY SERVICE

☐ The FCC should get words of praise rather than complaints and gripes. On April 23, 1962, I filed my application for my tech ticket. Only ten days later, May 3, I received it in the mail. With all the processing and filing of the many different licenses issued by the FCC, I feel they do a praise-worthy job. — *Peter Goldberger, WA2VYK, New Rochelle, New York.*

2nd 40

☐ Enclosed you will find my check for my League membership renewal and the card notice of same.

There is nothing unusual about this action it would seem but to me it carries special significance. This is the start of my second forty years as a member of the League. It was way back in May, 1922 when I joined the League. I have been a member continuously ever since, without a lapse.

What is even better I have forty membership certificates and every copy of QST covering the past membership period of 40 years.

I have more than enjoyed my small part in ARRL, taking part in SS Contests, holding OPS for over 20 years and more recently OO and PAM appointments. Yes, I have even enjoyed the several controversies that have raged in ham radio, from the old 3XC days to the present. But the best part of it all is that the League, like Old Man River, runs on and on.

You boys are doing a fine job, just like those who have gone before you did and I hope you all have many more years to carry on. Keep up the good work and we out here in the field will do our part to help you. I love my ham radio and can't imagine what I would do without it. — *G. Graham MacConomy, K7RUR/W6BUC, Sun City, Arizona.*

"D.W.I."

☐ The Seattle Worlds Fair special events station, K7USA has had varied experiences in the recent weeks since the fair opened; Friday May 11, was no exception. The station was visited by Armond, K6EA, who was invited to operate the rig. Shortly Army was in contact with a W1, and following this, many other c.w. stations were clamoring for a QSO. All this was soon interrupted by the manager of the local gas company whose exhibit at the fair is in an adjoining building. He was quite emotional, but finally we learned that his automatic dish washer was running around the stage — supposedly triggered by our operations.

None of us had ever heard of DWI (dish washer interference), but we decided to see for ourselves while Mary, KL7BJD operated the rig. Our visit to the exhibit didn't disclose any irregularities in the behavior of the dishwasher. We learned following the display that a gas technician had failed to cut the power circuit on the automatic equipment and this had created the dishwasher's erratic behavior. Army was disappointed I think; this would have been a good problem to solve!

Readers visiting the fair are asked to stop and sign in. The station is in the National Bank of Commerce Building, Alaska Pavilion — just 150 feet from the base of the Space Needle. — *George Raymond, K7LBT, Seattle, Washington.*

DIFFERENCES

☐ Regarding the comments of W6BG on "BK" in the May issue; I find the use of "B" "K" (a different signal than "BK") to be quite useful in C.W. work, especially in net and traffic work. I realize that the Army has a habit of forever changing its procedure but some ten years ago the pro sign "B" meant "more to follow." (Whether this is still true I don't know.) Therefore, used in the manner B K, the literal meaning becomes "I have more for you but go ahead and let me know if you have all ok to this point." This is

especially useful in message handling when used after the BT separating heading from text to make sure address, etc. is understood correctly before proceeding. I don't believe the pro sign "B" is listed as an amateur signal and perhaps not as a commercial one; when used this way, however, it does make a helpful operating aid. — *Bill Pettee, K9WYX, Princeton, Illinois.*

☐ In reference to W6BG's letter in May QST, in which he suggests the substitution of K for BK; this might be appropriate for phone but would subtract an element of desirable information from c.w. operation.

Properly used, BK informs listeners that the station transmitting is equipped with a break-in system and is therefore open to "access" at any time.

The ideal method is the use of BK until there is a response then K as a go-ahead for the breaking station. Thereafter, pauses in transmission or the use of question marks, are sufficient within the time limit allowed by the FCC. — *M. L. Muhleman, W2ZQJ, Bronzville, New York.*

COMMA

I wonder if the author of "the Novice Accent," who said a comma is not necessary between your city and state would accept me putting one there. If I don't, the poor station at the other end doesn't know if I am giving him the alphabet or what. — *Rick Kichl, K3RBN, Schuylkill Haven, Pa.*

NEGATIVE RESISTOR?

☐ Why doesn't some inventor come up with a negative resistor? Instead of reducing voltage, a negative resistor would amplify anything you put into it.

This would alleviate all this business of power amplifiers, Class AB1, etc. If you wanted to step up a voltage, there would be no need for matching transformers and impedance, or worrying about excessive grid or screen bias; just pop in a negative resistor and up goes your voltage, waveform and all!

Oscillators wouldn't be much of a problem either, simply hook up a battery (H) to a negative resistor, take the output and feed it back through a tuned circuit, and there you go!

Hope my letter has inspired a couple of inventive, imaginative hams (in other words, a couple of nuts) to launch into the world of negative resistance, and come up with the answer to my fondest wish. — *Joseph Cascio, KN1TZN, Needham Hts., Mass.*

HAM KNOWLEDGE

☐ The following is quoted from *The Narrow Margin*, authored by Derek Wood and Derek Dempster, published by McGraw Hill. This is an absorbing and comprehensive historical documentation of the decisive air battle of Britain.

From page 58: "Throughout the operational installation and development period of German radar, all branches of the service connected with it suffered from an acute shortage of skilled manpower. This was almost entirely due to Goebbels, who had seen fit to ban all amateur radio operators shortly after Hitler's rise to power. The excuse given was that of countering subversive elements during the anti-communist purge, but the order was never rescinded.

Until the end of the war, Germany was short of good quality radio and radar operators and engineers in complete contrast to Britain, where literally thousands of radio "hams" with first-class working knowledge joined the services and research establishments."

This should give thoughtful pause to those who may question the allocation of radio frequencies to radio amateurs. The Battle of Britain was won by the use of radio and radar, and the authors of this impressive book do not hesitate to point out the critical significance of England's active

radio amateur group. Also, this testimonial should remind amateurs everywhere that they enjoy their hobby incidentally to the service they should be prepared to give. — Charles A. Turner, W8CGK, Columbus, Ohio.

RELIABILITY

In my past year and a half of amateur operating I have realized the extreme cooperation granted in the ranks of amateurs. On several occasions I have had to send out a message via amateur communication. Not once has anyone refused to take or failed to deliver a message and several times it has been necessary for the other ham to help me on such data as phone number and specific address. I think this is a real credit to the amateur service. — Robert Olsen W4ZQPX, Westwood, N. J.

NEWCOMER

¶ In several recent issues of QST, I have read complaints from amateurs regarding Novice Hams using odd and strange methods of communications and being something of a nuisance on the ham bands. Being something of a newcomer to the ham bands myself, I would like to say something favorable about Novices.

As you know, Canadian hams have to remain on c.w. for a period of time and therefore all QSO's have to be made under this medium. When transmitting on the higher frequencies trying to make long distance contacts, the only answers one gets are from Novices. It appears that the more established hams use phone and cannot be bothered with c.w. Also being a QSL card hunter, I find that the Novices are willing to send a card while the older ham has so many cards that he refrains from sending one himself.

Novices do send some rather odd sounds and phrases over the air but I can cope with these. After all, my first trans-

missions must have been rather odd themselves until I got the hang of correct sending. —

So here's hoping that the Novices keep calling and answering CQs and I shall be very pleased to QSO with them. — M. Barclay, VE3CIH, Stratford, Ontario.

SB 2361/HR 9684

¶ I understand the ARRL is working on provisions for reciprocal licensing in this country. I contacted the FCC on this matter and received a rather vague reply as to the difficulties that would be encountered.

It appears that the FCC is worried about proper security clearances and agreements with other governments. It seems to me that the reciprocal licensing of civilian immigrants is filled with so many "if's," "and's" and "but's" that such provisions will be a long time in coming. However for the military man most of the objections the FCC raise can be ignored.

The average immigrant in the U.S. Military Service is there because of his willingness to serve his adopted country. His patriotism and loyalty is above dispute. To me it is strange that a man defending his country is denied the privilege and enjoyment of using the amateur bands, for fear of his compromising the security of this country. Each serviceman has at least a confidential, if not a secret, security clearance.

I am now serving a four year enlistment with the U.S.N., which in my case will probably turn into a 20 year enlistment. I was a bit shocked to learn I would have to wait three years before being eligible for amateur licensing privileges; however, in the meantime I was authorized to operate any MARS station for the purpose of handling military traffic. To me this sounds illogical. — Robert S. Ferguson, Naval Air Station 64, Memphis, Tennessee.



A Tribute

Most of us developed our radio enthusiasm during our boyhood when the encouragement of mom or pop spurred us further into this land of enchantment. For us the world was rose-colored — always the present, no time to think of the future — so characteristic of youth shamefully wasted on kids!

In those days the usual place for ham radio was in the bedroom or attic where our activities would not disturb others. This was a masterpiece of wishful thinking. The family concern over the nose-dive gyrations of school marks, the loosening of shingles from crawling over the roof-top with antennas, nailing gadgets to fine plastered walls, drilling the window sash for the lead-in with the inevitable result, digging up the green lawn and the flower bed for good earth ground, blowing the fuses and putting the house in absolute darkness, the acrid fumes of acid solder permeating the household and, occasionally, spilled battery acid on highly polished floors — these were only a few of the prices paid for the education and development of an avid genius and inventor in the form of a son.

Rich remembrances — yes, but have we ever given even so much as an appreciative thought to the patience and understanding of our mothers and fathers in what must have been frustrating periods for them. Our hats off to them! And if you are fortunate enough to have one living, it is not too late to show this appreciation. They are the real heroes of ham radio, for their spirit of paren-

tal fosterage has been the foundation upon which we, individually and collectively, have been able to help bring about an enlightening, valuable and highly interesting profession or hobby.

— W2ETY

W1JIS is 85 years old. Anyone older?

El Radioaficionado Norteamericano is a 96-page booklet in Spanish, authored by Michael Treister, K8GJM, with two objectives: to help those of our Latin friends unskilled in English to a better understanding of U. S. ham radio, and to provide English-speaking hams a working knowledge of Spanish radio terms for their Latin contacts. It covers U. S. license procedures, equipment and costs, mobile activities, emergency communications, radio club activities, all as seen by the author. There is a helpful list of Spanish-English equivalents of common radio terms and expressions, RST system, etc., so that any one with high school training in Spanish should be able to carry on a basic QSO in that language. The booklet is \$1.50, obtainable from UTEHA, Av. Universidad 767, Mexico 12, D.F. South American amateurs may find it more convenient to order from local bookstores; "Editorial Gonzalez Porto" is the supplier in many major cities.

Interested in seismology? Contact Richard Byrd, K9IDS, 2651 W. Morse Ave., Chicago 45, Ill.

• *New Apparatus*

University Model 70 Microphone

THE University Model 70 is an omnidirectional ceramic microphone finished in satin chrome and flat black. Following the modern trend in microphone design, the Model 70 is long and tubular in shape measuring about 1 5/32 inches in maximum diameter and about 6 inches in length. It weighs only 10 3/4 ounces. A die-cast removable slide-on stand adapter, with a hinged elbow and threads that mate with any standard microphone stand, is part of the microphone package.

The Model 70 gives a choice of high or low impedances: 30/50 ohms or 20,000 ohms. Frequency response is rated from 50 cycles to an upper usable limit in the 20,000-cycle region with the output level maintained relatively flat to 11,000 cycles. A 15-foot 3-conductor shielded cable and a cloth carrying bag are included with the microphone.

— E. L. C.



New High-Transconductance U.H.F. Amplifier Tube

THE price tag on the General Electric 7768 u.h.f. triode will keep most v.h.f. enthusiasts from running out to the corner radio store to order one, but its characteristics and applications will excite their interest. In grounded-grid amplifier service the 7768 should be equal to or better than anything yet produced in the way of a practical vacuum tube, particularly at frequencies above 400 Mc. It should come close to a parametric amplifier in effectiveness at 420 Mc., and may even produce useful gain and noise figure in the 1215-Mc. band, in conventional

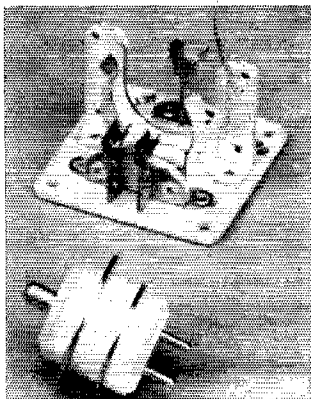
amplifier configurations.

The 7768 is a high- μ high- G_m triode of ceramic-and-metal planar construction. It is well suited to grounded-grid r.f. amplifier service, though with some ingenuity in mounting and connection arrangements it could be used in other circuits. Like other ceramic-type tubes, it is built for rugged service. Plate and heater voltages may be applied simultaneously, and no blower is needed so long as the envelope temperature remains below 250 degrees C.

Sockets are available for the 7768, though they are expensive, and they do not appear particularly well adapted to amateur applications, as may be seen from our photograph. Where the tube is to be used in u.h.f. service (420 or 1215 Mc.), at least, this method of connecting to the elements would seem to be impractical. Coaxial construction would be a must at these frequencies, and not difficult to achieve with handmade mounting and connecting devices.

The ceramic barrel of the tube is 0.575 inch long and 0.55 inch in diameter. Over-all length is 0.925 inch. The plate connection is the 1/8-inch diameter post at the top (left end in the photograph). The larger of the two metal planes, for connection to the grid, is 0.75 inch in diameter. The smaller, 0.6 inch in diameter, is the cathode terminal. Heater posts projecting from the bottom are 0.05 inch rods, 0.175 inch long and 0.2 inch apart, center to center.

Characteristics and typical operating conditions are given on next page:



The GE 7768 high- G_m u.h.f. triode. Special socket is shown at the rear of the picture. Construction is planar ceramic-and-metal, having properties of extreme ruggedness and exceptional performance in the u.h.f. range.

Heater voltage	6.3 ± 0.3
Heater current	0.4 amp.
Direct interelectrode capacitances, without shield	
Grid to plate	1.7 μμf.
Grid to cathode and heater	6.0 μμf.
Plate to cathode and heater	0.025 μμf.
Heater to cathode	2.4 μμf.
Plate voltage	200
Plate current	24 ma.
Plate dissipation	5.5 watts
Cathode bias resistor	270 ohms
Amplification factor	225

Plate resistance	4500 ohms
Transconductance	50,000 micromhos

The 7768 is intended primarily as a high-performance r.f. amplifier for receiving, but its 5.5-watt plate dissipation indicates that it should perform well in low-power transmitting applications. The last item in the table is the most interesting of all. Only one other tube has provided a transconductance of this order, the 416B, a limited-production item not available through normal commercial channels.

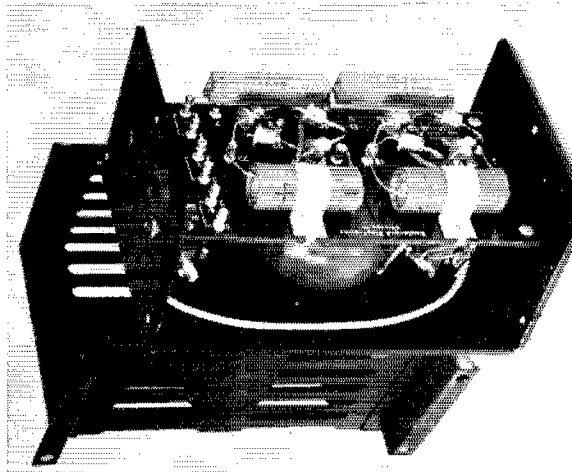
— E. P. T.

Transistor Mobile Power Supply

THE Boulevard Electronics transistor power supply shown in the photograph is actually two separate supplies. Although only two matched transistors are used in the primary circuit, a split secondary toroid transformer divides the high voltage into two separate 300-volt, 200-ma. outputs. Each output has its own full-wave bridge rectifier and filter. With this arrangement, the two outputs can be connected in series to furnish 600 volts at 200 ma., or connected in parallel for 300 volts at 400 ma. All of the output terminals are above ground so that any combination of terminal connections and ground can be made. The input to the supply, 13.75 volts nominal, is also above ground so that either positive or negative ground can be used.

Both primary and output connections are made to the supply by way of the terminals, at the top of the component board in the photograph. Leads are fed through the grommet and soldered to the proper terminals.

A ventilated box cover (which has been removed for the photograph) is designed so that when the power supply is mounted properly by the brackets that are furnished, air will circulate



from the bottom of the cabinet up through the top for efficient cooling.

The unit is manufactured by Boulevard Electronics, Inc., 4757 N. Ravenswood Ave., Chicago 40, Ill.

— E. L. C.

New Amateur-Band Coils

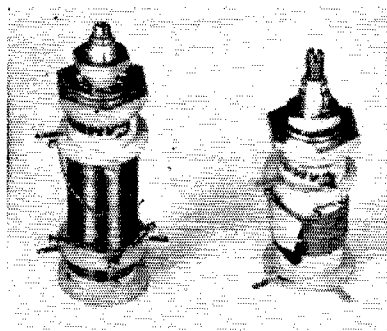
DESIGNED specifically for the amateur, two new slug-tuned coil series have been announced by the Cambridge Thermionic Corp., Cambridge 38, Mass. Coil series 2319 (one of which is shown to the right in the photograph) consists of five different high-Q coils, one for each amateur band between 80 and 10 meters. All of these coils are wound on ½-inch ceramic forms and have powdered-iron cores. A spare collar and two terminals are provided on the form for auxiliary windings. D.c. current ratings range from 240 ma. for the 80-meter coil to 2560 ma. for the 10-meter coil.

The 2546 coil (at the left in the photograph) is a tapped coil that covers the 80- through 10-meter bands. When the coil slug is adjusted to tune to 4 Mc. with 37-μμf. shunt capacitance, progressive shorting will automatically put the high-frequency end of each band at the minimum capacitance end of the variable tuning capacitor. This coil is also wound on a ½-inch ceramic

form. The Q varies from 80 to 45, depending on the band.

All of the coils come with necessary mounting hardware. They will be available through authorized radio-parts distributors.

— E. L. C.



NEW BOOKS

TV Trouble Analysis, by Harry Mileaf. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 224 pages, including index, 5½ by 8½ inches, paper cover. Price, \$3.20. Library Book No. 101.

After giving the reader a brief TV theory refresher course, the book explains the theory of "trouble." Information is given on how and why components and circuits fail and the effect of these failures on the TV receiver. Chapters include material on waveform analysis and component failure (tubes, rectifiers, capacitor and resistors, coils and transformers, speakers and tuners). Circuit failure, analysis of audio, a.g.c., i.f., video sync., and vertical and horizontal sweep circuits are also covered. By becoming familiar with the theory of receiver trouble, as presented in this book, the technician can greatly cut down on servicing time and increase his ability to pin point troubles in unfamiliar sets.

An Introduction to Electrotechnology, by S. J. Kowalski. Published by John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y. 5½ by 8½ inches, 316 pages, cloth cover. Price, \$7.00.

This book presents a practical course in alternating current and direct current electricity at the college level. Starting off with definitions of the units used in the course, the text goes into detailed analysis of the d.c. circuit and includes such subjects as mesh currents, delta star transformation and generalized equations. Other chapters cover advanced material in electric field intensity, Gauss's theorem, and capacitance. Magnetic theory is covered in great detail, as are transients and complex numbers. Although slightly out of the amateur radio field, the book will give those wishing a deeper understanding of the subject a good background in this area of technology.

General Electric Tunnel Diode Manual, published by General Electric Company, Kelley Bldg., Liverpool, New York. 5½ x 8½ inches, 96 pages, paper cover. Price, \$1.00.

Although directed to the circuit design engineer, this manual should be of interest to any one interested in tunnel diodes. It includes chapters on basic tunnel diode theory and contains information on circuit applications divided into four different chapters: amplifiers, oscillators, switches and logic circuits. The manual contains chapters on tunnel diode ratings, characteristics, and test circuits. Several outline drawings of typical tunnel diodes can be found at the rear of the manual along with a complete bibliography.

Silicon Zener Diode and Rectifier Handbook, second edition, published by Semiconductor Products Division, Motorola, Inc., 5005 E. McDowell Road, Phoenix, Arizona. 182 pages, including index, 6 by 8½ inches, paper cover. Price, \$2.00.

Although this second edition has almost the same chapter titles as the first edition, it is crammed with new and revised information on the subject of zener diodes and silicon rectifiers. Primarily a reference guide to the properties and applications of silicon rectifiers and zener diodes, there is information on testing, applications, temperature compensation, a.c. and d.c. amplifiers, surge protection, power supplies, and also a chapter comparing zener diodes with gaseous tube regulators. Mixed in with the text are many charts, graphs and illustrations, and the manual is concluded with a comprehensive index.

Radio Control Manual, by Edward L. Saford, jr. Published by Gernsback Library, Inc., 154 West 14th St., New York 11, N. Y. 192 pages, 5½ by 8½ inches, paper cover. Cat. No. 91. Price, \$3.20.

Starting with a run-down on electronic components, symbols and terms, the book goes through a progressive radio-control system, starting with a carrier operated system and advancing through all possible uses of tones through multi-channel simultaneous proportional control systems.

— E. L. C.

Strays

Real Life Drama

A One Act Play

Location: Sacramento, Calif.

Cast: Amateur Bob Michael, WA6JJK
Neighbor
21-Mc. TV set and rabbit ears.

ACT I, Scene I

Amateur looks in mail box hoping for QSL from DX station. Instead finds TVI complaint from FCC!

Scene II

Amateur calls on neighbor to investigate problem. Discovers "oldie" TV set with rabbit ears, (cs 21 mc IF) vainly competing with auto idling in driveway. Amateur explains facts of TVI life to neighbor and extends invitation to ham shack.

Scene III


Neighbor calls on amateur and watches TV

while amateur calls CQ 10 meter fone. Amateur hooks up with New York City station which turns out to be neighbor's hometown! Amateur hands mike to neighbor who is now 100% tongue tied!

Final Curtain

Neighbor calls amateur on twisted pair to announce purchase of ARRL *License Manual* and *How to Become a Radio Amateur!* The end.

Famous Last Words ^{by} WVV6LMM



LET ME GET
MY HANDS ON
THAT KID!

WHY PUT FUSES IN? THIS RIG COULDN'T POSSIBLY OVERLOAD

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whereupon:

Summer's DX lull moves in for sure this month, so it's a good time to sit back and chalk up one more commemorable DX anniversary. . . .

Ten years ago, in the bright spring of 1952, FCC-licensed amateurs first set foot — er, transmitter — on the 21-Mc. band. This spectral development radically modified our world of DX. Looking back now, it's hard to see just how we managed to get along so long without 15.

DX was truly a part-time thing before 1952. Even when propagation conditions were the best, it was such a long jump from 14 to 28 Mc. that DX paths often were closed on both bands for contrasting reasons: ionospheric absorption on 20 meters, and maximum usable frequency failing to reach 10. Another ham band at 21 Mc. obviously would bridge this gap, giving handom much more consistent DX around the clock.

Our "Ten Years Ago" column-closers now confirm that the birth of fifteen did not exactly set the DX world afire. We were nearing a sunspot minimum of the solar cycle then, just as we are now, and m.u.f.s were having enough trouble hitting 14 Mc. Years were to pass before the 21-Mc. band would attract action in QRM quantity; the triband beam remained a v.h.f. monopoly.

Accelerated pressure of DX contests soon began to impress amateurs with 21-Mc. possibilities. Regardless of discouraging conditions, multiplier-hunters hit 15 hard enough to begin to like its wide-open spaces and occasional red-hot openings. A determined *avant-garde* Novice crowd also put the new band to work with lots of CQs and some exciting long-haul results. (It quickly got around that a 40-meter doublet is a killer on 15!)

Manufacturers of ham apparatus began to hop aboard the 21-Mc. bandwagon as interest increased. H.f. receivers and transmitters without proper 15-meter provisions quickly slipped into marketing obsolescence. The antenna field entered new dimensions literally and figuratively.

It wasn't long before a few exquisitely rare DX items found that they could escape mountainous 20-meter pile-ups by making 15 their chief hang-out. Then many a 200-country DXCCer crept forth from his ancient 14-Mc. haunt for clean 21-Mc. shots at FUSAA, TA3AA and ZD9AA. Our new baby had really arrived!

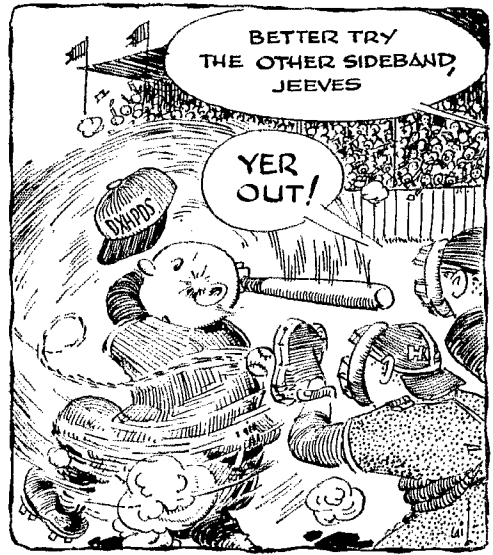
Fifteen now rolls along with momentum generated by a decade of delicious DX output, a world-wide array of high-gain gear especially tailored to 21 Mc., and thousands of DXers reluctant to abandon a good friend in time of trial. We feel that use of 15 meters will be surprisingly persistent throughout the sunspot minimum

Due to the sudden illness of W9BRD's XYL we have to present a much-abbreviated version of *How's DX?* this month. At deadline, Rod reports that his wife is now feeling fine, though she is still in the hospital, and he expects to have a full column for his fans next month.

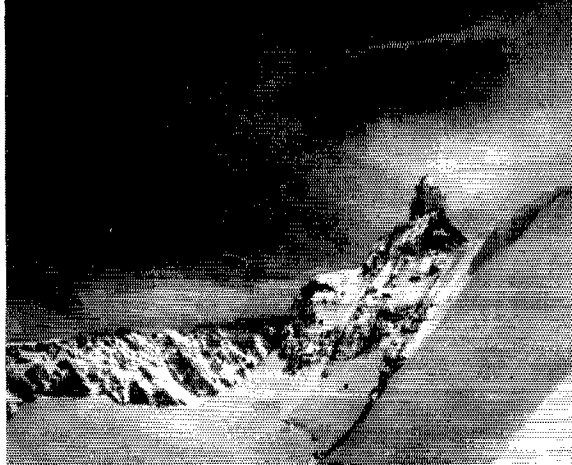
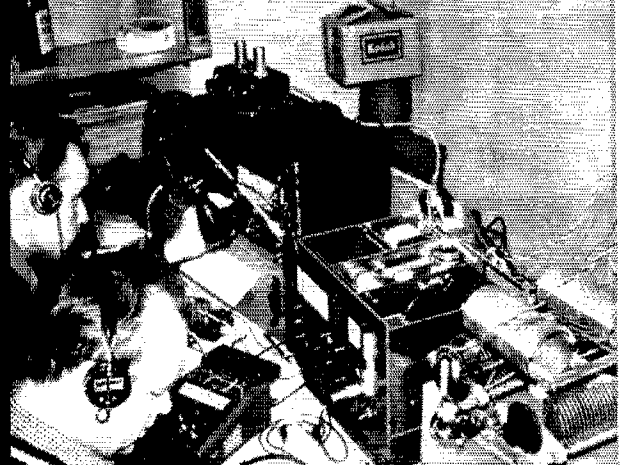
ahead. Those memorable unexpected DX openings *will* come along, and sudden short-skip fun is a lively field in itself.

Much of this commentary applies to 10 meters as well. We suggest you keep a few 21/28-Mc. watts handy at all times henceforth, just for kicks. *Big* kicks!

Ten Years Ago in "How's DX?" — Jeeves pulls a swami to give us previews of DX doings *circa* 1975 and 2002 A.D. Twenty phone is jammed with CS3AC, Ilni's EA9DC, HCSMM, I5UF, M1B, MF2AA, M13s DW RC RR, OE13SC, OQ5s CF VP WW, ST2GL, TA3AA, VSs 2BS 7FG, Ws 6HKKH/KM16 ØEGY/KJ6, ZS2MI of Marion, and 4UAJ On 20 c.w. we note C3MC, FD8AB, FK88AB, FL8MY, F07AW, HCSGI, HE9LAA, KT1OC, LBs 6XD 9Q, M13s LK US ZX, OE13s IIP RN USA, OQ5s PE RA, TA2EFA, VK1RG, VRs 4AF 7AB, VSs 2CY 7GQ 7NG, W7LDY/KS6, Y13BZL, ZCs 2ALAC 6UNJ, 4W1MY and 9S4AX Newcomer 15 features KC6QY, KV4AA and VP6CDI Ten-meter phones KJ6AR, KX6AO and PJ5ZO are reported, as well as PJ5NH on 10 c.w. Forty's best are HZ1MY, OD5AB and OY2Z On 80, of all places, Novice DXperts WL7AOC and WN4USQ captured ZL1ADU, VP7NT and six WH6s HR1BG and VP5BP shake up the 75-phone gang There are hints of imminent Andorra, Monaco, Nepal, Rio de Oro, Tibet, Union Island and Zauzibar emanations New certifications are offered for working 125 EAs, seven Cuban call areas and sixteen 4X4s Jeeves goes "way out for some weird DX, while pictures of GM2DBX, VP5s BD BE BH BP, KW6AR and a gathering at PY2CK round out the resume.



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



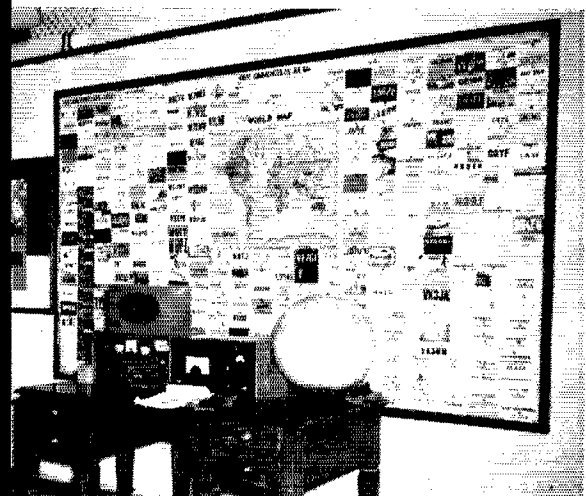
HB1ABU/vs, manned by HB9s ABU KC RC and a fearless s.w.l., spent the 1962 Helvetia-22 DX Contest in the Sphinx Observatory atop 12,000-foot Jungfrau-Joch with a 40-watt homebuilt rig, BC-348 and 70-foot wire. Zero temperatures, 80-m.p.h. winds, equipment difficulties and mediocre DX conditions held the lads down to 180 U.S.A. contacts. HB9KC, just back from a tour in equatorial Africa, really went from frying pan to freezer! (Photos by HB9KC)



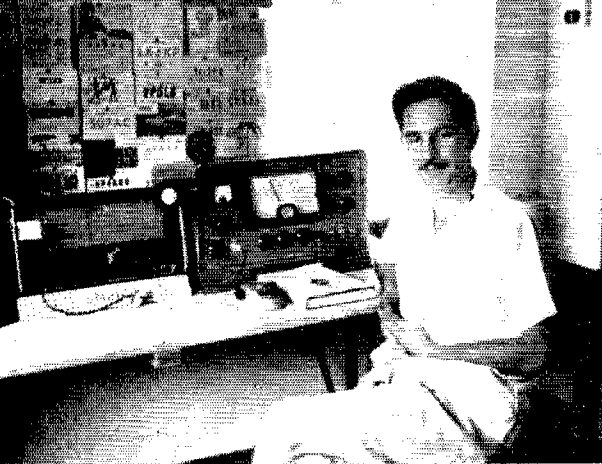
I1SVZ, aided by I1PGM, toted his Miniphase single-sideband outfit to San Marino for a three-day springtime DX sortie good for 1500 M1/I1SVZ contacts. Glauco anticipates an encore next month to some other rarish Mediterranean DXpeditionary target.



FA3OA (F2IC) manages frequent QSOs from troubled Algiers with his four-stage 807 transmitter, 12-tube double-con super and 150-foot long-wire, all homespun. Mike has amassed 146 countries and 3000 W/K friends, mostly via c.w. on 7 through 28 Mc.

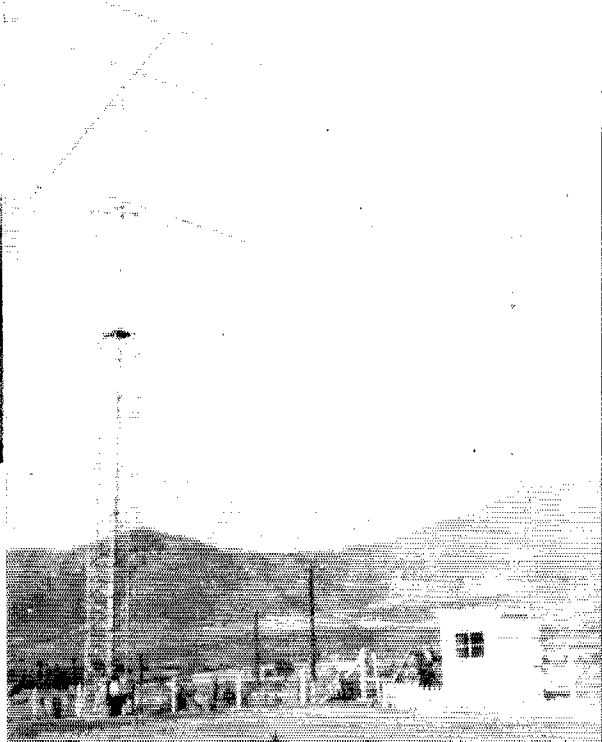


AP5CP enjoys enviable but exhausting status as East Pakistan's only amateur station. Mohd is with Dacca Signals and first fired up last July. Since then he has worked DXCC, 39 United States, and has qualified for numerous other certifications. AP5CP, quite isolated in his hamming pursuit, expresses particular appreciation for the brotherly assistance of Ws 1GYE 1WPO 3CRA 3VKD 4ML 4QCW 4SSU 5IGJ 6CUQ 6CUV 6YY, WA6DTA, VS1FZ and others who helped make it possible for him to become one of the most active DXers in southeast Asia.



5N2RSB, stationed at Kaduna with Nigeria's military, keeps QSL aide K3MNJ busy by working many a W/K/VE on several bands. Jim has an HT-17 and a 3.5/7-Mc. transceiver out of view here. (Photo via K3MNJ)

CE1AGI is a noteworthy call on 10 through 160 meters thanks mainly to operator W3EIS. Traveler W4CVO, discernible next to the shack, forwarded this photo of the station's log-periodic 28-Mc. twirler and 3-element 14-Mc. rotary. CE1AGI is installed at a satellite Minitrack site near Santiago.



High Claimed 1962 DX Contest Scores

THE 28th ARRL DX Contest, held last February and March, produced some real fine scores in spite of the low sunspot count. Final and complete results will appear in *QST* when checking has been completed. Only those *claimed* c.w. scores over 200,000 points and those phone scores over 100,000 points are listed. Following the call is the *claimed* score, number of contacts, and multiplier.

C. W.

Single Operator

HC1AGI	.....	326,677-2963- 93
W4KFC	.....	728,856- 773-318
W3ECR*	.....	665,873- 743-299
W3GRF	.....	642,252- 716-299
K2DGT	.....	571,896- 676-282
W1DQS	.....	542,049- 643-281
W8FGX	.....	475,323- 589-269
K4TML	.....	455,400- 575-264
W3ALB	.....	453,000- 604-250
W0AIIH/VE3	.....	441,636- 596-247
YV5AGD	.....	435,150-1934- 75
W4RQR	.....	434,134- 583-262
W1BLH	.....	423,111- 571-247
K2DCA	.....	405,834- 559-242
W3MVB	.....	405,621- 543-249
W1JYH	.....	384,780- 530-242
W2AYJ	.....	382,476- 529-241
W3EIV	.....	380,808- 516-246
W2WZ	.....	347,274- 531-218

PY4OD	.....	332,856-1657- 67
KP4CC	.....	328,866-1858- 59
YN1AA	.....	307,368-1423- 72
K2GUN	.....	300,825- 449-225
W4HUE	.....	294,372- 444-221
W6IBD	.....	293,706- 441-222
W5WZQ	.....	282,384- 424-222
W3SQX	.....	270,924- 428-211
W4JAT	.....	273,861- 441-207
YV5ANT	.....	269,445-1633- 55
ZP9AY	.....	268,104-1434- 62
W5CKY	.....	265,200- 400-221
G4CP	.....	264,300-1508- 60
W6HJT	.....	262,200- 436-200
W4JFE	.....	258,982- 471-184
K1DIR	.....	258,687- 429-201
W8ZJM	.....	256,464- 411-208
K4ZKI	.....	252,860- 449-188
HK7ZT	.....	244,725-1255- 65
W3IYE	.....	241,638- 391-206
W9WNV	.....	232,875- 345-225
W2FXN	.....	229,780- 407-180

W1FZ	.....	228,384- 416-183
WA2OJD	.....	223,222- 409-186
W3MFJ	.....	227,151- 423-179
T12CAH	.....	223,768-1097- 68
W6KG	.....	223,440- 392-190
W6LDD	.....	220,500- 375-196
W2ESO	.....	219,770- 358-205
WA2LZS	.....	217,704- 383-188
K4LPW	.....	215,340- 388-185
W9RQM	.....	214,032- 364-196
K1RTB	.....	210,541- 442-173
W7PGS	.....	206,853- 363-191
G13OQR	.....	206,550-1230- 56
W6BMM	.....	206,546- 337-186
VK2GW	.....	205,632-1071- 64
KR6AR	.....	201,131-1140- 59
W5BRR	.....	200,200- 367-182

Multiple Operator

W3MSK	.....	1,114,440-1004-370
W4KXV	.....	767,880- 810-316
W6RW	.....	626,694- 701-298
K6EVR	.....	586,968- 761-296
W3TMZ	.....	483,570- 597-270
W3KFFQ	.....	367,059- 539-227
W3GQF	.....	277,134- 418-221
W3MWC	.....	276,588- 468-197
W3WJD	.....	346,086- 522-221
W3GHM	.....	265,608- 434-204
W9YT	.....	228,096- 396-192
W3BYX	.....	200,070- 300-171

PHONE

Single Operator

W1ONK	.....	374,730- 592-211
K2GXI	.....	348,445- 513-227

XE1CV	.....	327,510-1214- 90
K5MDX	.....	259,530- 410-211
YV5AGD	.....	252,180- 934- 90
W4KFC	.....	249,039- 413-201
W1BVV	.....	242,688- 422-192
HC1AGI	.....	231,264-1056- 73
H18DGC	.....	230,434-1334- 58
KP4AWH	.....	220,728-1083- 68
VP5BP	.....	201,756- 990- 68
K2IEG	.....	194,706- 373-174
W0DUB	.....	186,394- 347-174
PS7RT	.....	167,301- 641- 87
W2FXN	.....	158,556- 362-146
VP5CH	.....	141,189- 835- 57
OE1RZ	.....	126,759- 899- 47
PZ1AX	.....	122,332- 601- 68
W9NZM	.....	121,989- 259-157
K8PUU	.....	120,744- 258-156
CT1YB	.....	119,350- 801- 50
W2WZ	.....	117,249- 323-121
W3TLN	.....	112,395- 295-127
K1RTB	.....	108,480- 316-126
W3WJD	.....	106,714- 230-126
VP3HAG	.....	105,792- 551- 64
W4JFE	.....	104,247- 297-117

Multiple Operator

W3MSK	.....	384,153- 557-231
W1HKK	.....	296,241- 517-191
W8NWO	.....	222,717- 397-187
K6EVR	.....	198,000- 400-165
W3GRF	.....	163,680- 352-155
W3NGO	.....	159,852- 346-154
C08RA	.....	141,236- 693- 68
W3KFFQ	.....	132,678- 351-126

* HC1DC/W3EIS, opr; * W3MFV, opr.

The World Above 50 Mc.

1215-1300

2300-2450

5300-5300

5650-5925

10,000-10,500

21,000-22,000

59,000-?

CONDUCTED BY SAM HARRIS,* W1FZJ

On the 30th of April we at W1BU heard the first moonbounce signals since July of 1960. The fact that they were very weak did not dampen our enthusiasm—we could still make out “W1BU de KH6UK on 1296 Mc”. Working on the theory that nobody could be that weak, we started thinking about polarization. Actually, there shouldn't be any problem on 1296 Mc. as long as everyone uses a polar mounted antenna. Faraday rotation on this frequency is negligible. A 40-meter contact with KH6UK brought forth the information that he was using an el-az mount and was polarized horizontal. A quick check with a hastily set up “globe and moon” display indicated that we were working cross polarized. By working all night we were able to remount our feed horn so that it would match Tommy's. On Tuesday, the first of May, we received KH6UK's 1296-Mc. signals with a strength of 6 to 8 db. over the noise for a period of 15 minutes. The signals from W1BU were not received at KH6UK and as of this writing a two-way contact has not been made.

The simplest explanation of our failure to make it “two-way” is the cloud cover experienced by KH6UK. As W2AZL expresses it: “There is a new kind of QRM on v.h.f. Clouds!” One of the disadvantages of an el-az mount is the difficulty of tracking the moon. With a polar mount, you can set your declination with a protractor and drive your hour angle with a clock. An el-az mount must be driven both in elevation and

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

azimuth continuously. If the el-az mount is calibrated accurately enough, it is possible to make up a conversion table for each day in the year to allow moon tracking. If you are talking about 1 degree accuracy, this is a laborious process. To make matters worse, a chart is only good for the exact location for which it is calculated. The aiming information for a polar mount is published yearly and is good for any QTH. If this is so, why doesn't everyone use a polar mount?

I will admit that there was a large amount of table pounding at the R.S.V.H.F.S. before I would consent to a polar-mounted antenna. One of the best convincers was the difficulty experienced in pointing our 128-element 2-meter el-az beam at the moon. Once we tried a polar mount, we were a “sold” bunch of boys. We no longer worry about clouds or rain storms. The book says the moon is there and we point the beam. The efficacy of this system is evidenced by the echoes which come back from the moon.

What is the difference between an el-az and a polar mount? Just one! The axis of rotation of a polar mount is aimed at the polar (North) star. Instead of mounting your rotator parallel to the earth you tilt it towards the north star. The amount of tilt is determined by your latitude. This is *all* you have to do to convert an el-az mount into a polar mount.

The benefits are two-fold. First, tracking the moon becomes automatic. Second, the polarization problem solves itself. As long as everyone is horizontal when pointing south, he will auto-



Work advancing slowly on the mount for the new dish at W1BU

"1st Annual Moonbouncer's Convention" photo, taken at the R.S.V.H.F.S. From left to right: K2HAC, W2AZL, VE3DIR, W1HOY, WA2TUO, W2ALR, K2TKN, VE3BPR, W6UXN.



matically match anyone else in the world regardless of location. The installations at W1BU, W8LIO, HB9RG and DL3FM are polar mounted. KH6UK and W6AY are el-az. W1BU, W8LIO, DL3FM and HB9RG are hearing echoes from the moon. Ergo.

I guess that you have to experience the thrill of hearing a signal from the moon before you can appreciate the feeling that the v.h.f.-u.h.f. is in for a complete overhaul. The first pioneering efforts of W4AO and W3GKP were passed over as evidence of how impossible it was. The efforts of W1BU and W6HB made it look more attractive. The efforts of W1BU and W8LIO during the summers of 1960 and 1961 made it look like duck soup. In fact, W8LIO is only about 5 db. away from receiving voice transmissions via 1296 moonbounce. K1HMU and W6DNG showed feasibility on 144 Mc. Not two-way, but a tremendous showing for a first effort. KH6UK's signals into Massachusetts really put the cap on it. Without any effort W1BU can tell if there are clouds over Hawaii. One of these nights there will be a two-way between Hawaii and the mainland. And it won't be too long before there will be contact between Europe (HB9RG or DL3FM, or both) and the mainland and quite likely to Hawaii. One thing is for sure; the band is always open via the moon!

420-Mc. Power Limit Proposal

As announced in *QST* last month, FCC has announced a proposed rule change which will allow the use of 1-kw. input in the 420-to 450-Mc. band. I must admit that if this proposal goes through it will greatly accelerate the use of 432 Mc. as a moonbounce band. The problem is not nearly as simple as 1296 Mc, but the availability of tubes capable of 1 kw. input at 432 Mc. makes it the most likely choice. The increase in power, however, does not by any means alleviate the need for parametric amplifiers. If you have been waiting for the power limit to be lifted, please note that an increase in power of 13 db. is only about 5 db. more than you could have gotten

with a good parametric amplifier. Furthermore, a paramp doesn't cause TVI or somesuch. If you are really interested in a good 432-Mc. paramp, drop me a card and if the traffic warrants, I will draft up a page or two on "How To."

50 Mc. and UP

The band was open! And 50-Mc. sporadic *E* reports are beginning to come in fast and furiously once again. DX? Of course! There had to be, everyone knows it was just waiting for Spring to show up. Or do they? Each spring season we keep our fingers crossed for fear that this year will be a poor one for Sporadic *E*, 'cause believe it or not there have been poor years.

Reports start off with the one from Ray Clark, K5ZMS in Duncanville, Texas, with the news that on April 23 XE10F was getting into Texas with 5,9 signals and that a couple of KPs were heard, plus Mississippi and Louisiana. Also the news was passed along that XE10E had QSOs for three consecutive days with LU3DCA in Argentina. On the 27th of April, California was heard coming in and after working three of them Ray started tuning "slowly and carefully" trying to locate a few (or even one) of those "states needed". What did he hear? Why Hawaii, of course! And of course it was his bad luck that the KHG could not be identified. Another local also copied the KH6 at the same time, so whoever the island station was, operating on 50.2 on that day — "you were heard in Texas". During the rest of the opening on that day the following stations were copied at the K5ZMS QTH: Arizona, Wyoming, South Dakota, Michigan, Nebraska, Mississippi and Louisiana.

Another opening on April 28 produced XE10E, XE1FU, XE1CZ, XE1PY and XE1DDD. Looks like Mexico is really going to be heard on 50 Mc. this season. On the 29th, North and South Carolina and Georgia were skipping into Texas, on the 2nd of May Florida came through, and on May 3 California was worked. (Sam, can we move to Texas?—Helen) We're going to miss these reports from Ray, as he is leaving the last of June or thereabouts for an overseas assignment. Meanwhile, he's going to try desperately to get those ten much-needed states for WAS. Watch for him between 50.1 and 50.2 during openings. He needs all the states in 1-land, Montana, Wyoming, Idaho and a couple of others. From the home state, Massachusetts, W1HGT reports hearing CO2XG, Michigan, Indiana, Illinois, Wisconsin, Missouri, Minnesota, Louisiana, Mississippi, Florida, Georgia, Alabama, Tennessee and Kentucky during the skip sessions on April 28 and 29. W1ZGO, Connecticut, says that Sporadic *E* to 4-land reared its lovely head on March 3 and that rumors are around to the effect that contacts were made to KP4, YV and PY areas on that opening. Watch for Al on s.s.b. soon, he's rebuilding his v.h.f. s.s.b. gear. More reports concerning Cuba from Ed, W3BNU, who worked CO3NR and CO2XG on April 28. Also heard and worked in Pittsburgh were Louisiana, Florida, Kansas, Missouri, plus other ♀ and



This is the way the rig looks in Vancouver, British Columbia, at the QTH of VE7IR.

9 area stations. Ed has also been working groundwave recently and has Virginia, Washington, D.C., Delaware, Eastern Pennsylvania and New Jersey all to his credit via that method. On April 23, Tony, WA2EVX, and Tom WA2GGB, copied an HH4 at 1205 EST on 50.095. Tony sez the c.w. was then covered by a burst of audio (not local, I hope). About a minute later WA4AEC was copied on s.s.b. at 50.131 and according to Tony "That was it."

We told you last month that VP7NP was closing down and now we learn that the equipment he used is available for use to any amateur in the Caribbean (other than CO, KP4, VP5) who (1) will keep it in use and (2) has no present 50-Mc. activity in his country. The foregoing information came to us from Vic Frank, W7QDJ, to whom the equipment belongs; it consists of a Telrex 6-element beam and a c.w. transmitter ending with a 4-65A on 50.023. Hope you have some "takers", Vic, sure would be nice.

Another report received from Dick, K1KRP, an enthusiastic six-meter boy although to date it's "listening only". For detailed reports this is what we need, but for more fun individually you've just got to get on the air. That's what Dick hopes to do by the first part of June. On the evening of April 29, while watching TV, Dick decided to watch one of the Boston stations instead of his local ones (Laconia, New Hampshire), and much to his surprise instead of Boston he was receiving Mississippi on Channel 5. A rapid trip to the ham shack followed. Band was not very good at that time, maybe twenty-five stations in all; many weak stations and a few strong ones. However K5PPAI in Arkansas kept plowing through even when the others dropped way down in signal strength. Between 2240 and 2250, K5PPAI, K5IPQ W4YMM and WA4BNI were the only stations to put through good signals into Laconia and by 2305 only three carriers could be heard, not copied. By 2330 everything in the way of skip had disappeared. During this period Dick copied stations in Alabama, Tennessee, Arkansas, Florida and Kentucky. According to Reg, W8MBH, the opening of April 28 was observed in the Detroit, Michigan area also, when the band opened about 1500 EST with 5s coming through and then continued with stations from the 4 area coming through until about 2200. K9SLH noted an opening on April 29 when he copied Florida and North Carolina with good signals for about two hours.

Seems that Vancouver, British Columbia (VE7 to you) is very well represented on 50 Mc., even though we in the New England area don't work them every day. John Van Lear,

2-METER STANDINGS

W1REZ...	32	8	1300	W5EDZ...	8	5	
W1AZK...	28	8	1205	W5YYO...	7	4	1330
W1KCS...	24	7	1150	W5UNH...	6	3	1200
W1RBU...	21	7	1120				
W1AJE...	21	7	1130	W6WSQ...	15	5	1390
W1MMN...	22	8	1200	W6NLZ...	12	5	2540
W1HDQ...	22	6	1020	W6DNG...	0	5	1040
W1IZY...	20	7	1180	W6AJF...	6	3	800
K1CRQ...	19	6	800	W6ZL...	5	3	1400
W1AFO...	18	6	920	K6HMS...	4	2	850
K1AFR...	17	5	450	K6GTT...	4	2	800
				W6MIU...	3	2	950
W2NLY...	37	8	1300				
W2CXY...	37	8	1360	K7HKD...	13	5	1130
W2ORL...	37	8	1320	W7JRG...	12	4	1040
W2BLV...	37	8	1020	W7JHL...	5	3	1050
K2GQL...	35	8	1365	W7JMI...	5	2	670
W2AZL...	29	8	1050	W7JJP...	4	2	900
K2IEJ...	27	8	1060	W7JU...	4	2	235
K2CEH...	25	8	1200				
K2LNG...	25	8	1160	W8KAY...	38	8	1245
W2AMJ...	25	8	1060	W8PT...	38	9	1260
W2ALR...	24	8	1100	W8SDJ...	37	8	1220
W2RXG...	23	8	1200	W8FPX...	35	8	980
W28MX...	23	7	1090	W8FPG...	34	8	1040
K2HOD...	23	7	950	W8LOF...	33	8	1060
W2RWJ...	23	6	860	W8LW...	32	8	910
W2PBJ...	23	6	753	W8GGH...	32	8	1180
W2LW1...	21	6	753	W8BAX...	32	8	960
K2KIB...	21	5	700	W8NOH...	31	8	1090
W2ESX...	21	6	750	W8SVI...	30	8	1080
W2UTH...	20	7	880	W8EHW...	30	8	860
W2WZB...	19	7	1040	K8ZHL...	29	8	760
W2RGY...	19	8	720	W8LPD...	29	8	850
W2RLG...	17	6	980	W8WRN...	28	8	680
K2JWV...	16	6	550	W8DX...	26	8	720
K2DDK...	13	5	465	W8LIC...	25	8	800
W2JFA...	10	4	340	W8TWY...	25	8	940
W2PGY...	8	5	266	W8WMI...	23	8	900
				W8GFN...	23	8	540
W3RUE...	33	8	1100	W8LCY...	22	7	680
W3GKP...	31	7	1180	W8BLN...	21	7	810
W3SGA...	31	8	1070	W8GTR...	17	7	550
W3TDF...	30	8	1125	W8NRM...	17	7	550
W3KCA...	28	8	110				
W3BYE...	28	8	1070	W9KLE...	41	9	1160
W3EPH...	32	8	1000	W9WOK...	40	9	1170
W3LNA...	21	7	720	W9GAB...	34	9	1075
W3LST...	21	6	800	W9AAG...	33	8	1050
W3NKM...	20	7	730	K9AJA...	31	8	1070
W3LBJ...	19	7	650	W9REM...	30	8	830
K3HDV...	12	6	1015	W9ZIH...	30	8	830
				W9PBP...	28	8	820
W4HJQ...	38	8	1150	W9LVC...	27	8	950
W4HHK...	37	9	1280	W9OJI...	27	8	910
W4LTP...	34	8	1160	K9ZHL...	25	8	760
W4TJL...	34	8	950	W9BPP...	25	7	1030
W4MKJ...	33	8	1149	K9AQK...	24	7	900
W4AO...	30	8	1120	W9LFE...	22	7	825
W4VLA...	26	8	1000	W9KFS...	22	7	690
K4EUS...	26	7	1130	K9SGE...	21	7	1100
W4EQM...	25	8	1040	W9CUX...	21	7	800
W4AIR...	25	8	900	W9ALU...	18	7	800
W4WNH...	24	8	850				
W4JJC...	23	6	725	W9BFB...	37	9	1350
W4VVE...	23	6	724	W9IHD...	31	8	1030
W4RMU...	21	7	1080	W9SMT...	29	9	1075
W4TLY...	21	7	1000	W9LTL...	28	7	1050
W4IKZ...	20	6	720	W9QDH...	27	9	1300
W4OLK...	20	6	720	W9RUF...	23	7	900
W4LNG...	19	7	1080	W9IC...	22	7	1360
W4RFE...	18	9	820	W9MIX...	22	6	1150
K4YFX...	18	8	830	W9IAE...	21	6	350
W4CPZ...	18	6	650	W9TGC...	21	7	870
K4VWH...	18	6	590	W9RYG...	20	8	925
W4MDA...	17	6	757	W9ENC...	20	6	1100
				W9AZT...	18	7	1100
W5RCY...	37	9	1215	W9TAS...	18	6	1130
W5AJC...	32	9	1350	K9AJM...	16	6	1120
W5YZZ...	30	9	1275	W9GFS...	16	6	1100
W5JWL...	29	7	1150				
W5DFU...	28	9	1300	VE3DIR...	30	8	1330
W5PZ...	27	8	1300	VE3AIB...	28	8	1340
W5LPG...	25	7	1000	VE3BQN...	19	7	790
W5KTD...	23	8	1200	VE3AAG...	18	8	1300
W5MLL...	16	5	700	VE3DER...	17	8	1340
W5KFU...	13	4	1300	VE3HW...	17	7	1350
W5FSC...	12	5	1390	VE3BPF...	14	6	715
W5HEZ...	12	5	1250	VE2ABF...	10	4	580
W5SVV...	12	4	745	VE2FJ...	10	2	365
W5CYW...	11	5	1180				
W5NDE...	11	5	620	KH6UK...	2	2	2540
W5VY...	10	3	1200				

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

VE7IR, sez that he and VE7OE have been working into the Seattle area every weekend, and to prove the good results, one of his contacts, W7ZQX, sent a tape of their QSO. John has recently moved into an apartment and when the rig is in running condition again he expects to have a 6-element wide-spaced beam about 65 feet above the ground, and will build a 300-watt final and a new converter using 417A's.

K1DTR and W1JAT remodeled their shack last year. No haywire here!

QST for



Another beam down at the present writing is that of Dave, K3HNP, but he wrote us anyway to pass along a bit of news he has collected. From George, W4NUT, in Ft. Lauderdale, Florida, Dave received word that on April 9 he worked a goodly number of LUs on six meters. And W0FGL was surprised that not everyone was aware of an opening on March 1 in which he and several Memphis, N.E. Arkansas and Missouri stations worked Hong Kong, Sweden and Germany. His location is in the extreme southeastern corner of Missouri. Can't make comment except that I suppose it could be possible. Have heard no direct word from any stations concerned, so-o-o. Down in Hermitage, Tennessee, W44AJC is looking for ground wave contacts on six meters. Wally has a Ranger II, HQ110C receiver with nuvistor preamp and a six-element beam 75 feet up. Ground wave phone contacts during 1961 included Mitchel, North Carolina; Bristol, Virginia; Cincinnati, Indianapolis; Sumner, Illinois; Louisville, Kentucky; Jonesboro, Arkansas; Corinth, Mississippi; Birmingham, Tuscaloosa, Huntsville, Decatur and many other Alabama towns, Atlanta, Georgia; Chattanooga, Knoxville, Greeneville, Morristown, Memphis and many other Tennessee towns from one end of the state to the other. He would especially like to hear from Missouri and South Carolina on ground wave. Look for Wally from 5:00-7:00 A.M., CST, almost daily and after 9:00 P.M., CST, phone or c.w.



That grin is probably the result of state No. 5 on 220 Mc. for Charlie, W4TLC.

Clubs and Nets

The Michigan 6 Meter Club again provided the patients at the Veteran's Administration Hospital in Dearborn, Michigan, an opportunity to send radiograms for Easter to their families and friends. Arrangements were made to have volunteers and equipment at the hospital on Monday, Wednesday and Friday nights previous to Easter. Approximately twenty amateurs worked on the project either at the hospital or handling traffic on the other end, and in all sixty-five messages were sent. Congratulations to the club members for a thoughtful idea completed with such wonderful success.

The Piedmont 6 Meter FM Net of Virginia, started in March of this year, meets each Sunday evening on 52.525 Mc. at 2200 EST. Net control is K4FSU in Lynchburg.

The Arizona Amateur Radio Society founded recently in Phoenix "is dedicated to advancement of the amateur radio art," and will undertake projects involving research and experimentation in new techniques. Initial project is construction and operation of a two-meter repeater station on Madera Peak for the purpose of providing nearly complete coverage of the state of Arizona. Officers of the society include K7ILJO, president; W7QNO, board chairman; K7AWI, vice president; K7ERB, secretary/treasurer.

The Six Meter Club of Chicago is sponsoring a v.h.f. contest for the two week period, July 6, 8 P.M., CDT, to July 22, 8 P.M. All entrants working 10 or more members of the Club will receive a certificate award, and a special award will be made to the contestant in each state who works the largest number of members. Awards will be made for 50, 144 and 220 Mc. The Six Meter Club of Chicago has approximately 200 members on the v.h.f. bands. Send entries to Joe Mann, K9HDE, 10129 S. Calhoun Ave., Chicago 17, Illinois.

144 Mc. and UP

A most interesting letter concerning 2-meter f.m. mobile nets was received here recently from VK3NR and to get the information across clearly we've decided to quote. "Recently a lot of the commercial services here are changing to multi-channel operation and they are disposing of their old equipment at quite low prices in the same way as we have read in QST that similar services in your country are doing. At present we have a net of about 20 stations with most of the sets running 10 watts output with a single 2E26 in the final. However, some of the sets are 20 watts output with push-pull 2E26's output. The receiver has one 6AK5 r.f. stage, 30-Mc. first i.f. and 2-Mc. second i.f., three i.f. stages and two limiter stages. We seem to be getting similar results to those described in your column by American amateurs. We had serious bush-fires about twenty miles east of Melbourne between January 14 and 17 this year and the Country Fire Authority asked us to help with communications. Eight mobiles went to the scene of the fires and one set was set up as a base station at the Authority Headquarters in the center of Melbourne. A six-element Yagi was used at this point and good contact was maintained during the emer-

gency. This resulted in a valuable contribution to the fire-fighting organization and of course amateur radio received some good publicity. We operate on 145.84 Mc. — rather an unfortunate choice, however. It happened more or less by chance, as the first few who got on used crystals they had on hand, and then the rest followed. After reading of your practice of using the higher end of the band, and easily remembered channels, we are beginning to regret the original

220- and 420-Mc. STANDINGS

220 Mc.		420 Mc.	
W1AJR.....	11 4 480	W9JCS.....	6 2 340
W1AZK.....	9 3 412	W9JEF.....	9 2 540
W1HDQ.....	11 5 450	W9OVL.....	6 3 475
K1KX.....	10 2 385	W9UED.....	4 4 605
W1QOP.....	12 4 400	W9ZIH.....	10 5 500
W1RFU.....	15 6 490	K0DGU.....	5 3 425
W1UHE.....	11 4 385	K0PTE.....	6 3 515
W2AOC.....	13 5 450	KH6UK.....	1 1 2540
K2AXC.....	8 3 230	VE3AIB.....	7 4 450
W2BAH.....	2 1 167		
K2CBA.....	13 6 650		
K2DIG.....	4 3 140		
W2DWJ.....	15 6 740		
W2DZA.....	12 5 410		
K2TFP.....	11 5 265		
K2TQT.....	11 3 265		
K2JWT.....	6 3 214		
K2KKB.....	12 4 300		
W2LRL.....	10 4 250		
W2LWL.....	12 4 400		
W2NTY.....	12 5 300		
K2PEZ.....	11 4 490		
K2QJQ.....	13 5 540		
W2SEU.....	4 2 150		
K2OUR.....	4 3 105		
W3AHQ.....	4 3 180		
W3FEY.....	10 5 350		
W3JYL.....	8 4 295		
W3JZI.....	4 3 250		
W3KKN.....	10 1 255		
W3LCC.....	9 5 300		
W3LZD.....	15 5 425		
W3RUE.....	9 5 450		
W3UJG.....	13 5 400		
W3ZRF.....	5 4 112		
K4TFU.....	8 4 400		
W4TLC.....	5 3 315		
W4UYB.....	7 5 320		
W5AJC.....	3 2 1050		
W5RCL.....	8 5 700		
K6GTG.....	2 1 240		
W6MNU.....	2 2 225		
W6NLZ.....	3 2 2540		
K7ICW.....	1 1 250		
K8AXU.....	10 5 1050		
W8LJG.....	9 5 475		
W8LPL.....	6 4 480		
W8NRM.....	8 4 390		
W8PT.....	10 5 660		
W8SVI.....	6 4 520		
W9AAG.....	9 4 660		
W9EQC.....	11 5 740		
W9JCS.....	6 2 340		
W9JEF.....	9 2 540		
W9OVL.....	6 3 475		
W9UED.....	4 4 605		
W9ZIH.....	10 5 500		
K0DGU.....	5 3 425		
K0PTE.....	6 3 515		
KH6UK.....	1 1 2540		
VE3AIB.....	7 4 450		
W1AJR.....	10 4 410		
W1HDQ.....	8 3 210		
W1MFT.....	8 3 170		
W1QOP.....	11 3 390		
W1RFU.....	7 4 410		
W1UHE.....	6 4 430		
W2AOD.....	6 4 290		
W2BLV.....	12 5 360		
K2CHA.....	5 3 225		
W2DZT.....	6 3 200		
W2DWJ.....	10 4 196		
W2DZA.....	5 3 130		
K2KKB.....	4 2 100		
W2NTY.....	3 2 100		
W2OTA.....	10 4 300		
K2OUR.....	7 3 175		
K3CLK.....	9 4 250		
K3EOF.....	6 3 296		
W3FEY.....	7 3 296		
W3LCC.....	2 2 96		
W3RUE.....	5 2 96		
W3UJG.....	6 6 4		
W3UVG.....	6 6 4		
W4HHK.....	6 4 550		
W4VVE.....	7 4 430		
W5HTZ.....	5 3 440		
W5RCL.....	10 3 600		
W6GTG.....	1 1 180		
W7LHL.....	2 1 180		
W8ECC.....	3 2 355		
W8IRC.....	3 2 250		
W8JLQ.....	4 2 275		
W8NRM.....	3 2 390		
W8PT.....	6 3 210		
W8RQL.....	4 2 270		
W8TYU.....	9 5 580		
W8UST.....	3 4 255		
W9AAG.....	5 3 375		
K9AAJ.....	4 3 425		
W9TAB.....	9 4 608		
W9OJI.....	6 3 330		

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

choice. As far as we know, this is the only f.m. net going in Australia, and we are most anxious that any future activity in other states should be on the same frequency for obvious reasons. Those active on the net are: VK3ZEL, VK3ZFS, VK3AAD, VK3AVE, VK3AQK, VK3BX, VK3ZLO, VK3DF, VK3EM, VK3ZEO, VK3ZCZ, VK3NZ, VK3QC, VK3ZJQ, VK3AGX, VK3ZBC and VK3NR." A very informative letter Noel, and one which we're more than happy to pass on to the boys. Good luck in your f.m. efforts and with your DX contacts to the other Australian states.

Now, away out there in Dallas, Texas, W5KFU tells us that back in September '61 he worked a short tropospheric opening on 144 Mc. and came through it with a new state, Alabama (W4LTU). A recent sked paid off for Mike with Missouri (W0FNN) being worked on two meters; it means that his two-meter total of states worked now stands at 13. Mike is also just about ready for 432 Mc., with transmitter and receiver being completed and antenna construction started. The antenna is to be 52 elements at 80 feet.

Word received from K3JYD sez that he will once again be operating portable 3 from Lexington Park in southern Maryland on two meters, beginning about June 10. The rig has been revamped and at the present time the final is scheduled to be completed and on the air by the end of June. Last summer proved to Fletcher that the location is a fine one for v.h.f. work, with regular QSOs with W2ESX and on good days into New England to W1MEH. He feels that he'll be able to provide a Maryland contact for anyone on the East Coast who's looking for one. Anyone interested in skeds during the summer should write to Fletcher P. Veitch, K3JYD, 6904 Pineway, Hyattsville, Maryland.

Our old friend W6YHI has returned to 144-Mc. operation at his new QTH, ten miles north of Sacramento. Jack's most recent two-meter operation was in Germany where he held the call of DL4WW, and from which location he worked ten countries including DL, G, ON, PA, OZ, F, OE, OK, LX and HB. (All right, Jack, now I dare you to do it from California.) The old s.s.b. exciter wound up in the junk box, sez Jack, after he found out that some helpful soul had filled the i.f. cans in the crystal lattice filter with oil. Didn't seem to work quite the same. Just finished is a new twin-heterodyne converter each winding up with Class AB₂ 6360 output stages; one for 50 Mc. and one is for 144 Mc. Both are mounted on a single chassis and he drives them with a homebrew phasing exciter from 14 Mc. Finishing touches have been put on the old linear by this time and Jack should be making a large noise on two meters in California. He's using a twin-six antenna and sez: "for the first time in 13 years am vertically polarized, due to local demand for that mode — When in Rome —." (Never did go along with those Romans, Jack.) He's now working a sked with W6FZA in Porterville and will be watching for the Los Angeles gang on c.w. and s.s.b. Frequency is around 144.100 Mc. and he's on the nightly and will shortly be on the prowl for 144-Mc. DX again.

K9E1V in Belleville, Illinois sez that on April 26 stations in Tennessee and Kentucky were heard on two meters at his QTH with a Heath Twoer; and on April 14 a station in Anna, Illinois (120 miles) and another in Perry County, Missouri (southern Missouri) were heard very, very loud and clear. Two-meter activity is increasing in Jim's area with about ten new stations in thirty days. A list of two meter s.s.b. stations heard and worked by W1BSY in the past 60 days include: W1BXM, W1QWJ, K1AOX, K1LSY, K1CRN, W1AIEH, W1BDF, W1HDQ, W2UM, W2QZ, W2KR, W2ALK, W2KDX, W2LFL, W2DIR, W2NCF, W2JFG, W2HEA, W2HNY, W2BXA, W2IMB, W2KEO, W2TMIN, W2AGWN, W3WOD, W3HFY and K3HEC. Quite an impressive list of sidebanders on 144 and as the FCC man said "You surely do talk on v.h.f., don't you!" Thanks Harrison, most complete list we've received from this area.

Word received from Jim, W4GHK, relates the sad tale of no 432-Mc. activity (that he can locate) in Florida. Jim recently moved to Palm Bay, Florida from New Jersey (K2KDZ) where he was active on 432. He's expecting to be active on that band sometime this fall and is also working on a 5894 transmitter and converter for 220 Mc. Anyone interested in talking over skeds get in touch with Jim Hagen, W4GHK. After a quick look into a very nice publication put out by the Radio Amateur Society of Harrison, we learn that Tilly, K2AUM, is operating TVI-free transmissions on 144 Mc., and that Paul, K2SSK, has added the 144 Mc. frequency range to his already well equipped QTH. His

two-meter equipment is strictly home-brew and has an impressive commercial look. Paul proudly claims that the rig worked the first time the switch was thrown on — no debugging necessary.

VE6DB sez there's no activity in the way of DX up that-a-way, and only a few local stations are heard occasionally. Still about a dozen locals on six and two and all are awaiting an opening on either band — ready to go! W8BAN claims good ground wave conditions for the past month or so. W8MZI reports a lot of activity on 144 Mc. during February and March with stations being heard from Canada and Cleveland on March 4. From Birmingham, Alabama, W4CIN sez that s.s.b. stations from Huntsville and Shelbyville, Tennessee have been putting in good signals for the past month or two and that a.m. activity is picking up on 144 Mc. Gerney is working on an s.s.b. transmitter now, so be watching for him in the near future with the new rig. Only comment concerning 432 Mc.: "Very quiet." Charlie, W4TLC in Taylors, South Carolina, writes that he worked W4RMU in Florida on 220 Mc. on April 24 at 2300 EST. Charlie and Allen had been keeping skeds since April 4 on Monday, Tuesday and Friday nights. The contact raises states worked on 220 to 5. On March 12 W4ZGS sez two-meter ground wave was doing all right when he worked K4PWP, St. Petersburg; W4UW11, Auburndale, K4QXX and W4UQD of Bradenton and K4QKR/4 at Orlando; all in Central Florida. Better watch out for TH on 220 and 432 Mc., he's recently added a 220-Mc. 7-element beam to the group, and is presently working on an exciter and 2C39 final for 432 Mc. In Edgerton, Wisconsin, W9EKZ recently had his first two-meter QSO with W9CIU, W9NHU and K9BVS; he reports that due to flood danger the southern Wisconsin relay net has been checking and reporting river levels in the Rock River. Ing also sez that he's completed a two-meter r.f. unit for the rig and although a few refinements need adding, the rig is working and on the air.

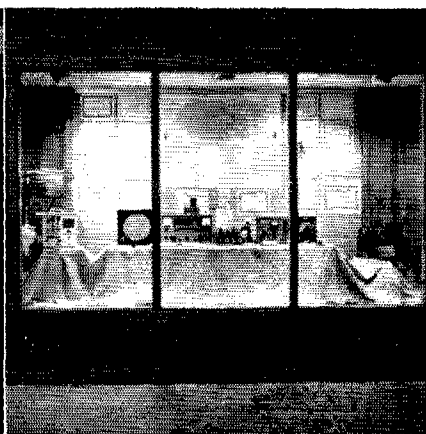
During March WA2ROT in New York City worked K1MEE in Easton, Connecticut, on two meters with a report of 5-9 + 35. K1MEE's signal 5-7. On March 29 W3 (Maryland) and W1 were heard with ease in NYC.

QST

Silent Keys

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

W1FVN, Elliott H. Finney, Suncook, N.H.
 W1KCG, Edward A. Dolan, Westerly, R.I.
 W1UBF, Robert M. Hall, Whitman, Mass.
 W1UHV, Edith Nielsen, Bedford, Mass.
 W1ZWB, Armand Cagiano, South Burlington, Vt.
 W3BCO, Donald L. Miller, Wormleysburg, Pa.
 K3MIZ, John L. Williams, Clairton, Pa.
 W3VEB, Anton C. Thoin, Silver Spring, Md.
 W3ZWJ, Harold S. Daniels, Everett, Pa.
 W4EOE, William G. Tattersall, Jacksonville, Fla.
 W4EK, Withers K. Lee, Jr., St. Petersburg, Fla.
 W4NTZ, Milton A. Chambers, Alexandria, Va.
 W4WHW, Everett L. Schauf, Mobile, Ala.
 W4YOR, Warren M. Lehmkuhl, Columbus, Ga.
 W4ZNF, Joseph A. Worrall, Mount Dora, Fla.
 KN5HHE, Elmer E. Corey, Van Buren, Ark.
 W6EUQ, Winfred C. Stivers, Palo Alto, Calif.
 W6GB, Gayler E. Andrews, San Francisco, Calif.
 W6LHC, Jesse M. Jones, Riverside, Calif.
 WVGNGX, Arthur M. Greenwell, San Diego, Calif.
 W6GPNP, Marianna E. Wirth, Escondido, Calif.
 K6SXM, Harry Blackstone, Inglewood, Calif.
 W7FCU, Oscar O. Russell, St. Maries, Ida.
 K7HML, George L. Howe, Klamath Falls, Ore.
 WN8CEC, Gerald Jones, New Buffalo, Mich.
 W8DQY, George E. Rehl, Galion, Ohio
 W8UHQ, William Beyer, River Rouge, Mich.
 K9AFA, William A. Franker, South Holland, Ill.
 W9CGO, James E. Flanagan, Antigo, Wis.
 W9FAW, Levin J. Peck, Chicago, Ill.
 VO1BR/W2, George W. Rabbitts, Coldenham, N.Y.

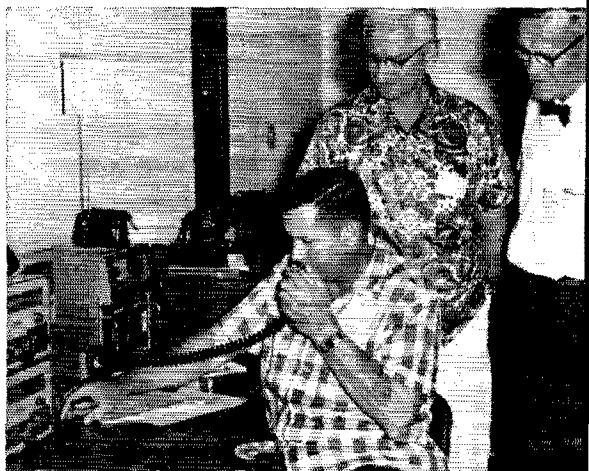


Call letter license plates are always news, and so Newfoundland's minister of finance, the Honorable E. S. Spencer, made an official presentation to the Society of Newfoundland Radio Amateurs. Above left, in the usual order; VO1CZ, Society president; VO1EC, Society secretary; and (not facing the camera) Mr. Spencer. . . . In the center is an amateur radio display arranged by K8TTI and K8ZYQ, members of the Branch County ARC. The display was set up in the new Coldwater, Michigan, high school. . . . Right, W2EW received a plaque from the Civil Defense Training Center, Brooklyn, N. Y., in recognition of outstanding service. W2EW is VHF PAM for the NYC-LI Section. He makes BPL regularly.



Above, left, WØIA (r.) receives a special citation from Dave Whalen of GE, for his outstanding record of service to the U.S. weather bureau and to radio and TV weathercasters. He has collected and relayed untold thousands of weather reports in the Rocky Mountain area. . . . Center, WØMOX (l.) received the Rocky Mountain Division VHF achievement award from Rocky Mountain Division Director WØBWJ, for his operating and technical activities in the v.h.f. . . . At the right, K8AXN (l.) receives the Cosmo G. Calkins Award, awarded annually to that Michigan amateur judged to be the most deserving. K8AXN has been particularly active in helping handicapped people get started in ham radio, although this is only one of his many interests in ham radio. Presenting the plaque is Award Chairman W8FSZ.

Maricopa County, Arizona, is reported to be the first county in the U.S. that has completed all three series of the Sabin Oral Poliomyelitis Vaccine. On the six Sundays set aside for distribution and oral inoculation, a total of 1,854,200 doses were administered, covering 78.9% of the county's population. Amateur radio played a key role in the project by setting up networks on 2, 6, and 75 meters and assisting with the delivery of the vaccine from the distribution point to some 60 clinics. Amateur mobile installations were placed at strategic points and made emergency delivery of vaccine to clinics that were running low. Thus, these amateur radio networks permitted rapid shift of vaccine from a point of over-supply to one of short supply. This photo shows Dr. Sabin, developer of the vaccine, standing at the left, while at the right is Dr. Farnsworth, county medical director. W7YWF is operating on the 75-meter net.





Operating News



F. E. HANDY, WIBDI, Communications Mgr.
GEORGE HART, WINJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, WIDGL, Ass't. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards
LILLIAN M. SALTER, WIZJE, Administrative Aide
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr., Phone

Iowa Amateurs Rise to Occasion. The Floyd and Big Sioux Rivers in Iowa were flooding seriously in March and early April. Amateurs over a wide area who had prepared themselves by registration and active participation in the AREC rose to the occasion. *Mismatch Magazine*, edited by KØRUF, features three accounts of work in the communities that figured in the news. Further Iowa activity is still to be reported. Let us here note a "well done" to all concerned. Also we must add that it was in great measure proper *advance organization* and alignment with AREC/RACES groups that made for successful results.

Get Identified with AREC and RACES. Dedicated SECs and ECs throughout the nation want to register every active amateur in the Amateur Radio Emergency Corps. (We have about 35,000 in AREC now.) To assure your own optimum chance at participation, should the emergency arise, every amateur in the U.S. and Canada, whether ARRL member or not, is invited to join up in AREC, and RACES where there is a RACES plan. *Mismatch and The Midwestern Radio Amateur* gives this applicable information on AREC.

AREC has no dues — it doesn't cost! It pays! It furthers the same job amateurs have done as individuals for many years, except in a more organized and efficient manner. Your county, if and when organized, fits into this system. Check with your EC. Make sure your county is represented in area and state nets. If your county has no EC, volunteer to start things rolling. If your area does not function, is not represented in plans or personnel, you hold down state responsibilities. More important, you are losing the benefit of a 794-member organization with 226 mobiles and 168 Emergency Radio Units, not counting the many stations that aid you in your day of emergency. The state plan is flexible. . . . AREC as a volunteer service, will not be forced on individuals or any net not wishing to co-operate. Citizens Band stations cannot give the wide coverage possible with well-trained, qualified and organized amateurs such as we have registered in our AREC. Joining AREC does not legally obligate you. . . . It does mean, however, that you as an amateur do stand ready to assist in an emergency. The plan is for every amateur in our state. Each individual, county, and area is given a job to perform. Be sure your assignment is not left undone. . . .

Commendation for Outstanding 1961 OO Results. The recent Annual Reports of ARRL's officers to the Board of Directors credit the calls of those Official Observers leading in the sending and reporting of co-operative notices — helping to keep members out of FCC difficulty and assisting in bettering operating conditions during 1961. Some 317 different Observers participated in the program, sending about 22,000 co-operative notices during the year. This is equivalent to sending 70 by each Observer. It was a matter of

teamwork with those notified. The work of each OO is deeply appreciated by the League. A "response file" is bulging with the thank you letters from those assisted. Special thanks and commendation are due those leading in this operation. Most of these men originated and reported three hundred or more advisories. W2BLP was credited with having sent over 1600 reports. Licensing area leaders are designated by (*).

W1JNV*	K4WI*	W8EMD*	W9GFF
W1AUO	K4ZRA	W8IBX	W9RKP
W2BLP*	W5BKH*	K8EEB	K9GDF
W2TPJ	W6WLI*	K8LOS	K0AZJ*
W3ZAQ*	W7ZAS*	W9ZWN*	

OO Candidate Requirements. An April *SCM Bulletin* has called on SCMs to cancel inactive Official Observers who are not reporting current activity. A quota of 8 to 10 experienced, active, well qualified OOs for each ARRL section is desired. In many sections SCMs are now looking for new OO candidates from those qualified and needed to help in this program of sending advisory notices. A General/Conditional class or higher grade license and at least 4 years licensed experience is required, as well as know-how relating to images, receiver overload, and a presumption to accuracy, tact and neatness in making out forms. ARRL provides postpaid Observer cards to assist in this useful field of service. See *Operating an Amateur Radio Station*

A.R.R.L. ACTIVITIES CALENDAR (Dates shown are per GMT)

- July 6: CP Qualifying Run — W6OWP
- July 11-16: CD Party (c.w.)
- July 17: CP Qualifying Run — W1AW
- July 21-23: CD Party (phone).
- Aug. 2: CP Qualifying Run — W6OWP
- Aug. 22: CP Qualifying Run — W1AW
- Sept. 2: CP Qualifying Run — W6OWP
- Sept. 13: Frequency Measuring Test
- Sept. 15-16: V.H.F. QSO Party
- Sept. 20: CP Qualifying Run — W1AW
- Nov. 10-12, 17-19: Sweepstakes Contest

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

- Aug. 11-12: WAE DX Contest (c.w.), DARC (next issue).
- Aug. 18-19: WAE DX Contest (phone), DARC (next issue).
- Aug. 25-26: Third All Asian DX Contest, Japan Amateur Radio League (next issue).

for details of the four classifications of OO work. OO application forms may be requested from SCMs, address page 6, QST.

Please note that the OO system is set up only to help amateurs who want to be helped, and who want to keep out of difficulty with FCC. The responsibility for signal conditions lies between each amateur and the FCC in his regulation observance. The OO's job is considered done when he has mailed the appropriate advisory notice.

6- and 10-Meter OOs Needed. Recently an Observer's survey was conducted to see how well the different bands are covered. This information is presented here in tabular form. In general all bands are being covered. Some 30% of the work is in nailing and helping curtail harmonics of newcomers and others falling outside of amateur territory. The figures seem to show that more observing and reporting activity on 6- and 10-meters is especially required.

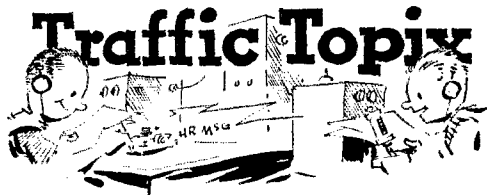
Percent of Observer Activity Per Band

160	1.2%
80	24.8%
40	31.8%
20	25.7%
15	8.9%
10	1.2%
6	1.3%
2	5.1%

Besides experienced amateurs needed to volunteer for OO work in the 6- and 10-meter bands, SCMs welcome qualified members with general coverage receivers who can devote attention to looking for amateur harmonics outside the amateur bands.

Study also is being given by SCMs to the possibility of creating a new class of Observer with the field limited to 6-meters and above. The new OO classification would be open to Technicians, using one (new) card form, and with the friendly notices limited to stations working the bands Technicians use. There is a question whether enough members, qualified by four years experience, can be found to volunteer. Since monitoring the 100 kc. v.h.f. band edges where c.w. is used is part of the problem, it has been suggested that for a Technician to hold this post, he must be able to copy 10 to 15 w.p.m., or he won't know what's going on. Any suggestions as to required code speed for such a proposed class OO? It seems to us the applicant who can do this can be a General and apply for OO under present SCM rules for the appointment.

—F. E. H.



Seems there are almost as many ways to handle traffic as there are traffic handlers. Every time we start copying traffic from someone, we find he transmits it just a little differently from anyone else. It may seem to many traffic

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for April Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUTL	41	1156	989	146	2332
K6BFL	96	1085	970	115	2266
W0LGG	462	788	707	81	2138
W3CUL/4	23	896	872	10	1811
K4AKP	36	741	640	98	1515
W9JOZ	13	707	719	1	1440
W3VNS	1	577	744	9	1341
K00NK	155	370	508	31	1264
K3IAP	100	563	538	19	1220
K48JH	51	559	443	15	1068
K6EPT	20	520	300	220	1060
W3BML	14	519	484	31	1158
W5ICQ	11	514	599	5	1039
W8DAE	37	527	382	110	1036
W1PEX	26	478	449	15	968
K2UAT	172	491	378	7	958
W7BA	5	466	431	34	936
W6WPF	34	441	426	15	916
W44BMC	151	343	336	20	850
W3WRE	30	399	371	25	825
W9DYG	50	395	311	47	804
W8UPH	6	394	320	74	794
WA2GPT	375	293	77	46	791
K2UBG	15	390	347	14	766
W3VIR	14	377	349	6	746
W8SCA	15	354	351	1	721
W7DZX	11	380	285	32	708
K0LTJ	301	201	109	92	703
WITXL	74	302	286	16	678
W4PL	15	320	282	21	638
W9IDA	17	308	306	2	634
K1KWQ	8	310	280	22	621
W4FOR	122	239	175	64	600
W6UUS	1	288	279	4	572
W3HNK	14	275	265	10	564
WA2OPG	22	270	253	17	562
W2EAV	19	221	111	106	557
K0UCY	26	251	254	10	541
K7NHV	53	244	238	14	549
W4DLA	18	257	252	8	545
W8CHT	46	240	223	18	527
W3YYC	18	255	193	53	519
W6GYL	106	207	190	14	517
W8AJN	0	252	248	3	503
Late Reports:					
W3VNS (Mar.)	14	464	723	17	1218
K3GSU (Mar.)	0	482	68	138	688
W9IDA (Mar.)	11	287	280	4	582

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W6IAP	95	1137	1092	68	2392
W6YDK	1047	429	399	21	1899
W4PFC	167	362	349	3	881
KR6GF	596	107	54	53	810
Late Report:					
W4PFC (Mar.)	202	337	302	15	856

BPL for 100 or more originations-plus-deliveries

K3WBJ 209	K9ZZW 137	K9LXS 107
K4TBG 206	W9NZZ 131	W2GKZ 107
K2UCY 173	K0RPH 124	K4HOE 107
W4NTR 165	K4PSS 119	WA2UZH 105
K6GZ 163	K4HGI 117	K2ASP 104
WA2JHQ 152	K3DCB 111	K3JYZ 104
K8KMQ 145	W9RTH 111	K1GGG 103
WA2EDG 137	W3RV 110	WA2CCF 101
	K9YIC 110	

More-Than-One-Operator Stations

W1AW 103

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: K3GMV, K4HOE, K4PQI. The BPL is open to all amateurs in the United States, Canada, and U. S. Possessions who report to the 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.

men that we do a lot of "fussing" about small details in traffic handling, but judging by some of the garbled traffic floating around, we need to do a great deal more fussing about them so that traffic will be handled correctly and accurately. Even on NTS, the disregard of standard ARRL procedure is little short of appalling — not in essence, but in some of the small details which often make the difference between accurate and garbled messages. In the résumé of a few such that follow we will make no mention of the greatest fault of all traffic men — carelessness. No matter how rigid and closely-followed the rules, if we are careless, if we acknowledge receipt without being sure, if we leave out parts, if we assume without having actually copied, we are going to have garbled traffic.

There are two different modes by which traffic can be handled: by Morse Code and by voice. At this point we know someone is going to mention RTTY, but this is more

a matter of typing than operating, and the receiving operator has little more to do than sit and watch his equipment; so let's not discuss RTTY traffic handling — at least, not now. By voice or c.w., there are considerable differences, so we'll have to talk about them separately, but in the same paragraph.

Start the message with "number" or NR. Some phone operators like to be fancy and say "please copy message number . . ." or "follows message number . . ." This is all right, if a little on the gabby side. On c.w., it takes longer to be gabby and wastes time. On the other hand, starting a message "cold" without NR can get the receiving operator off to a late start. On c.w., repeat the number; on phone, pronounce each digit distinctly; don't say "number fi'hunnert niney tree," say "number fivev niyet thuree." Also repeat the station of origin twice, using phonetics the second time on phone. Which phonetics? Gad, let's not get into that! The purpose of phonetics is to make yourself understood, not show your loyalty to MARS or ARRL or Western Union.

On phone, it's no trouble to say "check" before the word count; on c.w., the prosign CK is just as well omitted. Don't say CK XX, or "check double X-ray." The check is not optional. If the message had no check when you received it, count the words and put one on it when you pass it on. Then, on c.w., you'll have something like NC/10, and on phone "no check, corrected to ten." Feel free to correct the check if it is wrong, but *make sure* your copy agrees with that of the transmitting operator before re-copying for the message.

The place of origin is the city and state (or province), nothing else. Don't get into the habit of leaving off the state if the city is well known; it may be well known to you, but you'd be surprised how many people don't know where "Poughkeepsie" is. Even if they do, it's sloppy procedure. Leave us not be slovenly, let's handle a tidy, precise message. No free advertising for fairs, expositions, nets or systems. Just city and state.

The filing time is optional with the originator. In amateur procedure, it is usually omitted; but if it's on there when you get the message, *don't omit it when you relay!* If you are the originator putting in a filing time, use GMT; but if you are simply relaying, relay it exactly as you received it.

We haven't (yet) adopted date-time groups in ARRL procedure, mostly because the filing time is optional, so keep the filing time and the date separate. When transmitting the date on c.w., it is permissible to leave out the name of the month, to shorten the procedure (we *hope* no message could be so old as to raise possible confusion!). On phone, this is unnecessary; however, it can be confusing, on phone, if you say "today's date," or if you say "five eighteen sixty two" instead of May 18. In the case of the former, the operator often has to think what date today is (and often gets it wrong), and in the case of the latter, an operator not used to this procedure might not even recognize it as a date, not to mention the ridiculousness of giving the year as well as the month.

This discussion is taking up more space than we thought. In the next installment, we'll go into the address, text and signature. Please stand by. — WINJMJ.

April net reports.

Net	Sessions	Check-ins	Traffic
Fourth Region Day	30	220	231
East Coast Traffic	21	73	213
Early Bird Transcon	29	—	327
Eastern Area Slow	30	121	29
All Service Net	5	45	40
N. E. Area Barnyard	—	740	7
Interstate Sideband	30	1179	643
20 Mtr. I.S.S.S.B.	22	624	805
7290	42	1642	900

National Traffic System. KØRTI reports results of a series of test messages he conducted. Five messages were sent via NTS to Seattle, Wash., from Nucla, Colo. All five were delivered, with a total of 22 errors, maximum of five, minimum of 3.4, average of 4.4. Maximum time was 73 hours, minimum time 26 hours, an average of 52.5 hours.

Six messages were sent to Cincinnati, Ohio. Only 5 were delivered. Of those five, the maximum error was 3, the minimum zero, an average of 1. Of all ten messages, the average time of delivery was 59 hours, the average error per message 2.2.

Is this good or bad? We'll let you judge for yourselves. One thing is for darned sure, though — it could be a lot better.

April reports:

Net	Ses-sions	Traffic	Rate	Aver-age representation (%)	Repre-sentation (%)
EAN	28	1481	.956	52.9	99.4
CAN	30	1557	.872	51.9	97.8
PAN	30	1175	.759	39.2	98.9
1RN	57	617	.357	10.8	72.4
2RN	60	616	.500	10.2	92.5
3RN	60	1064	.451	17.7	98.3
4RN	60	784	.354	13.7	88.3
RN5	60	560	.283	9.3	74.3
RN7	54	396	.223	7.3	58.1
8RN	82	492	.225	6.0	81.8
9RN	45	1106	.674	24.6	73.7
TEN	77	793	.442	12.9	69.5
EON	18	44	.142	2.4	82.2 ¹
TWN	30	496	.485	16.5	91.3 ¹
Sections ²	1160	7429		6.4	
TCC Eastern	120 ³	481			
TCC Central	90 ³	994			
TCC Pacific	119 ³	798			
Summary	1851	20883	EAN	10.1	EAN
Record	2075	27780	1.057	17.8	100.0
Late report:					
RN6 (Mar.)	40	433	.321	10.8	85.2

¹ Region net representation based on one session per night or less. Others are based on two per night or more.

² Section nets reporting: BUN (Utah); NEB (Nebr.); WSB, BEN, WIN, WSSN (Wis.); GEM (Idaho); SCN, NCN, SCN (Calif.); NCN, NCSN (N.C.); SCN (S.C.); BCEN (B.C.); QKS (Kans.); CPN & CN (Conn.); RISP (R.I.); ADD & MDDS (Mid-Del.-D.C.); OQN (Ont.-Que.); CCW (Colo.); WSN (Wash.); AENB, AEND, AENP, AENM, AENO (Ala.); Wolverine & QMN (3 Mich. nets); VFN, VSN, VSSN, VN (Va.); POI (Hawaii); MJN, MSN, MSPN Eve, MSPN Noon (Minn.); NJN (N.J.).

³ TCC functions reported, not counted as net sessions.

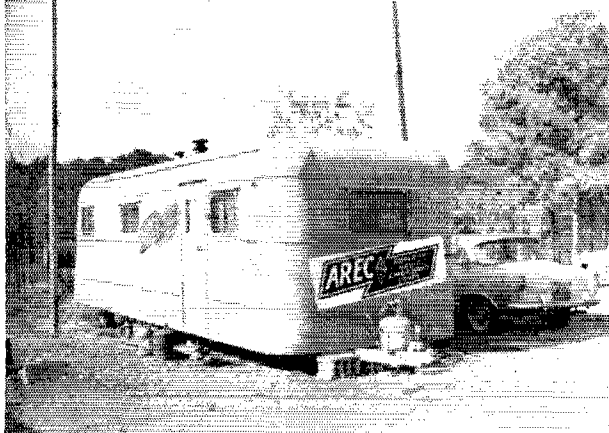
WSSCW, after over a decade at the helm of EAN, has announced his intention to resign as soon as a qualified replacement can be found. This won't be easy. QRN is beginning to wreak havoc on CAN; W9DYG says the CAN gang is the best bunch of ops, most reliable, most helpful and patient to be found anywhere. PAN is remaining on GMT, as are most of NTS nets in Pacific Area. WIBVR QNCs 1RN net statistics on the net early each month. W2E2B announces that 2RN will meet an hour earlier on both schedules from May through October. W4MLE, W4TUB and W5OWV have been awarded RN5 certificates. The holes are all filled on RN7, sez Manager W7DZX, and no RN7 traffic is going begging. W8DAE says 8RN now has 3 Mich. and 4 Ohio men who "go the route"; openings are always available for good men, but "you gotta have regulars." Well deserved certificates have been awarded to W8CXM, W8IXJ and K8KMQ. Increased job responsibility is cutting down on W9FEO's time, but TWN continues to get better every month.

Transcontinental Corps. Failures were "up" in the Eastern Area this month; WISMU is moving, and hopes to have a real signal when he gets settled. K4AKP continues to mastermind TCC-Central like an old veteran, W7DZX does a good job on both RN7 and TCC-Pacific.

April reports:

Area	Functions	% Suc-cessful	Traffic	Out-of-Net Traffic
Eastern	120	76.7	1528	481
Central	90	87.8	2178	994
Pacific	119	87.5	1604	798
Summary	329	81.0	5310	2273

The TCC roster: Eastern Area (WISMU, Dir.) — W1s EMG NJM OBR SAU, W2MTA, K2UAT, W4s APY OPC, W3s EML FAF WRE, K3RXQ, W4s DLA FOR W3s CHT ELW UPH, Central Area (K4AKP, Acting Dir.) — K4AKP, K9UGY, W3s JOZ DYG CXY ZYK, K3s RCF OVQ, W3s DUA SCA, Pacific Area (W7DZX, Dir.) — W5ZHN, K6s ZYZ G1D, W6s EOT FNE HC, W6ROF, K7s NIW NWP, W7s DZE GMG ZB, K8s EDK DTK EDH, W8s WHE/7 WAX KQD.



K8s AUS VDA VCB and UZO equipped this trailer with AREC equipment for use in Oakland County, Mich. It contains five transmitters, two receivers, two antennas, five pieces of RITY equipment, a gasoline-driven generator, an air conditioner, and miscellaneous test equipment and tools. The AREC signs are actual photographic enlargements of the standard AREC decal. On the left is the inside of the trailer, with Howard Estes, W8ELR, former Mich. SEC, at the operating position.

RESULTS, APRIL CD PARTIES

The following are the high claimed scores. Figures show the score claimed, number of QSOs, and the number of different sections worked. Final and complete official standings will appear in the July CD Bulletin.

C.W.	K9QCQ	106,500-350-60	
W3TMZ	239,040-747-64	W2MTA/2	106,445-344-61
K4PUZ	230,480-684-67	W6YK	103,200-337-60
K4BAI	214,825-654-65	W2CVW	103,040-361-56
W4MLE	208,325-633-65	W4KPC	103,040-361-56
K2EUI/2	201,545-637-63	K1MZY	102,579-368-55
K0YRQ	172,980-552-62	K0QVY	102,300-330-62
K4TEA	172,575-527-65	W8VPC	101,990-322-62
VE7AAF	169,975-517-65	K3KMO	101,185-336-59
K8MTI	167,265-526-63	K3JLQ	101,075-311-65
K0IVQ	154,635-501-61	K4JLD	100,800-336-60
K5OCK	146,560-452-46	K3ANU	100,340-341-58
W8AEB	138,300-456-60	K0AZJ	100,320-348-57
K6BHM	136,500-448-60	W3YA*	180,810-567-63
W9YPL	134,230-427-62	K3JCT	143,650-438-65
W4BZE	131,570-441-59	WA6CFY*	137,100-457-60
K1LPL	128,030-427-59	W5YU*	120,655-402-59
W1SWX/1	127,575-400-63	W8LXJ	117,705-399-59
W2GEZ	124,200-407-60		
K6LKD	121,800-401-60	PHONE	
WA4EJM	120,170-387-61	K4YZT	9520-65-28
W9QQG	117,450-400-58	K4BAI	8880-67-24
W7BAJ	117,120-377-61	W1PYM	8050-65-23
W0ETT	114,560-354-64	K8RAM	7155-48-27
W4LK	107,970-368-59	K1MEM	6705-56-21
W7IEU	107,665-349-61	W1MX?	5980-45-23
K4ZYI	107,260-342-62	K2QDF	5400-54-20
W1MX?	107,010-362-58	K2SSX	5280-43-22
W6WX	106,950-338-62	K5MDX	5040-42-24

* K9ELT, opr.; † K2KIR, opr.; ‡ K3AHT, W3GYF oprs.; ‡ Multioperator; § WA6BSO, W6CUF, WA6HRS oprs.; † K4DRO, K5HSJ, oprs.; † W8LXJ, K8HLR, oprs.

CONTEST NOTES

Word from the Montreal Amateur Radio Club reports these corrections to the results of the 1961 VE/W Contest as it appeared in March QST. Illinois winner is W9LNQ. E. Pa.'s K3MNT was incorrectly listed as K3MNI. WA6HRS should have been listed in the S.C.V. section, placing him second and leaving K6EIL as Sac. V. certificate winner.

Addenda Sweepstakes Results reported in May QST. The following amateurs are also phone Technician winners — K2TXG, W.N.Y.; K3POG, W. Pa.; K8UQA, Ohio. Also, the club score of the Central Michigan Amateur Radio Club is amended to 313,354 with W8VPC the club certificate winner. And K7NHV, Montana, was incorrectly listed in the c.w. scores as K7HNV. The phone score of Illinois' certificate winner, W9NZM, was reported in error. W9NZM worked all 73 sections for a score of 88,914 points with 408 contacts.



We are glad to see Form 35, our "AREC Activity Reporting Form," receiving such widespread use. Whether or not its use is responsible for the tremendous influx of reports on amateur operation in emergencies we can't be sure, but we have a terrific pile of such material on hand at the present time.

Some time ago, we described the unofficial "priority" system we used in selecting material for this column. (See QST, Aug., 1958, p. 78.) This still goes, but the way things are developing now we won't even have room to include all the emergency information. Last month, for example, we had room for less than half of the emergency items, none at all for squibs on non-emergency activities.

This is just by way of explanation, in case you're wondering why the item you sent in has not appeared. Now that we've made it, let's get down to business before we use up any more space. — WINJM.

On Feb. 17 the Logan County (W. Va.) AREC was called out at the request of civil defense to furnish communications assistance in the flood situation on the Guyandotte River in the vicinity of Logan. EC K8KVX alerted K8s CMW VQD VOX ULJ MHC and WFR. K8KVX's mobile rig was installed in the amphibious jeep and K8CMW was assigned to operate this station. K8VQD was stationed at c.d. headquarters. K8s ULJ VOX and MHC were located at strategic points on the water's edge. K8KVX acted as NCS at K8WFR. With this arrangement, emergency operation was very effective. The net operated from 0630 until 1915, local time, with all operators on duty the full time. At a post-emergency critique, C.D. Director WA8CGM stated that emergency communications were the best he had ever had during an emergency. — K8KVX, EC Logan Co., W. Va.

On March 5-7, during a big snowstorm, the Baltimore Area AREC was in session relaying much needed road information and fallen power line reports to the local Department of Traffic and Transit, state police, county police, Gas and Electric Co., and state road commissions. The following mobiles participated: K3s OGA QAK KPZ, W3HZG. Other amateurs taking part included K3s MDL NAS LJB RGD LEN PZB EYE EVI QOK, W3s HYY BOM TAL TRU USW NAE. Another fine example of amateur service rendered as a result of preparedness.



The AREC provided communications for the Red Cross during the flooding of the Floyd and Big Sioux Rivers. The operation began on March 26 at 0730 local time, and before it ended at 1745 April 1, 77 amateurs had contributed 1448 man hours, operation had been conducted around the clock for a total of over 137 hours, and 8 portable stations had been installed, plus twelve mobiles and four hand-carried units. During the early hours of March 26, amateurs installed equipment at Red Cross Disaster Headquarters, evacuation shelter, furniture storage warehouse, plus NCS at the club house of the Sioux City Amateur Radio Assn. and a mobile relay station at TV Channel 9 transmitter site. Traffic was light until the afternoon of March 27th, when it got into full swing. Before the crest of the flood came there were three Red Cross canteen units with amateur stations installed in them, working along the Floyd River. With another AREC unit at the kitchen, it was possible to know the exact needs of each canteen and keep them supplied. Mobile units also provided officials of Plymouth County communication with Red Cross officials in Sioux City. Another mobile unit was dispatched to Lutton, where Red Cross aid was needed in a train accident brought about by the flood.

The Floyd River kept everybody busy for 72 hours, then the Big Sioux River got into the act, keeping the AREC group busy for another 55 hours. It was late Sunday, April 1, before the flood threat was over and the amateurs were released. Six meter equipment was a big improvement over the 75 meter gear previously used. Young high-school-age amateurs were the backbone of the operation, with their stamina and eagerness. The six meter units used (mostly converted CB transceivers) made mobile installations very fast and flexible. A personnel coordinator lined up the working and operating schedules to systematize the whole activity effectively. The following amateurs took part: KØs AAR AHP ASI ASW AUU BGG BNF BNG BXO C7Q DON DPH EFK ERV FKQ GBL JFZ JJK KGS LSU MFY MMQ MMS QII QKX SIC SLY SZJ TTF THE UAF UAH VEJ VND WIZ WLX WVS YFF YHN YZP ZEO ZFU LAC LYO OCK RIS, WØs AXE BXD CDE CRF CXN DAM DJU DOF EMI EPQ EQN EYR FBY FKZ FNF FZO GEJ ILW JAQ MHC NRG OSO POD SDV DUL, WAØMCW, W4MYV, W7ZLY, K9LEY.

More reports have come in on the early March Atlantic storm which wreaked havoc along the east coast. The AREC in the Long Beach Island (N. J.) area went into action on Mar. 8 under the leadership of W2PZV, EC for Forked River, setting up base stations at Forked River, Warrentown, Manahawkin and Tuckerton on the mainland, and at Beach Haven, Harvey Cedars and Barnegat Light on the island. Twelve island towns were without communication or power. Water had surged over the island, completely cutting off Barnegat Light. The first communication was set up at this point, relaying appeals for supplies (which had to be taken by boat) to Warrentown and Forked River, thence to c.d. headquarters at Toms River, to state police, local police, and other points. Mobiles were established at Harvey Cedars on Long Beach Island (which was nearly washed away), from which messages were relayed to the mainland and passed on. Another mobile was set up at Coil Field to direct helicopters. A fixed station was installed at Manahawkin, and a mobile at Tuckerton at the National Guard armory.

All amateurs used their own equipment for the first two days, then two-meter gear was made available for mobile use. Home stations continued to be used throughout. Participating amateurs were members of the Apple Pie Hill Amateur Radio Club: K2s VFT PZV, W2s PG MZR MZT UWA CHL ENS, W4s QOL QOW QPD AWE.

KØMMS, EC for Sioux City, Iowa, reports to Red Cross that evacuation of his part of the flooded area is complete.

On Mar. 13 at 2300Z, an emergency net was called into operation by EC KØLXL and SEC KØEXN for emergency communications during the year's worst blizzard. Net operation lasted until 0500Z and reopened at 1400Z, closing again at 1544Z. The amateurs were instrumental in rescuing a group of people in 20 vehicles from a snowbound area on Highway 20 between Schaller and Galva, Iowa. The amateur net obtained plows from the Highway Department to remove drifts as high as 20 feet, obtained food and shelter for stranded motorists, and handled messages to and from officials regarding conditions and persons wishing to contact families and friends. Travelers were from Iowa, Minn., Wis., Nevada and Oklahoma. The following amateurs were logged as having assisted in this operation: KØs VBM EXN FXX FYC YTO LXL HQD TBO EVC KAI AHP KOI QDC IQV UQL ARA ERV DVN LBF LVF LUW HLF YTU ZAK HLX DYC QGY EDJ JPI DKM, WØs EFG GYC TBR DIT YOZ OBQ NWX TJA MHC BJW JDV FDM KMU MEL VQX GQE SGT AYC ZDT EYI, K9KZB. — KØVBM, EC Northwest Iowa.

Members of the Santiam Radio Club of Lebanon, Ore., were called on March 18 by the Air Search Head for the Lebanon area to help with communications during the search for a light aircraft missing somewhere between Redmond and Sweet Home, Ore. Club station K7ALA was manned by W7VWG with a call on the Oregon Emergency Net for stations in Redmond and Eugene. Mobiles were sent to the Springfield, Redmond and Bend airports with fixed stations to act as relays. Communications were maintained between the various airports to coordinate the search effort and to keep all points advised of progress. Through this procedure, the possible route of the missing aircraft was covered very thoroughly, but with negative results. Participating amateurs were K7s JPI DFU IFI AYQ OYK, W7s FSU IGI UFR GDL FCF AVK QJQ TAZ VWG DKC SAR IGZ. — W7WKP, SEC Oregon.

In the period from March 29 thru Mar. 31, 32 amateurs participated in emergency operation on the Cedar River from Cedar Falls, through Waterloo to Evansdale, Iowa. Traffic was handled for flood control agencies of these three towns. The following amateurs participated: KØs DFH EFX JFF DCV OTV RLS AVM JIIV WOW CVV EHK RDN QVT YBU YXS KVM FDX JQI MTG, KNØs KYR TZQ, WØs EFM ANZ JPI PGJ KVJ RFC PTL, W4Øs ASL ANT, W9Øs ATR ATT BSM. — WØPTL, EC Black Hawk Co., Iowa.

April Fool's Day for the Florida AREC was no joke. They were up to their necks in the second disaster in Western Florida in six months — the result of a large tornado which smashed into Milton, about 30 miles north of Pensacola, depriving the community of electricity, telephones and other communications for more than 24 hours. Acting EC K4VND took over direction of the disaster operation. The storm hit Milton at about 1500Z on Mar. 31. K4VND tried to contact Milton on 75 meters, but found the band unusable because of QRN. Operation was established on 40 meters with W4EWG as NCS. Meanwhile, mobiles W4OOW, K4DDD and K4PIQ, operating on ten meters, left for Milton while K4RSE and K4HYL in Pensacola guarded the frequency. K4VND then notified PAM K4QQJ, who dispatched six-meter mobiles K4s QAC LAN AH and W4VBU, with W4PBC as NCS. K4VND acted as liaison between the 6 and 40 meter nets. The 6-meter group continued to operate mobile from Milton from about 1700 to about 2400Z, handling high priority traffic in considerable volume. At about 2400Z K4FMH got a fixed 6-meter station on the air and, with the assistance of K4WY74, W4RRD and W4IMY remained on the air until emergency operation was closed down about 2300Z on Sunday. On

Mar. 31, K4HOX handled much personal-inquiry traffic from Milton, assisted by Gulf County EC K4RZF who drove to Milton all the way from Port St. Joe and remained for the whole of the 30-hour operation. About 1700Z on Mar. 31, SEC W4MLE instituted a "Condition Two" alert, activating two nets and two key cities, although these nets were already in operation. The c.w. net handled incoming inquiry traffic from out of state and "down state." During Mar. 31, replies were transferred to the phone net to be handled to Milton via K4HOX. However, on the evening of Mar. 31, W4POY got into operation on c.w. from Milton and this traffic was then handled direct. Replies were either fed to K4VND in Pensacola on 6 meters or to Tallahassee on the phone net via W4CMG and transferred to the c.w. net.

Shortly after 0500Z Apr. 1, activity slowed down as the local hour grew late. However, at the urging of W4OCE, manager of the s.s.b. net, this net was activated at 1500Z to handle an anticipated peak which did not develop; so the net was deactivated at 1800Z. During the afternoon and evening some additional inquiry traffic was handled, but telephone and electric lines were rapidly being replaced and Condition Four was declared late Sunday, Apr. 1. More than 500 messages were handled by over 150 operators during the activity. It was another example of the Florida AREC's planned readiness for emergency. — W4MLE, SEC W. Fla.

Thirty-one SECs submitted reports for March activities, representing 14,460 AREC members. Last March we had 24 reports representing 13,567 members, so you can see where we stand by comparison. March reports were received from the SECs of N. N. J., Va., Tenn., Los A., Okla., E. Pa., Minn., Utah, S. Dak., E. Bay, Colo., E. Mass., E. Fla., Iowa, NYC-LI, Nevada, W. Pa., N. Tex., N. Dak., Ariz., Wash., Mich., Ohio, Alberta, Ore., Ala., Me., Ind., Nebr., Md.-Del.-D. C. and S.C.V. Even though lower than the all time record-breaking total of 34 last March, 31 is still a pretty fair number of reports as reporting has gone in recent years. However, it is still below 50%. Our SEC reporting ought to be closer to 80%, so let's get some of these non-reporting SECs going. How? Why, by sending them some EC reports (Form 5) to base theirs on.

Since the April issue, when we summarized SEC reporting for 1961, we have been getting loud squawks of anguish from SECs who have been done wrong. Honestly, no injustice was intended. In some cases investigation of our records showed that the complaint was justified; in others, we don't know if it was justified or not. If we don't have the report, naturally we don't report it as having been received. If the SEC says he sent it (and can he help it if we mislaid it?),



When a gasoline storage tank exploded in Houston on April 24, portable equipment was set up in a city park in East Houston and the West Gulf Emergency Net was activated. That's K5RDP at the operating position, with South Texas SEC W5AIR looking on.

we're perfectly willing to believe him, but the fact still remains that we don't have the report — so what's to do?

Well, rather than ink a good SEC, we have decided that if an SEC claims he sent in a report not shown in our files, we'll just give him credit for it and let it go at that. On this basis, we now credit the SECs of Ohio, Utah, and Okla., with 100% reporting records for 1961.

We also have to acknowledge a couple of plain goofs on our part. First of all, Indiana has now had *three* consecutive 100% years, not two as shown in April QST. Also, Colorado was inadvertently omitted from the 100% list. Our apologies, gentlemen!

RACES News

Figuring quite prominently in the emergencies being reported these days are various RACES organizations, usually operating in conjunction with AREC groups under an amateur serving two simultaneous jobs as RO and EC. We report them under this heading for the sake of both convenience and accuracy.

On Mar. 14 the AREC and RACES group of Marshall County, Iowa, was activated by the c.d. director in view of possible flood conditions in the Marshalltown area. On Mar. 17 and 18 antennas were erected and equipment installed in the municipal building and in police, fire, sheriff and the Mayor's office. A trial run, in which everything worked perfectly, completed preparations. On Mar. 21 at 2300 local time the group was alerted, and the following day operations commenced. The next few days were very busy ones as communications were required in connection with rising water, dangerous ice jams, dike conditions, calls for equipment, food, medical supplies and personnel. Operation was on 29,600 kc. with the base station operating under the call W0EFL/0. Mobile units were K0s EAA UTC OTV TFW and W0DGY. Other amateurs taking part were K0s BSZ HTK GBD JHM, W0s EFL LGG GJT BDZ UJC FIP KXT, W0Ns AIO AJG. Said the Mayor of Marshalltown: "I cannot find enough words to express the city's appreciation." — K0EAA, EC Marshalltown, Iowa.

The Polk County-Des Moines AREC-RACES unit was called out on Mar. 31 at 1800Z to provide communications for Des Moines city engineers as they patrolled levees during a flood period of the Des Moines and Raccoon Rivers. A particular threat was posed to the Great Lakes Pipeline and the City Sewage Disposal Plant, where there was a levee break. K0HEA, RACES headquarters station at Fort Des Moines, was activated at 1400Z on Mar. 31 to control mobiles on 29.6 and 50.56 Mc. A link between headquarters and the city hall was set up on 147.5 Mc. Operations continued until 1400Z Apr. 3, when the emergency was declared over. However, the group was reactivated at 2300Z for cleanup operations and finally secured at 1300Z Apr. 4. Twenty-one of the 37 who participated were mobile and a total of 85 man hours was contributed. The following took part: K0s HEA ZCS RIH QXT JRV CLO VYT ALD RVS SAF LCE LUP AIZ LUN YPR FGR SWE BCA HPQ LUG SVR TXL HRO, W0s REM LRY QHB PKW PKU BBE NXD IVI DEJ SVD. — W0MJH, RO/EC Polk County, Iowa.

At 0730 local, Apr. 1, the town manager of Concord, Mass., declared a state of emergency when the entire telephone system went out because of flooding of underground cables. The AREC-RACES group was activated and EC/RO W1WNP rounded up six amateurs, including four 2-meter mobiles, all of whom converged on c.d. headquarters. By 0810 local the control center, as W1WNP/1, was in action under RACES and became "Emerson Control." Units were set up in Emerson Hospital, at the Medical Center, and at the police department. Mobiles stood by at the hospital and medical center to run errands, get doctors, warn the hospital of accident cases on the way and the type of injury suffered. One urgent request was for three specialists for an emergency Caesarean; all three doctors reached the hospital in time. As the afternoon progressed telephone service was gradually restored, until by 1630 local the net was secured. Six amateurs devoted about 60 man hours to this emergency. Those involved were K1s GLAI KEC NSN, W1s WNP LAMZ TED. — W1WNP, RO/EC Concord, Mass.

On Mar. 28 the North Fork River in Northeast Nebraska overflowed its banks and flooded part of the city of Norfolk, including some of the business district. Ten members of the Norfolk Radio Club were called into action by the c.d. communications officer. A remote control installation of club station WØVNI was made at flood operation headquarters at the National Guard Armory and all portable equipment and operators were placed on a stand-by basis. A radio-equipped car was dispatched to Pierce to relay river gauge readings and aid flood fighters. A portable rig was also set up at the Weather Bureau office at the airport; by 2200 local the system was in full operation, with units along the river from Pierce to Norfolk feeding reports on river levels

to flood headquarters, radio station WJAG and the Weather Bureau. Restricted operator licensees were used to supplement the amateur operators as necessary, and a regular schedule of operators for over two days made it possible for the c.d. director, the mayor, councilmen, city engineers, street commissioner, fire department, Weather Bureau and broadcast station WJAG to contact each other almost at will, wherever they were, through the RACES facilities. Radio-equipped cars were also invaluable in locating men and machines working in the emergency areas. The following amateurs furnished 12 vehicles and a total of 18 two-way radio units: KØs ABT QGY HKE, WØs GHM APS ZUT NBO YSK OPZ HQZ. — WØYFSK.



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 as of the end of the last day of the month of April, 1962.

PY2CK 308/320	W1GKK 306/319	W9YFV 304/316	W5ASG 302/314	W8KML 300/311
W2HUQ 307/319	W3JNN 305/317	W8BKP 303/314	W7PHO 302/312	W8JBI 300/310
W4DOH 307/319	W9RBI 305/318	LU6DJX 302/314	W1CLX 301/312	W7GBW 300/312
W6CQO 307/320	W3KTT 305/317	CE3AG 302/314	W8KIA 301/313	CX2CO 300/312
W2AGW 307/319	W8DMD 304/315	W2HMJ 302/313	W5MMK 301/312	W1B1H 300/312
W3GHD 307/319	W8BF 304/315	W6AM 302/315	W5HUZ 301/312	W2LPE 299/311
W8BRA 306/318	W5ADZ 304/315	W0QVZ 302/312	4X4DK 301/311	W9LMN 299/312
KV4AA 306/319	W8UAS 304/315	W2BXA 302/314	W9NDA 300/313	W4TM 299/311
W8JIN 306/319	W7GUV 304/316	W6EBG 302/315	W1ME 300/312	W3LMA 299/310

Radiotelephone

PY2CK 308/320	W9RBI 302/313	VO4ERR 301/313	CX2CO 299/311	W8KML 297/308
W8GZ 305/316	W7PHO 301/310	W4DOH 300/310	4X4DK 299/309	W6YY 297/308
W8BF 303/314	W8PQQ 301/311		W3JNN 298/309	W6AM 292/304

From April 1, to May 1, 1962, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

New Members

W8FAW 168	CX8GB 111	W6OMR 104	W4JDM 102	W3AIZ 101	W2TOC 100
VQ4DD 133	VE1CD 108	HB9PP 104	K4YXJ 102	K3HJG 101	K4LPR 100
W8WBT 128	OK1FA 108	W6GFE 103	W5CME 102	K7CLA 101	W4ZYS 100
K2EAC 126	OK3NZ 108	K9PLT 103	WA6KNE 102	ZL30B 101	K5VTA 100
OZ7BQ 120	W1MKX 106	SM7AML 103	UA9DM 102	W1PYM 100	K9PQT 100
DJ4OM 119	W48VJ 106	YU3TE 103	W1TIW 101	W2FOO 100	VE3DEB 100
PY7MP 113	UR2KAE 105	K1PNN 102			

Radiotelephone

CR6DB 123	K8OYO 112	W8FAW 108	W9EXY 103	K9AZB 101	W7DQM 100
W2WAG 120	VQ4DD 111	VE5BY 106	W4QO 101	W5CME 100	F8DF 100
W6PH 120	WA2EOQ 110	K9ZEQ 105	W6RLC 101	K6SSX 100	KØWKE 100
G3KLL 117					

Endorsements

W6RZE 300	W1QJR 239	W2ZVS 200	VE3TB 169	WA6TGY 143	K9RZV 130
W9AMU 300	W3MWC 239	W4HUE 200	K1DMG 162	K9MGE 143	F8DF 130
W9YSX 300	W2AYT 238	W8KMD 200	W2MES 162	HIF 143	PAØVER 129
W7QACX 300	VE5RU 233	W4UO 199	K1MOD 160	W8NAN 142	W5EJV 125
ON4DM 292	OE1FF 232	K5ESB 197	WA2CB 160	W9MQZ 142	CR6DB 123
W7WVE 290	W1FQA 231	W6PHE 193	W4AVY 160	K2OUS 141	W9YTO 121
W4ECL 281	W9LTR 231	W3MSR 192	H8HFZ 160	W1VUZ 140	W1DDO 120
W0MLY 280	W1RAN 230	W9EXY 188	ZS5KU 160	K2FG 140	W2ASY 120
VE3BWW 272	W6RAG 230	K6IEC 184	WA2AEL 152	K4GCK 140	W2CUE 120
K4AIM 271	W8TBX 230	W2BXY 180	W4BEU 152	K4SCT 140	W3FOG 120
W2RYV 270	DJ3JZ 230	W2QDY 180	HB9TU 151	W7AIB 140	W2NCG 120
W5BRF 270	K9HFX 225	W5LEF 180	K2BG 150	K9JLR 140	K3CUI 120
W8SA 262	W4HYW 223	W6PBI 179	W2KOY 150	DJ5GG 140	W6FAY 120
W1WDD 261	VE5JV 222	MP4BBE 179	K6ZIF 150	SP9TA 140	W7LZF 120
W3ZAO 261	W4IKL 213	W4AWS 175	W7JPC 150	W6ATJ 139	SP2DX 120
W3DKT 260	W5EJT 212	W6GEL 175	W7WV 150	K1EM 134	5ØTAC 119
VE3BS 257	W5NUT 210	4X4GI 173	K8PIT 150	W8QNW 134	VO2NA 115
W8SZS 255	W7ATV 210	K2MIS 171	W9FKH 150	H89BJ 134	W2ELW 112
W1ACB 251	HFO 210	VE7QL 171	WØRZU 150	W1P 133	ØH2EJ 112
W3WU 250	W3JZY 208	DLØTJ 171	VE2AFC 150	W4NJE 132	W7DOM 110
W1UOP 242	WØEWH 203	W3YZI 170	QA4BK 150	W5RU 132	W18TK 110
W3MAC 240	W8JXY 201	W4LIZ 170	W7BPS 146	W4JGM 130	W6MVG 110
W7AS 240	W9QPC 201	W8JAQ 169	WA2EGK 143	W4QVJ 130	W9HGP 110
K8LSG 240					

Radiotelephone

PY4TK 300	VE5RU 217	VE3ES 179	W4DLG 151	W1PNE 140	W4CWO 130
W9YSX 292	W8SZS 201	K9PPX 175	NZ2SY 151	HB9RB 137	W2FGD 121
K4AIM 265	YV5AIP 200	DJØCP 177	K1IDW 150	KP4CL 136	W4NJE 121
W1PST 255	W7ZAS 195	YV5ANQ 172	K8LSG 150	W4HUE 135	W2ZWL 119
W2LY 247	W9ILW 192	W3JZY 166	K8PIT 150	W4BEU 134	W4IKL 118
YV5AB 244	K2JFY 190	ZS5PG 165	KØPTU 150	W4UO 134	W6MAZ 118
W1UOP 242	W9LTR 190	W8JXY 163	W2PTM 142	W7BPS 134	K1NO 110
W1CLX 240	W1LSZ 182	K2TAP 160	VE2WY 142	K2JMY 130	W2ELW 110
ON4DH 240	DLØFC 182	KG4AO 154	VE3BTI 142	K2OEA 130	K9RYV/4 110
W1ZW 220	CT1MB 180	VE5JV 153			

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, Honolulu -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 July 17 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 July 6 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:*² In converting, 0130 GMT July 17 becomes 2130 EDST July 16.

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, 25, 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 list, try to send in step with W1AW.

- Date Subject of Practice Text from May QST
July 2: "Little John" on 40 and 80, p. 52
July 5: Simple Wacemeters for V.H.F. . . . , p. 18
July 11: How's Your Line Voltage, p. 56
July 14: Keeping Track of Oscar, p. 15
July 16: Hams Help "Get Out the Vote," p. 62
July 25: A Versatile Receiver Audio System, p. 44
July 31: A Small Tilt-Over Mast for Roof-Top, p. 34

W1AW SCHEDULES

(July 1962)

Operating-Visiting 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 Maxin 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 July 4, Independence 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. Amateurs are respectfully requested to refrain from transmitting on the above frequencies during W1AW bulletins and code practice.

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.

• 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: W3DUL, RM: W3EML, PAM: K3BHU, V.H.F. PAM: W3SAO. The new EC for Carbon County is K3GLL. One of our great traffickers, K3IMP, has left Pennsylvania. New Gear Dept.: To W3VR a 75S-3, K3LKR is going mobile with a new G-76. K3NBU is sporting a 4-band vertical, W3NNL built a miniature 30-watt 10-meter rig. W3EU is getting a new shack after his ordeal with fire. The new club bulletin of the St. James RC is called *QRT* in commemoration of its editor, K3KZG. K3RXQ and W3EML attended the Roanoke Division Convention. W3UTU received the Frankford RC Award. W3RV is now 65 years young. With the time change a lot of operators, including K3MIQE, find it rough meeting skeds. K3HTZ will vacation at VE3EYC this summer. A 400-watt linear rewarded K3LSC with 43 countries in three weeks. Our apologies to the Professional Freeloaders Convention announcement which should have more appropriately *Three Feathers*. New club officers: Oxford Circle Radio Assn.—K3ALI, pres.; K3BFV, vice-pres.; K3ALD, secy.; K3HYT, treas.; K3JNS, act. mgr. Lancaster Radio Transmitting Society—W3JPS, pres.; W3A1Z, vice-pres.; W3OY, secy.; KN3-RZE, treas. Lighthouse High School ARC—K3JIV, pres.; K3JTE, vice-pres. W3DJW has installed a remote system for controlling his transmitter from 13 locations in his home. W3LC works all bands 10 through 80 meters with an Apache. W3GJA added 40-meter operation, extending his 80 through 6 meters. KN8SME had his first QSO with a K3RVZ as a starter. K3ETS worked Florida with a "Sixer." W3GRS added HK0AB for country No. 228. Adams County ARC is rebuilding a generator donated by the local fire company. The Philmont Mobile RC, at a formal ceremony, opened its station W3TYQ in the Franklin Institute, Philadelphia. Traffic: (Apr.) W3CUL 2332, W3IVS 1341, K3AMP 1220, W3EML 1058, W3VR 746, W3HNK 564, K3GSU 424, W3LNW 377, W3RXQ 241, W3UTU 196, W3JKX 195, K3DCB 173, W3RV 133, K3MVO 128, K3BHU 104, K3JSX 84, W3ZRQ 73, K3NLW 69, K3JHF 64, W3ITI 62, K3MQE 54, K3HTZ 48, K3LQ 39, K3JLW 34, K3NBU 31, K3CAH 30, W3LC 27, W3AXA 26, K3KJZ 22, W3ADE 16, K3ANU 14, W3EFN 12, W3NNL 12, W3OY 12, W3BUR 10, W3GJA 9, W3BFF 7, K3JJJ 3, W3ELI 2, K3EWC 2, W3ID 2, K3MDG 2, K3ALD 1, K3ETS 1, K3NZD 1. (Mar.) W3IVS 1218, K3GSU 688.

MARYLAND-DELAWARE—DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—Asst. SCM Delaware: M. P. Nelson, K3GKF. SEC: W3CVE. The MDD Traffic Net meets on 3650 kc. at 0000Z daily. The Del. ARC had the following chairmen for Field Day: Del. ARC, K3AMC; Del. 6-Meter Net, K3AZH; Dover 6 and 2 Club, K3EEB; First State, K3JXR; Kent ARC, K3LGC. New officers of the Kent County ARC are K3LGC, pres.; K3OCI, vice-pres.; K3OFF, secy. K3GKF is busy visiting the radio clubs in Delaware. K3EBB has a new home-brew 829B on 6 meters. K3AZH sends in a nice traffic total. W3JFR will be operating mobile 80 through 10 meters. K3EWK reports the 1st State ARC of Wilmington has submitted application for affiliation with ARRL. The Foundation for Amateur Radio, Inc., held its annual election of officers May 5, with the following trustees at the helm: W3AFV, pres.; W3RGX, 1st vice-pres.; W4TE, 2nd vice-pres.; W3OTC, secy.; W3RE, treas. The FAR is a board of trustees made up of two selected members from each club or organization that is a member of the Foundation. If your club or organization desires information on the Foundation for Amateur Radio write to W3OTC, secy. W3BKE has a new Valiant on the air. K3DNO will try to get a summer job now that he has his 1st-class telephone ticket. W4EXM/3 is leaving for a field engi-

neering assignment in Teheran, Iran. K3DCP had visitors from Kansas. K0ZZF and his XYL K0ZZE. K3GZK reports that Hartford County ARC turned out 16 Novices during the month of March. W3HQE is putting up a new tower. W3HB just returned from a Florida vacation and says that the hams down that way will be looking north during any opening of 2 meters. W3IVC has moved to a new QTH and plans on growing antennas. The B&O Radio Club Banquet was well attended. W3CVE, the guest speaker, spoke on AREC Activities in the MDD Section. A V.T.M. was won by the grandmother of W3LQY. K3NMM and W3JWY report a 6-meter band opening Apr. 29, with South America, Central America and a station in Florida working Alaska being heard. K3JYZ sent out the MDD Net bulletin. W3KCY, from Taunaytown, made a tape recording and it was put on the air by WTTR, Westminister, Md. K3KPZ reports that Governor Tawes proclaimed the week before Field Day as Amateur Radio Week in Maryland. K3LEM is on 6 meters. W3LQY has moved to a new QTH. W3MCG reports operating W3MSK as multi-op. in the DX Contests, with over a million points in the C.W. Test but found it hard going in the Phone DX Contest. K3MDD used a motor scooter and walkie-talkie in the transmitter hunt. W3OHI put up a two-element 15-meter beam in the attic. KN3FT is taking the General Class exam. W3YYC is a real traffic man, making BPL on his first report after leaving the service. He also operates on 6 meters with an eleven-element beam. W3YZI is watching for out-of-band operations. W3ZNW will be monitoring 29.640 kc. as a reliable AREC circuit 14 hours daily. W3ZAQ reports conditions are improving in spite of the QRN. Many OOs made excellent scores and W3GKP was the only one making a *perfect score of zero* with two measurements in the February PAIT. Three BPL certificates were issued for April traffic. Traffic: W3YYC 519, K3JYZ 272, K3WBW 231, W3IVC 103, W3TN 96, W3ZNW 84, W3MCG 71, K3NCM 64, W3HQE 45, K3EWK 29, K3AZK 22, W3JFR 18, W3BKE 17, W3OHI 17, W3QZZ 12, K3EBB 11, K3DCP 6, W3YZI 6, W3CVC 2, K3GZK 2, K3MDD 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY, PAM: W2ZL, RMs.: W2HDW, W2VAT, W2AOVR. Trenton, is the new Mercer County EC. K2RNB, Margate, has gone s.s.b. W2VAT, Haddon Heights, is moving to Woodbury. W2JQU, Fort Dix, ex-KL7DIR, was the speaker at the Burlington Co. Radio Club April meeting. N.J. Phone and Traffic Net totals for April: 30 sessions, QNI 527, traffic 229. Net certificates (N.J. Phone Traffic Net) have been issued to WA2AAI, WA2AOX, WA2ARJ, WA2EVK, WA2KWB, K2MBW, W2MZR, W2QVC, K2RXB and W2TLO. W2ZL, Trenton, was guest speaker at the Gloucester Co. RC. W2BLV, Somerdale, is heard regularly on NJN. K2CPR still is chasing certificates. WA2QOO, Trenton, hopes to increase power soon. WA2ARJ, Millville, spent 3 weeks in the hospital. K2DCA (SJRA) was top scorer in the recent DX Contest. He scored over 400,000 in c.w. and 100,000 in phone. WA2IEK and W2ZX were runners-up. WA2FGS, Rose, writes the YL/XYL news feature in SJRA's *Harmonics* WA2GSO, WA2EIJ, and K2KCI helped K3EGP with his antenna repairs. Your SCM visited the Cumberland Radio Club. WA2WNC, Mt. Holly, is a regular on the NJ Phone Net. K2KTS edits the Delaware Twp. High School (Cherry Hill) *Acex*. Recent training classes produced 55 new operators, bringing the school total to 126. W2ADA, Palmvra, has gone s.s.b. on 50 Mc. ECs are needed for Camden, Burlington and Gloucester Counties. All club secretaries are urged to furnish me with a monthly activity report. Traffic: (Apr.) W2RG 143, K2RNB 107, WA2VAT 92, W2JQU 72, W2ZL 36, WA2BLV 23, K2SOX 13, K2CPR 12, WA2WNC 8, W2TU 7, W2BZJ 4, W2AKWB 2, WA2MEQ 2, WA2HJD 1. (Mar.) WA2HJD 14.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE, RMs.: W2RUF, W2EZB, W2FEB, PAM: W2PVL. 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 kc. 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. BPL was made by WA2OPG in April. Endorsements: W2IDM, EC St. Lawrence County, K2SSX and K2KNV as ORSS, K2KNV as OO. The Auburn ARA elected WA2LWV, pres.; K2ZOD, vice-pres.; WA2KLT, secy.; K2JVI, treas. The club has

(Continued on page 104)

CONVENTIONS

AMATEUR activities should have your support. By "amateur activities" I mean the various conventions, hamfests, dinners, picnics, etc. The activities sponsored by your local clubs are either non-profit (intentionally) or are used to raise funds for the club activities; usually for civil defense or field day equipment.

THE people concerned with running them donate much time and energy to assure you that you are entertained, educated, and enriched (contest prizes, you know!).

THE common meeting ground provides opportunities for eye-ball QSO's with old friends whom you have never before met; re-establishing friendships with those you have. A meeting with hundreds of fellow amateurs with the same interests as your own.

THE various technical speakers pass along new ideas, new inventions and new approaches. The forums, RTTY, DX, SSB, VHF, etc., all bring into a close-knit group the leaders in the particular fields, and *you* to exchange ideas and discuss mutual problems.

SEE the latest equipment . . . lift the tops, count the tubes, spin the knobs: If you have an equipment complaint, or if you want to know more details about a new piece of gear, or if you want to know why they don't add the feature you want, talk to the man from the factory. He will be there as most manufacturers send technical personnel to the major ARRL amateur functions.

MEET your League officials. The ARRL is more than just an association or a place somewhere in New England. It is amateurs; very nice people much like yourself who devote their time and talents to serve you.

YOU may win a contest. There are many prizes. Somebody has to win — it could be you. Most of all, have fun with your fellows in this finest of all hobbies.

Hope to see you soon — next convention perhaps?

— R. W. "BUD" DROBISH, W9QVA

Levin's Marshall K9EBE

W. J. Halley W9AC

for **hallicrafters**

FIRST PRIZE WINNER in Hallicrafters' SSB, CW, VHF Contest:

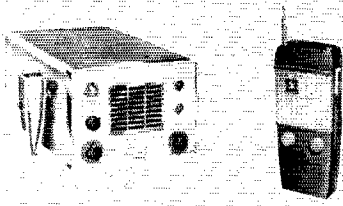
EDMUND LYNCH, K2UKE

15 Orchard Park, Red Oaks Mill

Poughkeepsie, New York

VIKING TRANSMITTERS YOUR BEST BUY... AND HERE'S THE REASON WHY!

Excellent dollar value . . . solid power . . . dozens of convenience features—just a few of the many good reasons why you get much more with a Viking! Yes, dollar for dollar, a Viking is your best buy . . . and that's why Viking transmitters are "first" choice among the nation's amateurs!

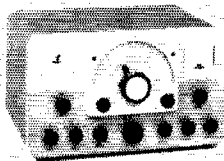


10 METER "MESSENGER"—For base station or mobile use! Instant selection of five crystal frequencies in range of 29.4 to 29.7 mcs., within a 300 kc segment of 10-meter band. 10 watts AM input—10 tubes (including rectifier). Super-heterodyne receiver—excellent sensitivity and selectivity! ANL, AVC, and "Squelch". With tubes, microphone and pair of 29,640 kc. crystals. 115 VAC; 115VAC/6VDC; or 115VAC/12VDC models.

Cat. No. 242-201; -202; -203
Amateur Net From **\$129.75**

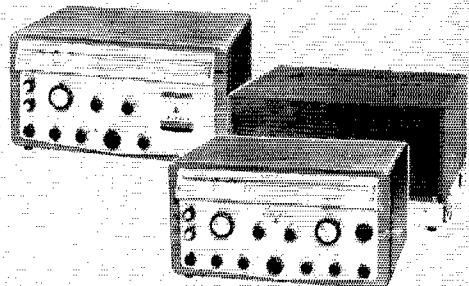
10 METER "PERSONAL" MESSENGER—1 watt for extended range or 100 milliwatts for shorter range. 11 transistors, 4 diodes. Super-heterodyne receiver—two-stage transmitter. ANL, ACV, and "Squelch". Rechargeable nickel cadmium battery and other accessories available.

Cat. No. 242-103 100 milliwatt
(less penlight cells) Amateur Net . . . **\$109.50**
Cat. No. 242-104 1 watt (less
penlight cells) Amateur Net . . . **\$129.50**



RANGER II—Now!—A new version of the popular 75 watt CW or 65 watt AM "Ranger"! Also serves as an RF/audio exciter for high power equipment. Self-contained—instant bandswitching 160 thru 6! 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 Amateur Net . . . **\$249.50**
Cat. No. 240-162-2 Wired, tested
Amateur Net . . . **\$359.50**



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 thru 10 meters—no extra crystals to buy—no realigning necessary. Delivers solid 200 watts CW and P.E.P. SSB input; 90 watts AM (25 to 30 watts output—upper sideband and carrier). Built-in VFO—exclusive RF controlled audio speech power. Wide range pi-network output circuit—extremely smooth VOX and anti-trip circuits. Fully TVI suppressed. Self-contained heavy-duty power supply. Wired and tested, with tubes and crystals.

Cat. No. 240-302-2 Amateur 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 a solid 2000 watts P.E.P. (twice average DC) input on 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. Wired and tested, with power supply, tubes and crystals.

Cat. No. 240-304-2 Amateur 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". Completely wired and tested, includes everything you need—no soldering necessary—complete the entire conversion in one evening.

Cat. No. 240-303-2 Amateur Net . . . **\$619.50**

New! "Valiant II"

● Built-in provisions for use with SSB adapter... increased communications power... VFO designed for outstanding stability so vital to SSB operation!

Newly restyled—and offering many new operating and performance features, the "Valiant II" gives you outstanding flexibility and performance in a compact desk-top rig! Completely bandswitching 160 through 10 meters—delivers a full 275 watts input CW or SSB (with auxiliary SSB exciter or the new Viking SSB Adapter) and 200 watts AM! Low level audio clipping prevents overmodulation and increases modulation level and intelligibility for increased communications power. Differentially temperature compensated VFO operates in the 1.75 to 2 mc. and 7.0 to 7.45 mc. ranges—provides the extreme stability necessary for peak SSB operation. High efficiency pi-network tank circuit will match loads from 50 to 600 ohms and tunes out large amounts of reactance—final tank coil is silver-plated. Other features: complete TVI suppression; timed sequence (grid block) keying; high gain push-to-talk audio system for use with high impedance crystal or dynamic microphones; built-in low pass audio filter; self-contained power supply; and single control mode switching.

AS AN EXCITER—The "Valiant II" will drive any of the popular kilowatt level tubes, and will provide a high quality speech driver system for high powered modulators. The 9-pin receptacle on the rear of the transmitter brings out TVI filtered control and audio leads for exciter operation... Also permits the "Valiant II" to be used as a filament and plate power source, as well as a modulator for auxiliary equipments such as a VHF transmitter.

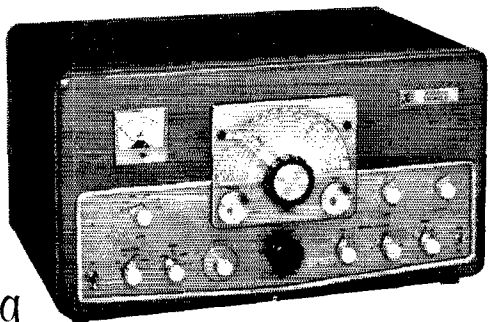
SSB OPERATION—New in the "Valiant II" are provisions for plug-in SSB operation with no internal modifications necessary. Rear panel coax fittings are provided for VFO output and SSB input, and a 5-pin plug, also located on the rear panel, provides connections for remote control of the final amplifier bias and VFO keying through the VOX control of the SSB adapter.

Available completely wired and tested or in a complete kit.

Cat. No. 240-105-1 Viking "Valiant II" Kit with tubes, less crystals..... **AMATEUR NET \$37500**

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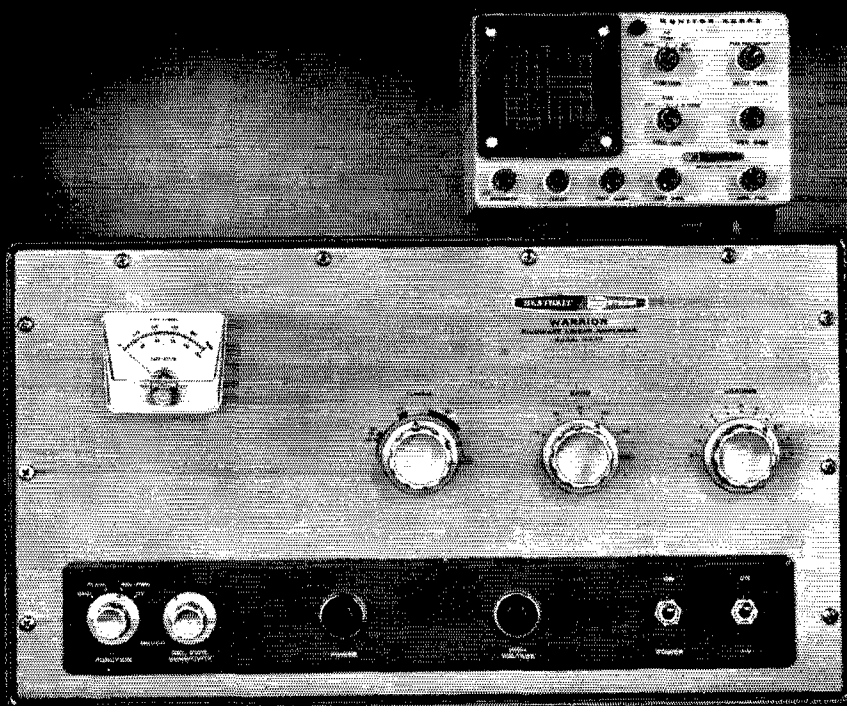


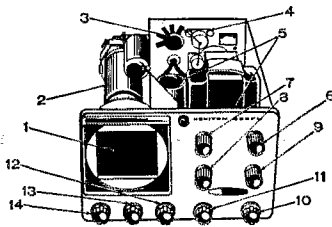
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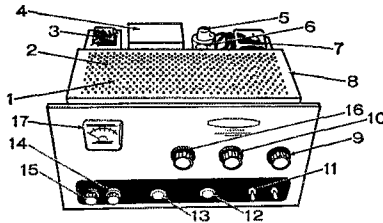


HEATHKIT AMATEUR MONITOR 'SCOPE... just \$59.95

1. 3" CRT 2. Neckshield minimizes external field effects 3. RF attenuator accommodates 5w to 1 kw power levels 4. Rear panel RF feed-through connectors and input and output jacks 5. Compactrons for space-saving layout 6. Sweep frequency adjust with "clamp" position to prevent CRT burns under SSB no-modulation conditions when using trapezoid function 7. Wave envelope, AF or RF trapezoid selector 8. Built-in single or two tone test generator 9. Horizontal gain 10. Horizontal position 11. Vertical position 12. Vertical gain 13. Focus 14. On/Off/Intensity

Go Linear with the Heathkit Desk-Top Kilowatt... \$229.95
Stay Linear with the Heathkit Monitor 'Scope.... \$59.95

Put this space-saving twosome to work in your shack for a clean KW of single sideband. The "Warrior" in a short time has justly earned a world-wide reputation as the finest watts-per-dollar value anywhere in kilowatt linears. QSO an amateur who has one, there are hundreds on the air. The new Heathkit Monitor 'Scope is especially designed for hams with useful patterns for checking "flattopping" and non-linearity in SSB linear amplifiers, observing modulation characteristics of AM and SSB transmitters, and monitoring the quality of received signals. Send for free specification sheets on these ham-engineered, quality kits from Heath.



HEATHKIT DESK-TOP KILOWATT LINEAR... \$229.95

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



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IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a \$16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been talking about.

Wishing you the best for 1959, I am

Sincerely yours,
Thomas G. Gabbert, K6INI (Ex-T12TG)

**OR IS K4ZRA THE NEW
CHAMP?** Read his letter, and see his diagram of a typical installation and what it achieved:

2539 Christie Place
Owensboro, Kentucky

GOTHAM
Miami Beach, Florida

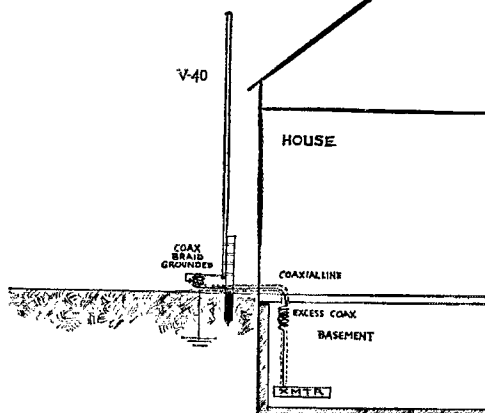
Gentlemen:

During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military ARR-7 (Hallcrafters reboxed SX-28.)

The above mentioned contacts were made with the vertical mounted several inches off the ground, without radials, with only a simple ground connection to the coaxial shield.

Daniel F. Onley, K4ZRA

K4ZRA's INSTALLATION THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL



FREE

Send a card for our valuable catalog of 50 different antennas with specifications and characteristics. Gives bands and frequencies covered, element information, size of tubing used, boom length, shipping weight, feed line used, polarization, and other data.

OLD-TIMER K4KXR (ex-W2JAY) SAYS:

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THE GOTHAM V-80 IS THE BEST ALL-BAND ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets¹ 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. **ONLY \$16.95.**

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GOTHAM

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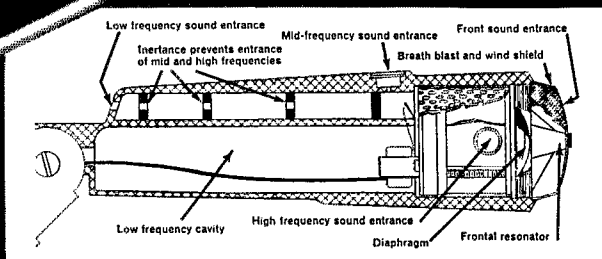
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More effective cardioid pattern, essential for SSB, cuts accidental tripping of VOX circuit!

MODEL 664



HERE'S HOW IT WORKS

Exclusive E-V Variable-D* (Variable Distance) provides three sound-cancelling entrances at different fixed distances in back of the diaphragm. These entrances, utilizing the proper acoustical impedances, combine to form an effective front-to-back spacing which varies in distance from the diaphragm inversely with frequency. The resulting phase and amplitude conditions provide a uniformly true cardioid pattern at all frequencies.

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Here's What the Top Radio Amateur Operators in the World Say About These E-V Microphones:

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- W8KML** "The 664 surpasses its claims in difficult operational environments."
- ZL1HY** "During QSO's . . . everyone preferred the 951."
- W3JNN** "I am really sold on the 664."
- W8BF** "I have had many unsolicited compliments since using the 729."
- VQ4ERR** "The performance of the 664 matches its thoroughbred appearance."
- PY2GK** "My 664 microphone vastly improved my SSB transmission."



Average Peak-Power and Intelligibility!

CHOOSE AN *Electro-Voice*[®] MICROPHONE

Model 664 for Highest Front-to-Back Discrimination Manufactured, Plus Peak-Free Wide-Range Response!

The effective strength of all sounds arriving at the sides of the 664 are reduced by as much as 50%, and arriving directly at the back of the microphone by as much as 90%. This uniquely effective design permits you to work at twice the distance from the microphone . . . a perfect invitation for "arm chair" QSO's—with no VOX tripping problems.

Smooth, peak-free response guarantees maximum P.E.P. Remember, a peak in response in or out of the voice range will limit maximum modulation and result in reduction of P.E.P. You do not have to talk with your lips on the mike. For best results, sit back and talk naturally.

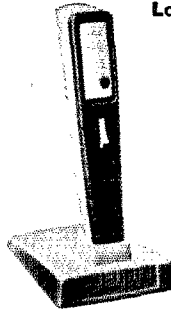
Virtually indestructible Acoustalloy[®] diaphragm withstands high humidity, temperature extremes, corrosive effects of salt air and severe mechanical shock. Extra ruggedness means extra service, year after year.

MORE 664 FEATURES: Output—55 db. On-off switch (can be wired for relay control). 150 ohms or Hi-Z output selected at cable connector. Satin chromium finish. High-pressure die-cast case. Pop-proof filter plus magnetic shield. 90° swivel mounting. 18 ft. cable. 7 $\frac{3}{8}$ in. long (less stand coupler) by 1 $\frac{1}{2}$ in. diameter. Net Weight 1 lb., 10 oz. Amateur Net, \$51.00. Matching desk stand with DPDT switch. Model 419S, \$9.00. Less switch. Model 419, \$6.00.

The World's Finest Mobile Microphone. Model 600D Dynamic Widely Known As Military Types T-50 And M-105/U!

Designed for high articulation under rugged mobile conditions, the Model 600D provides all the advantages of a dynamic element with peak-free, flat response for maximum P.E.P.

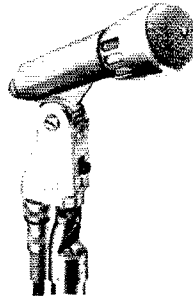
High-impact case soaks up physical abuse, feels comfortable at any temperature, fits hand naturally. Extremely high output of -55 db. is ideal for mobile equipment with severe audio requirements. Available in 50, 250 ohms or Hi-Z. DPDT switch. 6 ft. coiled cord. Panel mounting bracket included. Model 600D Amateur net, \$28.50.



MODEL 729SR

Lowest-Cost Ceramic Cardioid Available ... Includes Every Feature Essential For SSB Operation. Flat, Smooth Response From 300 To 3,000 CPS!

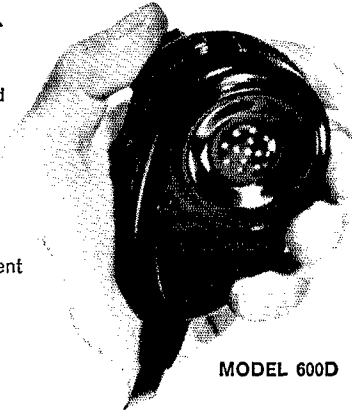
Rugged enough for mobile operation, the slim, small Model 729 fits easily in your hand or slips into the desk stand or floor stand adapter provided, without any hardware adjustments. Hi-Z output -60 db. Two-tone grey, pressure die-cast and plastic construction. Shielded, 8 $\frac{1}{2}$ ft. cable. 7 $\frac{3}{4}$ in. long by 1 $\frac{1}{2}$ in. wide. Net weight 1 lb. Ceramic element unaffected by high heat, humidity. Model 729. Amateur net, \$14.70. Model 729SR with relay-control switch. Amateur net, \$15.90.



MODEL 951

First True Crystal Cardioid With Variable-D Design. Combines High Output With Excellent Noise Rejection At Modest Cost!

Finest crystal microphone available for SSB. Variable-D design of Model 951 cuts room noise, interference from receiver speaker to a minimum. Allows greater working distance to microphone. Peak-free rising response for high intelligibility. Hi-Z output -60 db. High-pressure, die-cast finished in Metalustre grey. On-off switch. Shielded, 18 ft. cable. 5 $\frac{1}{4}$ in. long (less stand coupler) by 1 $\frac{1}{4}$ in. diameter. Net weight 1 $\frac{1}{4}$ lbs. Model 951 Amateur net, \$32.70. Matching desk stand with DPDT switch. Model 418S, \$9.00. Less switch. Model 418, \$6.00.



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moved to a room in Red Cross Hq. and set up club station K2BFB. The RAWNY held Old-Timers Night in Buffalo with many pioneer hams in attendance from all over. If all hams could capture the spirit of brotherhood that prevailed I'm sure all our problems would be solved. W20MV gave a talk to Clyde Lions Club, showed an ARRL c.d. film and gave a live 2-meter demonstration. WA2WVV/VO2 has been assigned permanent duty to the ham station in Goose Bay. The Ogdensburg ARC held a raffle and raised 82 dollars for Field Day expenses. W2PVI is doing a first-class job on the NYSPTEN Net Directory and net activity reports. W2GSS is organizing a statewide Red Cross teletype net on amateur frequencies. Interested parties are requested to contact him at 209 Knapp Rd., Syracuse 4, N.Y. The ARATS has named its bulletin *The Coherer*. It is published and edited by W2RGJ. W20FZ has a 2-k.w. p.e.p. linear on s.s.b. WA2BCW gave a talk on slow-scan TV to the CARA. All active clubs are invited to submit regular reports of activities and/or club bulletins to the SCM each month. There have been many requests from hams mobiling through our area for active local net frequencies. Your SCM will compile a list of monitored frequencies by area if sufficient response is received. Permit for operation in Canada may be obtained by writing: Director, Telecommunications and Electronics Branch, Department of Transport, Ottawa Canada. Traffic: WA2OPG 592, WEZBZ 367, W2MTA/2 346, W2RUF 275, W2FEB 190, WA2HSJ 166, K2RTO 166, W2RKL 172, WA2KZQ 61, K2QDT 39, WA2XY 35, K2OFV 33, WA2LKW 27, W2PVI 26, W2RQF 21, WA2GLE 14, WA2TDE 13, K1BVI/2, 12, K2HOH 12, WA2WEE 12, K2AFE 11, K2SSX 10, K2PNA 8, WA2SHE 7, K2PBU 6, W2RUT 6, K2TDC 6, WA2DAC 5, K2GOI 4, K2MWS 4, WA2VTV 1.

WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: W3WRE, Asst. SEC: W3KUN. RMs: W3KUN and W2NUG. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets 2330 GMT on 3585 kc. Mon. through Fri. W3JHG is on 160 meters. K3KMO has WAS on 80-meter c.w. now. The Steel City ARC reports via *Kilowatt Harmonics*: W3YDP is down-under on company business; W3UTCH has a new 15-meter beam; W3MPO is in YV-Land. The Mercer County Radio Assn. recently changed its name to the Shenango Valley ARC. The Penowva Net had a large turnout at its banquet in Burgettstown. W3LOD has a new Marauder s.s.b. rig. The Etna RC reports via *Oscillator*: W3MTY is on s.s.b. with an HA-32B; K3OTY and W3LKZ have an HE-50. K3COT is recuperating very nicely from major surgery. K3BWI is mobile on 6 meters. The Bedford County ARC has selected a new club frequency of 3885 kc. on Sun. at 8 A.M. and Wed. at 10 p.m. K3MNP is putting together a Mohawk receiver. DX station HS1R recently was assigned to duty in the Pittsburgh Area and will be operating as W5OZI/3. The Cumberland Valley ARC reports via *Valley QRM* that the 1962 Cancer Drive was a huge success using mobiles. W3SYY participated in the V.H.F. Contest at K3HKK. A new Novice in Meadville is KN3SYP. The Coke Center RC has a movement on foot to supply some equipment for W3THY, who sojourns at the County Home in Uniontown. The H-CAR reports a new Novice, KN3SNJ; W3WIV and K3HXV have KWM-2s. Uv Erie way: K3HYL has a new T-bird tribander; K3CWS is attending Case Inst. in Cleveland. W3LIV has a new HT-41 linear. K3KMO will be leaving for Germany in July to start an 18-month assignment. The Penna. C.D. Net (c.w.) meets on 3537.5 kc. at 1400 GMT Sun. Traffic: (Apr.) W3WRE 825, W3KUN 222, W3SMV 66, W3JHG 53, W3LSS 52, W3UHN 50, W3OEO 41, W3RTV 30, K3-EDO 24, W3IYI 15, K3DCI 13, W3HXF 8, W3LOD 7, K3GQA 6, K3KMO 5, W3KNQ 5, K3COT 3. (Mar.) K3KMO 33.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. RM: W9USR. PAM: W9RYU. EC of Cook County: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. The Radio Amateur Megacycle Society (Chicago) now meets the 4th Fri. of each month at Shabonna Park, 6000 West Addison St. K9OZM is now on phone with a home-brew job. WA9ACO is working the hard one with a new vertical and reports FB contacts. K9ZKN also is sporting a new beam for the same purpose. The ILN handled 336 messages during its 21 sessions and the North Central Phone Net had a traffic count of 194 for the same period. The net members of this section, together with all the amateurs, mourn the loss of W9FAW. Our sympathy to his family and to his many friends. K9TOK made WAS. W9HJY has finished his Heathkit Twoer and is trying to work WAS on that band. New Novices heard from Northern Illinois were

WN9DKL and WN9BQA. W9HOA added a Collins 32V-3 to his shack. Your Director, W9GPI, and your SCM, W9PRN, attended the Haunvention at Quincy May 19. K9YVT, W9VOX, K9YLV, K9UCG, W9QKE, W9GFF, W9IMN, K9JTD, W9KCR, W9NPC, W9U4, K9KZW, W9IPT, W9FLQ, W9ALS and W9ZTN participated in the recent Frequency Measuring Test. Delegations of several amateur radio clubs in northern and central Illinois joined with the Joliet Amateur Radio Club in observation of "Old Timers" Night at the JARS club house May 1. K9IVG has moved, her QTH from Berwyn to Indiana. The Chicago Area Radio Club Council sponsored a tour of the Great Lakes Training Station June 16 and it was a great opportunity to witness this modern electronic training center. W9YTX, the former SCM of this section, is recuperating from a recent illness. W9TEM was active from the 1962 International Trade show from McCormick Place. K9QMJ was appointed OES. K9QPA and K9VJX are experimenting with RTTY. K9DWR has erected a new ten-element Hy-Gain 144-Mc. beam and also is getting ready for the 220-Mc. band. New officers of the Vermillion County Amateur Radio Assn. are K9JLC, pres.; W9JZH, vice-pres.; K9RKY, secy.; K9JLA, treas. K9UDG is the editor of its publication and K9WUV is program chairman. Through a typographical error K9RUC was reported to have passed on. We regret this error and hope that he has not been cited for bootlegging his call. The traffic count for the Chicago Area Emergency Net was 20 and W9BQC reports that the Rockford 2-Meter Net had 75 check-ins during its five sessions representing 27 stations in 7 cities. W9CWH has completed an RTTY auto-start terminal unit for monitoring 147.7 Mc. K9MWA was appointed OBS. W9IDA and K9UGY are recipients of BPL certificates for April traffic. W9IDA made BPL in February. Traffic: (Apr.) W9IDA 633, K9UGY 551, W9USR 435, K9BTE 363, K9OZM 285, K9OUV 241, W9EET 187, W9AKV 151, W9QQG 124, K9OCU 97, K9KZB 96, W9XVJ 79, K9J5V 75, K9DRS 64, K9OAD 38, K9ZQT 31, K9IVG 28, K9QYV 28, K9LXG 27, K9RAS 28, K9VQC 24, K9UCG 22, K9VJS 18, K9CRT 15, W9MAK 12, W9PRN 10, K9SQG 9, K9PYD 8, K9TVA 2, K9PZP 2, K9DWR 1. (Mar.) W9-11A 582, K9YNW 52, K9DRS 29, K9QYV 27, K9CRT 22, K9RAS 12. (Feb.) W9IDA 309.

INDIANA—SCM, Donald L. Holt, W9FWH—Asst. SCM: Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: K9KTL, K9CRS, K9GLL. RMs: W9TT, W9VAY, K9WET. Net skeeds: IFN, 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.), 1930 daily on 3920 kc.; QIN (training), 1800 M-F on 3745 kc.; QIN, daily at 1900 and RFN, 0700 Sun. at 3556 kc. The Delaware County Amateur Radio Association will hold its Annual Hamfest from 10:00 a.m. to 4:00 p.m. Sun., Aug. 19, 1962, at the Fairgrounds, Muncie, Ind. K9CRS was appointed PAM of the Indiana Single Sideband Net. A new Novice in Seymour is WN9BYB, new Techs. in Anderson are K9FVV and WA9CMK; new Conditional Class licenses in Winslow are K9DHL, K9GHN and K9SXF. QIN Honor Roll: K9SGZ, W9TT, W9QLV, W9VAY, K9WVJ, K9VEJ, K9WET. New officers of the Bloomington ARC are K9KKE, pres.; W9AOC, vice-pres.; K9QDD, secy-treas. Board members are K9YXK, W9YAN, K9KTH and K9UFX. Those making BPL: W9JZO, K9YIC, W9NZZ, W9RTH and K9LXS. April net reports: IFN 339, ISB 411, QIN 277, QIN (training) 37, RFN 75, Hoosier V.H.F. 246. Traffic: (Apr.) W9JZO 1440, K9YIC 424, W9MM 261, W9VAY 227, W9NZZ 215, K9SGZ 195, W9TT 172, K9OBT 169, W9RTH 117, K9IXS 111, W9FJR 106, K9WET 103, W9ZYK 99, K9GLL 94, W9BUQ 92, K9ZLA 78, W9QLV 69, W9RE 67, W9FWH 66, W9MPT 60, K9KTL 63, K9RWQ 63, K9CIF 45, K9JSI 44, W9GJS 41, W9SNQ 37, W9YC 36, W9QYQ 33, K9YJW 33, K9ZUP 33, W9AWH 27, K9ILK 25, K9CRS 24, W9EJW 24, W9OG 22, K9FPV 20, W9BRW 17, K9ZLB 17, W9EGV 16, K9YXK 16, W9IMU 15, K9DZV 14, W9DGA 13, W9DOK 13, K9VWJ 13, W9CKW 11, K9RGS 10, W9BDP 9, W9DZC 9, K9VEF 8, W9HUF 8, K9MAN 6, K9HMC 5, W9ZNC 5, W8LFG 4. (Mar.) W9DGA 10, W9OKR 7, K9CMH 6, W8LFG/9 4, K9ATY 3, K9VBA 2, W9YDP 1.

WISCONSIN—SCM, Kenneth A. Ebner, K9GSC—SEC: W9BCC. RMs: W9VIK and W9VHP. PAMs: W9NGT, W9NRP and W9SAA. New appointments: W9-KQB as OO Class IV and K9WVM as OBS. The OO appointment of W4VRD/9 was promoted to Class I after his FMT results of 4 p.p.m. Other FMT results were: W9SZR 17.2, W9DOO 24.2, W9RKP 79.2, W9LFP 82.5, W9ONI 140.1 and K9GDF 150.3 p.p.m. Endorsements: W9ONI and W9DYB as ECs, W9VTK as RM and ORS. K9YLK is experimenting with the 61D4 nuvistor. K9ZMS and K9ZMT have received their WAS awards. WA9DHL is holding Novice classes for SPARK. W9QFC has confirmations from all countries of the 15th zone. K9GSC has a new Heath Apache. K9UUT worked 5U7AC with his beam on the ground. K9HBT has received his General Class license. K9CKA has dropped the "N" from his call and has a DSB-100. K9ELT worked HK0AB.

(Continued on page 106)

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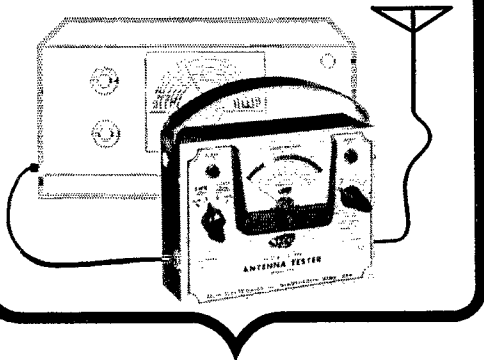
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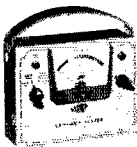
(Continued from page 104)

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W9KQB again is handling traffic. The WNA Picnic will be held July 8 at Hartford. Get details from W9NGT. W9IQW is back on the WIN as Thurs. NCS. K9LGU has an Apache and an HQ-170. W9NBDX has an Eico 725 transmitter. K9GDF has received his Zone 4 award and Great Lakes Award. W9DYG made the HPL in April. Traffic: W9DYG 804, W9KQB 375, W9SAA 153, W9VHP 95, K9UUT 80, K9GSC 64, K9GDF 52, W9VIK 52, K9WGN 51, W9CBE 42, K9LGT 30, W9IQW 23, K9WVM 28, W9DWH 24, W9OTL 23, W9RZ 19, W9YT 17, K9MR 16, W9HPC 11, K9REC 11, W9WJH 11, K9ZMU 10, WA9DHL 7, W9AIWQ 7, K9RTB 7, K9QKQ 6, W9ONI 4, K9WIE 3.

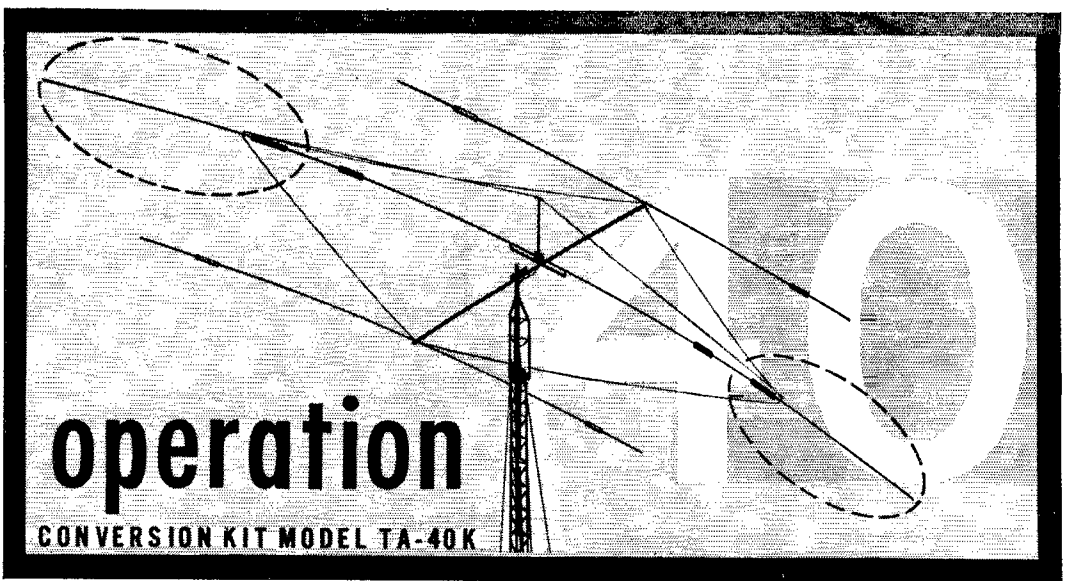
DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, W0-HVA—SEC: W0CAQ, RM: K0QWY, PAM: K0TYT. The North Dakota 75-Meter Phone Net report for Apr.; 25 sessions, 379 check-ins; maximum check-ins 37, minimum 13; 42 pieces of formal, 72 informal traffic handled with 6 relays. The North Dakota C.W. Net report for Apr.; 10 sessions, 53 check-ins; maximum check-ins 8, minimum 4; 2 pieces of traffic handled. The C.W. Net sessions closed Apr. 30 for the season and will reopen Sept. 3. K0IVQ has a new RME-4350A receiver. K0RSA has a home-brew mobile rig. K0YWD is experimenting with a rocket transmitter for 6 meters. The Central Dakota Radio Assn. has changed its name to Bismarck Area Radio Klub, BARK. Meetings are held twice a month. Present officers are K0HDA, pres.; W0BHT, vice-pres.; K0IKD, secy.; W0QWG, treas.; K0JNB, act. mgr.; W0IKW, trustee. Traffic: (Apr.) K0IVQ 451, K0ITP 42, K0RSA 20, K0TPK 18, K0QWY 14, W0YCL 9, K0JNB 6, K0TYT 6, W0IRN 4, K0YWD 4. (Mar.) W0IRN 28.

SOUTH DAKOTA—SCM, J. W. Sikorski, W0RRN—SEC: W0SCT. Our February report should have read K0WEN as OPS instead of K0WEM. April appointment: W0CUC as OO. K0CVF received his General Class ticket. K0GSY is on phone with a Viking II. K0LKH operated portable from high school as a physics project. The Sioux Falls ARC conducted another successful quarterly auction. W0RRN "graduated" a class of six Novices. W0DSK has moved from Milbank to Sioux Falls. K0FKJ, Dell Rapids, worked 4 new states—Tennessee, Arkansas, Mississippi and New Mexico—on 50 Mc. during the week of April 23. Traffic: W0SCT 350, W0ZWL 227, K0BAQ 142, W0DVB 126, K0CXL 31, K0AIE 26, W0OFP 18, K0ZBJ 13, K0BSW 13, K0JGM 13, W0NNX 12, K0WEN 12, W0FJZ 10, K0TKN 8, K0VY 8, K0YJF 6, K0YNS 6, W0YVF 6, K0BRC 5, W0A0Y 4, W0DIY 4, K0HQD 4, K0WEM 4, W0SWH 2, K0LKH 1.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, W0KJZ—Asst. SCM: Charles Marsh, W0ALW, RMs: W0KLG, K0AKM, PAMs: W0GCR, K0EPT. We deeply regret to report that W0VOY, of Tracy, is a Silent Key. The SPRC of St. Paul elected W0THY, pres.; W0QKJ, vice-pres.; K0WML, secy.; W0KKO, treas. W0RQJ, one of our first to hold the Extra Class license, has a home-brew station except for his 75A-4 receiver. The following MSN c.w. operators can be heard on s.s.b.: W0-1S7, KLG, DQL, KJZ, K0S IDV and OTH. W0DOB, licensed since the "ole spark days" in '21, can be heard on the air with a DX-40 and a SX-25 receiver. W0MDL, phone since '51, is now on RTTY, v.h.f., s.s.b. and police. He has a 5LJ3, an NC-300, a 100V and models 15 and 19 RTTY. K0EUI has a Ranger transmitter and a 129X receiver. The U. of M. Club station is operated by K0UXQ, K0TDB, K0HKZ, W0ISJ and W0QDZ. K0JXE, of Rochester, won the McPherson scholarship; he plans to attend Dartmouth College in the fall. Director W0BUO spoke at the RARC. K0HGO recently was added to the staff of E. F. Johnson Co. as test engineer. New Novices in Rochester are K0JEX and W0OCBZ. K0JFV passed the Tech. Class exam. W0JBT has a Valiant transmitter, an NC-173 and a TA-33 beam. K0CIE can be heard with a Globe Scout and an NC-183. K0RCF recently was made EAN-TCC liaison on CAN. K0PIZ is a member of Bloomington RACES and has a GSB, a 100-Hv-Gain vertical and an RME 4350A-4301 receiver. W0A0, CAH and CAI are a father-and-son team in Wheaton. They use a Viking II and an HQ-129X receiver. K0FSU, of Biwabik, is using an Eico 720 and an HQ-100 receiver. K0IJU is now a member of MSPN, PICONET and placed first in the Novice Class in the '61 SS Test. Mark the following picnic dates in your ham activity calendar. MRC, Minneapolis Sun. Aug. 5. St. Cloud at Wilson Park Sun. Aug. 19. Traffic: (Apr.) K0OTH 405, W0KJZ 272, W0YC 109, W0KLG 86, W0HEN 54, K0WPK 40, K0ZKK 40, K0QBI 36, W0ADX 34, K0FJZ 34, W0MXC 33, W0ATO 32, K0SBB 30, W0UMX 30, W0OPN 29, W0LST 27, W0ALW 26, W0THY 21, W0RIQ 20, K0YJZ

(Continued on page 108)



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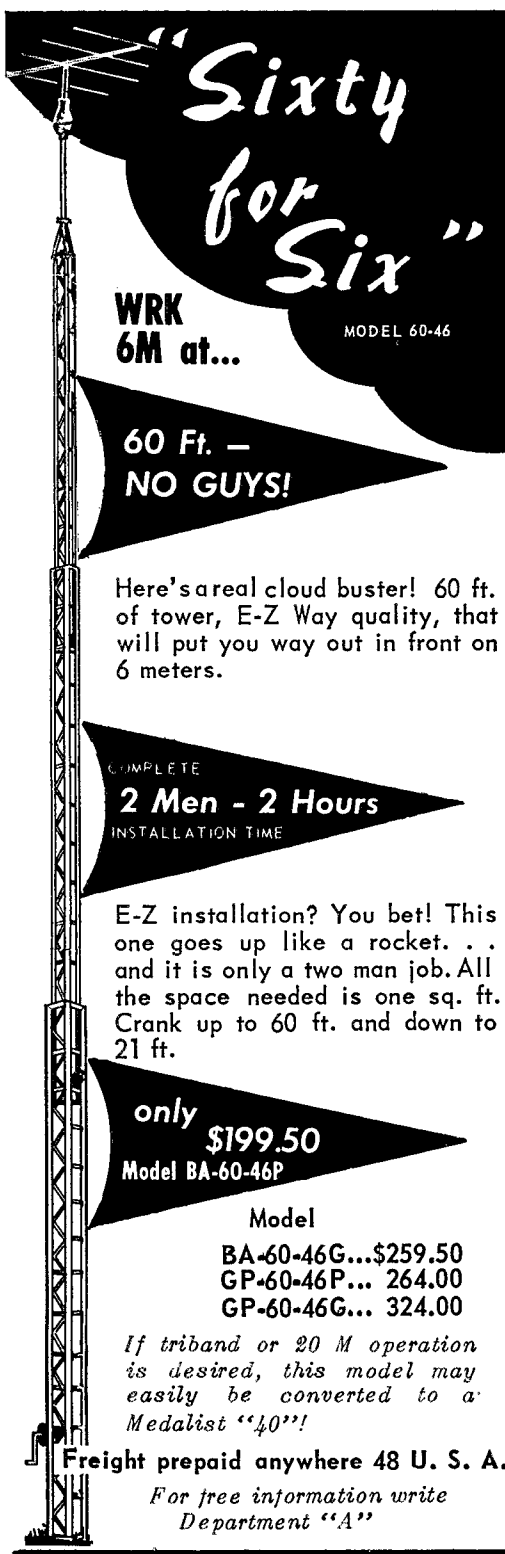
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19. KÖPIZ 19. WOWMA 17. KODEF 16. KOCNI 10. WAOABU 9. KOZOH 9. KOUBA 7. KÖVPJ 6. WÖFGP 5. KÖLJU 1. (Mar.) KÖPIZ 11.

DELTA DIVISION

ARKANSAS—SCM, Orlia L. Musgrove, K5CIR—SEC: K5IPS. PAM: W5DYL. RM: K5TYW. Judging from all reports the Eureka Hamfest was a big success, the best ever. The Breakfast Club has asked the members of the Arkansas Emergency Phone Net not to tune up on 3985 kc. until 0600 because it interferes with its net. Two-meter activity in the Fayetteville Area is at an all-time high, with more stations coming on all the time. W5RDY is the c.d. director for Jefferson County, and W6KRO is the new assistant director. They have some big plans for RACES here in the county. The Arkansas Emergency Phone Net met 25 times during the month of April and had a total of 924 check in, for an average of 37. Traffic: K5TYW 189, K5IPS 31, K5YCM 26, K5GTN 15, K5ABE 2.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Your SCM had a very nice meeting with the Caravan Club at Shreveport. An old-timer who attended the meeting was Dr. Scott, W5AEN. W5KRX, K5CZV, W5WGC and K5QXV had their appointments renewed. W5CEW is back in the saddle again calling the Delta 75 Sun, mornings. K5LZA was active from the home QTH during the Easter holidays. W5CEZ says the SCM misquoted his traffic count and credited W5CEW with it. W5MXQ, our SEC, attended the Lake Anacoco Hamfest and reported about 150 attended. Al reports the Delta Division Convention plans are progressing FB. New Novices in Ville Platte are WN5BWB and WN5BVK. W5WWR has been working portable in West Monroe on 20, 40 and 6 meters. K5VJT is sure keeping Lafayette on the map. W5UQR, one of the top v.h.f. OES appointees, has been doing some fine work on 6 meters. WN5BAN has been practicing code with WN5BLG and WN5BLH on 21,225 kc. at 1930-2100 CST. K5JAX has a 1-kw. linear on 6 meters using a 450TH grounded grid. K5GVE is using a pair of 810 tubes on 6 meters with a kw. input. W5JGV, who is an OES, sent in such an elaborate report that a copy was dispatched to QST for "50 Mc. and Above." From finals, excitors, antennas, loops, etc., not to mention a TV transmitter in the making, the report made very good reading. The Springhill ARC had three transmitters and K5VSU, K5SQO, K5QNK, K5ELM and K5ELJ on Field Day. W5WSF advises that the quad tuning stub as described in the ARRL *Antenna Handbook* should be 58-60" and not 30" as shown. Please send reports before the fifth of each month. Traffic: W5CEZ 349, W5MXQ 89, K5QXV 42, W5CEW 38, K5CZV 18, W5EA 4, K5LZA 4, K5VJT 4.

MISSISSIPPI—SCM, Floyd C. Teetson, W5MUG—This report was prepared at League Headquarters while I was there attending the Board Meeting. You should visit W1AW and League Headquarters when you can. W5CKY reports he has just worked country No. 300. The Biloxi gang had a fine simulated emergency test recently. The Meridian Club's Magazine, *QRM*, had a fine schematic on a 6-meter rig in a recent issue. K5GAD and K5WSY handled traffic during Amateur Radio Day at school this year. K5DGL has a new conelrad alarm. K5DZF reports that W5YE is back on the air at "Ole Miss." W5WZ reports that WA5DGO is on the air with a new ticket and a new HT-37. The Jones County Club Bulletin had a fine sketch on an inexpensive conelrad monitor recently. The Natchez and Vicksburg Clubs held FB suppers recently. Glad to see the increased activity, gang. See you at the Jackson Hamfest. Traffic: K5WSY 120, K5YYPV 31, K5DGL 14, K5GAD 11, W5WZ 10, W5YE 10..

TENNESSEE—SCM, David C. Goggio, W4OGG—PAM: W4PQP. RM: K4AKP. I would like to express my appreciation to all who supported me in the recent election. All who can are urged to check in the section nets. The Phone Net meets at 0645 Mon.-Sat., 0800 Sun. or 3980; the C.W. Net at 1900 Mon.-Sat. on 3635 kc.; the Sideband Net at 1800 Mon.-Fri. on 3980 kc. All times are CST. New officers of the reorganized Jackson Radio Club are W4WTP, pres.; W4UN, vice-pres.; WN4BCT, secy. W4PL, the dean of Tennessee traffic men, still is pounding brass from his QTH in Chattanooga. New appointee: WA4FPS, with previous runs of 3.7 and 1.5 parts per million error, as OU Class I. Congratulations to K4PUZ on the national high score in the CD party. The Delta Radio Club of Whitehaven (Memphis) will hold its Annual Hamfest Aug. 4 and 5. See Hamfest Calendar for details. Make your plans now to attend the Delta Division Convention in New Orleans Labor Day week end. Reports were received from: OOs K4PUZ, WA4FPS; ECs W4JVM, K4TFA, W4TYV, W4TZG, W4TZJ, W4WBK, W4ZBQ; OES K4KYL;

(Continued on page 110)

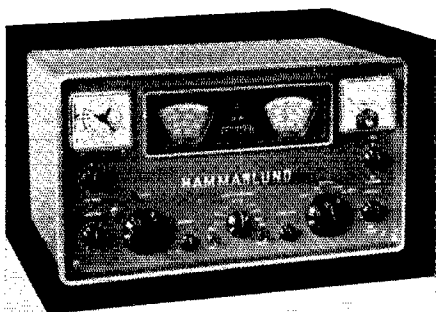
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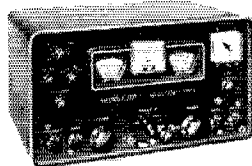
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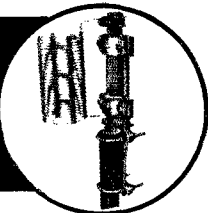
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OBSs W4SGI, W4OQG, W4TZG. Net reports: Phone Net, 872 check-ins, traffic 94; C.W. Net, 233 stations, traffic 122; ETPN, 378 stations, traffic 73. Reports were received from Loudoun County (Oakridge) MARRA (Memphis) and Delta (Whitehaven) Clubs. All clubs are urged to send copies of their Newsletters for news. Jack Hudson was the main speaker at the first combined meeting of the three Memphis clubs and 78 members enjoyed his talk on FCC Rules & Regulations. K4JIG, W4OQG, K4DJ0, K4AKP and W40GG attended the Birmingham Hamfest along with 3000 others. Traffic: K4AKP 1515, W4PL 638, W40GG 289, W4OQG 127, W4PQP 116, K4OUK 69, K4WUG 45, W4UIO 36, W4LLJ 30, K4WVQ 27, W4FPF 23, W4TYV 23, K4TAX 18, K4CPC 15, W4TJZ 14, W4VTS 14, K4JXG 13, K4VOP 13, W4TZG 10, W4JVM 5, W4PSN 5, K4PUZ 5, W4SGI 5, K4TTA 3, W4ZYJ 3.

GREAT LAKES DIVISION

KENTUCKY—SCM, Elmer G. Leachman, W4BEW—SEC: W4BAZ, PAM: W4ZDB, RAI: W4CDA, V.H.F. PAM: K4LOA. Calling all amateurs to Lexington, Oct. 13, for the State ARRL Convention, Phoenix Hotel. An important traffic link is established to South-East Kentucky through W4EON on 3660-ke, phone daily at 6:45 EST. Tom is publicity director of the very active East Kentucky Amateur Radio Society, Louisville AREC, under the direction of W4BAZ (SEC), set up on 53.6 Mc. at the Annual Home Show and originated 477 messages. W4BAZ urges all ECs to become more active with membership drives, local tests and monthly reports. K4LRX now holds WAS, WAC, AI, A3, OBS, RCC, WBE and DXCC certificates. W4JUI is building an s.s.b. exciter. K4ZQR is setting up on RTTY. W4CDA has Rand-McNally maps of Kentucky. Order yours. K4TQZ also is working on RTTY equipment. K4KWQ holds the traffic record this month and has made BPL three times in a row. He also received his 9RN and CAN certificates. The Central Kentucky Emergency 6-meter Net meets on 50.3 Mc, Mon.-Thurs. at 2230 EST. Other areas should try to tie in. All stations should check ARRL appointments. Send certificates to the SCM for endorsement if needed. Traffic: K4KWQ 621, W4BAZ 398, K4CSH 379, K4OZG 120, W4CDA 116, K4HOE 113, W4KJT 38, K4OLT 24, W4SZB 22, K4NYO 20, K4VDO 17, W4YYI 17, K4QZR 12, W4BEW 11, K4LDA 9, K4TQZ 9, W4JUI 3.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8LOX, RMs: W8EGI, W8QOQ, W8FWQ, K8KMQ, PAMs: W8CQU, K8LQA, V.H.F. PAM: W8PPT. Appointments: W8PDE, W8QOO as ECs; W8HKT, K8HLR, K8KQV as ORRS; K8LQA, K8LZF as OPSs; W8ACNT, W8FWG as OBSs, K8RQO as OFS; K8RDE as OO. Officers of the Lake Huron RC are: K8GSW, pres.; K8EFG, secy. The Upper Peninsula Hamfest will be held Aug. 4-5 at Munising; the West Mich. V.H.F. Picnic, usually Aug. 5, at Allegan State Park; the W8SB/RR/MEN Picnic in July (set the time and place on their net); the QMN Picnic Sept. 9 at W8SCW. Saginaw Valley ARA announces it will be host for the 1963 Michigan ARRL Convention. K8PKU handled traffic for servicemen, K8KMQ and K8ZZW made the BPL, but K8JJC missed by 1. W8BEZ is building his own electric plant. K8SHQ and K8TJH like the new Warriors. W8LOX is revising the AREC list. New officers of the Ford ARL are K8LIB, pres.; K8JEL, vice-pres.; K8MYH, secy.; K8SSZ and K8TKK, net mgr. W8TKJ reports his HQ-180 works fine since he took out the back-to-back diodes he had across the antenna and ground to "kill" strong locals. K8JGP, K8KUY and K8VRJ handled Easter messages from the Veterans Hospital, Dearborn. W8USZ and W8ACW handled traffic to Flint hospitals. K8QCJ now has a new Collins KW4I-2. K8TFE hosts the Michigan P.O. Net with QMN. K8RDE (OO) has a HC-221 for better OQing. The Copper Country RAA is now an ARRL affiliated club. W8EMD is working on his new antenna farm. K8LOS has a new Phasemaster II. K8RDE and K8LOS made Class I OO. W8JTQ took a six-week vacation—in Florida. W8YGI went on a California trip. The following are in the Flint 2-Meter Hospital Net: W8AKX, K8LNN, K8NOC, K8PKU, W8USZ, K8UJZ, K8WFN, K8YGH, K8YQC. The Michigan 6-Meter Club got its ARRL affiliation charter. The City of the Straits Radio Club's affiliation charter, dated May 1922, now is in the Detroit Historical Museum. Traffic: (Apr.) W8LXJ 365, V83CYG/W8 305, K8TDJ 282, K8JG 258, K8KMQ 229, K8ZZW 192, K8HLR 104, K8RQO 89, W8OCC 82, W8ELW 78, W8ITQ 77, W8IBB 70, W8HKT 62, K8PKU 60, W8ZHB 55, W8FWQ 52, K8JCF 52, K8PYW 44, K8QLL 41, W8DSW 39, W8FP 38, W8FGI 37, W8M4I 34, W8BEZ 32, W8USZ 30, W8MIPD 29, W8EOT 28, K8QCT 18, K8SHQ 18, K8TFE 18, K8LUY 17, W8EU 16, K8IUZ 15, K8WQV 15, W8DSE 14, K8EPZ 13, W8TBP

(Continued on page 112)



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 Wind Surface Area—5.7 sq. ft.
 Wind Load—114 lbs.
 Maximum Element Length—28'
 Boom Length—14'
 Turning Radius—15.5'

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Using our special design rotor mount-
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Boom—2" OD x .110 wall x 20'
 Maximum Element Length—44'3"
 Turning Radius—24'4"
 Antenna Weight—58 lbs.
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Brkt.	Mast	Cage
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 plate for access to motor and
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12, K8GJD 10, K8JED 10, K8KQV 9, W8RVZ 8, W8-
 WVU 7, W8HK 6, K8TJH 6, (Mar.) W8ELW 7L, W8TBB
 55, W8MAI 34, W8AIPD 30, K8PKU 30, W8DSW 25,
 W8USZ 24, K8LRC 22.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM;
 J. C. Erickson, W8DAE, SEC: W8HNP, RMA; W8BZX,
 W8DAE, W8VTP, K8ONQ, PAMs: W8VZ, K8KSN, W8-
 IBX received WZ and WANE Awards. W8NTZ, now an
 MD, has been commissioned a lieutenant in the U.S.A.F.
 K8s PAU and PEQ are on 6 meters, K8s HLH and
 USJ received their General Class licenses, W8ATU is
 a new Technician, W8PNZ has a new SX-111 and an
 HT-37. Piqua RC's officers are W8PFC, pres.; K8UAS,
 vice-pres.; K8BLC, secy-treas. Scioto County AREC
 helped to evacuate 300 families in the recent Ohio and
 Scioto River floods with K8s BNL, ETW, NLM/8,
 NVQ, PJM and W8UCO helping. Warren ARA's officers
 are K8QDQ, pres.; K8LSI, vice-pres.; Ionogene, secy-
 treas.; K8XNB, corr. secy.; K8LDX, act. mgr.; K8-
 GAS, K8LDX and K8BXT, trustees. Your SCM at-
 tended a special meeting, at which WIICP from ARRL
 spoke on antennas, and the club was presented its cer-
 tificate of affiliation with the ARRL. The club's ham-
 fest has been changed to Sun., Aug. 26, at Trumbull
 County Fairgrounds. New appointees are W8s AZL,
 CUT, ONT and PIN as ECs; W8AGV as OES. K8CVJ
 has a new DX-100B, Champaign County ARC's
 station call is W8EBG, Mt. Vernon ARC's officers are
 W8CPU, pres.; K8LFA, vice-pres.; Spencer, secy.;
 K8TPU, treas. Tiretown RC's officers are W8VJX, pres.;
 K8SHE, vice-pres.; K8NYM, secy.; K8LDU, treas.
 W8CZR is a new Novice. The Seneca RC saw W8-
 MVE's and K8KFY's color slides of their trip to Ten-
 nessee and Florida and heard W8JLJ talk on antenna
 construction. The Boardman High School ARC had its
 SX-100 serial #10003012112 and an R-48 stolen. Toledo's
Ham Shack Gossip tells us that W8UPB spoke to the
 Toledo RC, Toledo Mobile RA and Toledo Edison RC
 on ARRL and license fees; W8FPU has a new baby
 boy. W8IBX received Cardinal, WBC and USA-CA
 Awards. Clermont County ARC has over 40 attending
 its code and theory classes. W8AKC, K8VJR and K8-
 ZFY received their General Class licenses. Canton
 ARC's *Feedline* has on its cover page a picture of K8-
 VLU and K8VLYK (father-and-son team) at their sta-
 tion and states that K8LBZ won a National Science
 Foundation grant; K8TOX has a new Invader 2000;
 the stork brought a new baby boy to W8UNE; K5YTS/8
 is now W8DHY; W8DOA is a new ham; K8RXD re-
 ceived his General Class license, Great Lakes Director
 W8UPB and your SCM attended the Dayton Hanven-
 tion where over 2200 registered with 650 at the banquet
 and 155 taking the General Class examinations with 55
 passing the code. A beautiful trophy was presented to
 W8UPB, W8WT and W8MLY were presented with
 USA-500 awards. The banquet speaker was W8TNS,
 ARRL President, who spoke on Ham Radio and its
 Future. The Drake 2-A was won by K8KAR, the Vik-
 ing Invader by a Mr. Smith and a Clegg Zeus by
 W8FGZ. We were told 4292 registered for their call let-
 ters on auto license plates in Ohio this year and the
 Dayton Hanvention will be held Apr. 26 and 27, 1963.
 Dayton ARA's *Z-F Carrier* informs us W8AKW is
 a Silent Key; W8H described a simple conversion of
 the BC-221 for improved accuracy of reading; K8KNU
 spoke on Modulation. The Miami Valley Radio Contest
 Society has challenged the Cincinnati DARA to match
 scores in the recent SS contest, the loser to furnish
 dinner for the winners; W8CEA has a new Collins 30L1
 final and W8LLT has a KWM-2 in his Cadillac. W8-
 CHT, W8DAE, W8UPH and W8AJN received the BPL
 in April. *Smoke Signals from the Indian Hills RC* tells
 us the members saw the film Time from Bell Telephone,
 and W8TNB is on vacation in Florida. South East
 ARC's officers are K8ZFD, pres.; K8TSI, vice-pres.;
 K8SVN, secy.; W8CTZ, K8LME, K8MHK and K8ONA,
 board members. W8ABF is the proud father of a baby
 boy. Parma RC's *P.R.C. Bulletin* informs us that
 W8NACY is editor of *Ham Shark*, a weekly column in
 the *Brooklyn-Parma News*. Massillon ARC's officers
 are K8EKG, pres.; K8HTM, vice-pres.; K8NEB, secy-
 treas.; W8VYU, pub. mgr. W8WE is on the mend.
 W8SCOB and W8NCPN are new Novices. Traffic:
 (Apr.) W8DAE 1036, W8UPH 704, W8CHT 527, W8AJN
 503, K8SQK 178, K8BDZ 162, W8BGP 121, W8LFE 56,
 W8LZE 56, W8CXM 52, K8KSN 43, K8VWN 39, K8LYU
 31, K8RYU 31, W8AL 24, K8RXD 22, K8AFJ 17, K8-
 KLA 17, W8TBX 14, K8PBZ 13, K8WHI, 12, W8APS 11,
 W8CYS 7, W8YGR 7, W8WYS 6, K8KXS 4, W8QCU 4,
 K8BAP 3, K8BNL 3, K8CKY 3, K8CYJ 3, K8WDC 2,
 (Mar.) W8AJN 240, K8AAG 169, K8JSQ 3, K8WLP 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy,
 (Continued on page 114)

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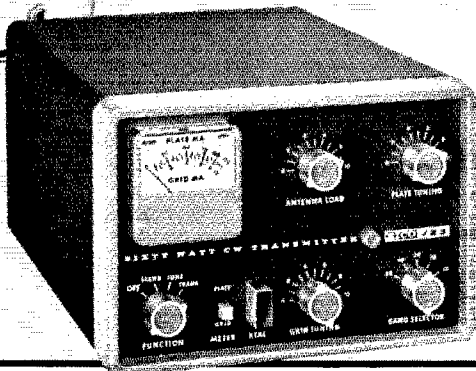


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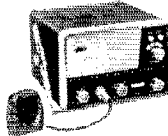
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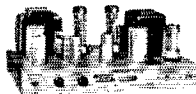
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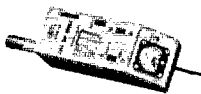


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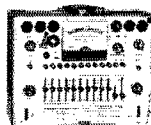
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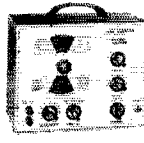
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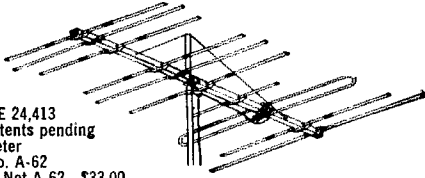
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W2EFU—SEC; W2KGC. RMs: W2PHX and K2QJL. PAM: W2JIG. Section nets: NYS on 3870 kc. nightly at 0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-club on 28,600 kc. Mon. at 1030 GMT. Appointments: K2SJM as OPS and WA2PNR as EC. Endorsements: W2URP as OB; W2SZ and K2RTU as OPS and ORS; W2HZZ as OBS; K2CXO as EC; W2SZ as OBS. K2EIU/2 operated in the CD Party from Troy with a Drake 2B, an Apache and two folded dipoles. Also in Troy. W2SZ has a full-swing traffic program going for students at R.P.I. WA2HLH reports WAS but lacks cards from Montana, Colorado and Wyoming. Any ENY station working RTTY is requested to contact W2GSS in Syracuse for an interesting assignment. Among the spark plugs for those newly acquired call-letter license plates in N.Y. State were K2SJO, K2SHN, W2OOJ, W2AAO and W2GTT. Our thanks to all of you for a fine job. K2HQI is now signing WA6LMA in California. W2DSK celebrated 30 years in ham radio. Our sympathy to WA2DTS, who lost his XYL, and to K2CLW, who lost his mother. K2LOI spoke to the Albany Club on "Electronics and Medicine." On Apr. 27 W6OGI/1, of ARRL, was guest speaker. At New Rochelle the CCNR guest was Vice-Director W2TUK. WA2QMR is on 2 meters with a Clegg Zeus and WA2QEQ is mobile with a Gonset III. The Ulster County Club made a tour of AT&T facilities in Kingston. Traffic: (Apr.) W2EFU 228, W2THE 162, W2DQW 100, WA2MID 92, K2TXP 88, WA2HGB 82, W2SZ 53, WA2DRP 38, K2SJM 38, WA2LOJ 36, W2URP 24, W2VYHA 13, K2HNW 11, K2MPK 8, LWA2JTX 2. (Mar.) WA2HGB 131, WA2DRP 25, W2PHX 6, K2EIU 4, K2HNW 4.

NEW YORK CITY AND LONG ISLAND—SCM. George V. Cooke, jr., W2OBU—SEC; W2ADO, RM: W2VFL. PAM: K2HCU, V.H.F. PAM: W2EW. Section nets: NLI, 3630 kc. at 0015 GMT nightly; NYCLIPN, 3908 kc. at 2230 GMT nightly; V.H.F. Net, Tue.-Wed.-Thurs. on 145.8 Mc. at 0100 GMT and Fri. through Mon. on 146.25 Mc. at 0000 GMT.; the Mike Farrad Net on 7238 kc. at 1700 GMT.; the All Service Net at 1800 GMT Sun. on 7270 kc. As noted above, K2HCU has assumed duties as PAM, replacing W2UGF who resigned because of the pressure of business. Bill served long and faithfully. BPL certificates went to K2UAT, WA2GPT, K2UBG, W2EW, W2GKZ and K2ASP for April traffic. After many long years of earnest effort and disappointment the radio amateurs of New York State have received permission to apply for call letter automobile license plates starting with 1963. Victory has become ours through the work of K2SJO and the committee that supported the program for so long. Governor Nelson D. Rockefeller, by Executive Order on Apr. 30, brought this about after the two bills had successfully passed both Houses in Albany. Ways of securing license plates will be worked out later and the amateurs in our state desirous of getting plates for '63 will be notified some time in the future. All amateurs in the state who supported this campaign are hereby thanked for their letters, QSL cards and telegrams that showed the public support necessary in putting this matter over the top. New officers of the New York Radio Club are W2BR, pres.; WA2NLL, vice-pres.; K2DPN, sec.; W2EEO, treas. K2OPT has a new GPR-90 and a GSB-1. W2VFL's son is now WV2WYP. WA2NCE has received his hard-earned WAS certificate. W2PF is using a new 75-83 receiver and his son, W2IVA, has a KWM-2 and is active in Fort Monmouth, N.J. K2IVE put up a new TA-33 beam and rotator, and now is president of the Bellerose Amateur Radio Society (BARS). K2DDK is giving up on d.c. bands and acquired a new 416-B for use on 220 Mc. WB2AQM is a new call in New Hyde Park. W2SEU put up a 60-ft. tower mounting two seven-element beams for 220 Mc. and one five-element for 6 meters. WA2MLJ has ham TV on 420 Mc. with a live camera and is interested in contacting others on TV or with a definite interest in starting a station. A group of Tu-Boro RC members, led by W2MES, enjoyed a visit to ARRL Hq. W2LGG, Queens EC, announces the Queens 6-Meter AREC Net meets Sat. on 50.25 Mc. at 2245 GMT with WA2WAO as NCS. WA2GAB does volunteer work at the Fort Hamilton VA Hospital teaching code and theory and assisting in finger, hand and speech therapy. He was nominated for the Edison Award recently. WA2UBI is on 6 and 2 meters from his new yacht on Long Island Sound. W2PVR settled on a Comm. IV and an eleven-element beam for his v.h.f. activity. WA2SAR, the son of WA2KSP in Northport, now is back stateside after 15 months in the Orient. Section net certificates have been earned by W2EW, K2IUU, W2UWG, K2ASP, WA2FRW and WV2UKK. Every amateur in our section is urged to give as he can to the ARRL Building Fund so that a new structure can be built and dedicated to more and greater service to all radio amateurs. Traffic: K2UAT

(Continued on page 116)



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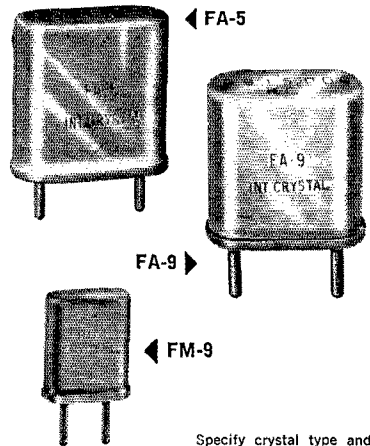
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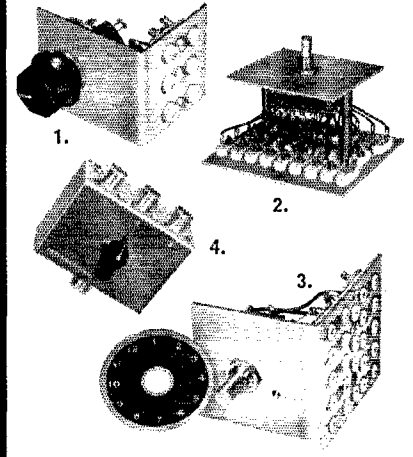
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| CC-2 Carrying case accommodates KWM-2 and PM-2 permitting inclusion of portable station with other luggage. | \$85.00 |
| CC-3 Carrying case for 312B-4 or 312B-5 and MP-1 plus spares. | \$107.00 |
| 399B-5 Novice adapter for CW operation meeting requirements of Crystal Control less crystals. | \$46.00 |
| 312B-4 Speaker console, incorporating directional wattmeter and station controls. | \$195.00 |
| 312B-5 VFO and control console, permits individual control of transmitter and receiver frequency as well as other station control functions. | \$350.00 |
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| 351D-2 Mobile mount for quick and easy mounting and demounting of KWM-2 in mobile installations. | \$120.00 |
| 351E-4 Mount for table top location in vehicular use. | \$24.00 |
| 351R-1 Relay rack mount | \$32.00 |
| 136B-2 Noise blanker for electronic reduction of ignition noise in mobile installations. | \$124.00 |
| MM-2 Comfortable combination earphone/microphone for "no hands" voice communications. | \$39.00 |
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NORTHERN NEW JERSEY—SCM, Daniel H. Earley, WA2APY—SEC: K2ZFI, PAM: K2SLG, V.H.F. PAM: K2VNL, RM: WA2GQZ. The names, times and frequencies of the New Jersey NTS Nets: NJN, 2300Z on 3695 kc. daily; NJPN on 3900 kc. at 220Z except Sun. at 1200Z; the NJ 6 and 2 (recently a member of the National Traffic System) 51.15 Mc. Thurs. and Sun. at 0100Z; 147.75 Wed. and Sun. at 0100Z. Net reports, sessions, attendance and traffic: NJPN—30-527-229, NJ 6 and 2—20-126-19. New appointees: ORS—W2LQP, WA2OQP, EC—W2LEP, OOs—K2ONE, W2CVW, K2-DQT, OBS—WA2THG. Renewals: K2UCY as ORS, OO and OBS. K2TWY has gone mobile. W2BVE says he spends too much time with RTTY and not enough on school work. K2OQA is working hard trying to get DXCC before he goes into the Navy. K2VZJ is back doing a little DXing. WA2OQP's brother is going to get his Novice Class license. This means another rig, he hopes. K2UKQ is off 20 meters until her beam is fixed. W2CWX gave up spring chores long enough to get into the CD Party. W2OPB and WA2KKH are going to have a booth at the local scouting show. W2NLY says he was very pleased to hear so many NNJ boys in the CD Party. We have a lot of appointments in NNJ but let's not keep them for CD Parties, men. W2NKD is going mobile so he won't be lonely on those long trips. The Rutgers Radio Club has another rig now, a 20A. The Parsippany High School Radio Club, now WA2-WXP, had a message service for the Easter vacations. It went over big, says K2SBS. Looks like WA2EDG didn't get on 160 meters last night; he says it was dead before he got there. WA2JHQ still is on that 220-Mc. rig. K2UCY wants to know if in a DX-100, the 100 stands for maximum plate current. The BPLs for the month are WA2CCF, K2UCY, WA2EDG, WA2-UZH, WA2JHQ. Now we get to the SCM's gripe dept. There are 58 ORS and OPS appointees and about 25 of them report traffic. This hardly seems fair to the traffic-handlers and makes the appointment like the proverbial wall paper. We aren't asking for much, just a few messages reported by the 5th of the month, please. It seems the only way to make an appointment valuable is, like the diamond, to make it rare. This goes for the other appointment holders also; approximately 35 reports were received from about 80 appointees. The hams are continually under pressure and these appointments make a unity, a purpose that no one can ignore. When you hear of good deeds that hams have done they usually take the form of message handling or the AREC work. Traffic: (Apr.) K2UCY 436, WA2JHQ 291, K2VNL 201, WA2CCF 144, WA2EDG 143, WA2FTZ 137, WA2AFY 128, K2SBS 107, WA2UZH 105, WA2SRK 80, W2QNL 58, W2CVW 56, K2SLG 40, W2TFM 27, WA2TWL 18, W2CFB 15, W2ABL 12, W2EWZ 11, WA2OLZ 10, WA2QOH 10, W2NKD 9, WA2-LUD 8, W2BVE 6, W2NLY 3, W2OXL 3, WA2KKH 1. (Mar.) WA2KKH 27, W2BVE 6.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WONTB—SEC: K0EXN, PAM: W0PZO, RM: W0DUA, OOs: W0-QVZ, K0AZJ. Amateurs of the Iowa section: Let's close ranks and solidly support all organized effort in behalf of our hobby. As we see it, effective results come from working in ARRL. If one doesn't like the way an organization is run, the thing is to get into it, and contribute effort and ideas to make it better. W0NWX and W0QVZ attended the W0DXCC meeting at St. Louis, Mo. There is a great deal of activity in the county AREC nets. I wish to commend the county leaders for their very fine work recently, especially those in flood and other disaster areas. We are proud of you and you have much to be proud of. Net reports: 180 meters—QNI 868, QTC 54, sessions 30; 75-Meter Phone—QNI 1315, QTC 142, sessions 25; 75-Meter EEB—QNI 704, QTC 34, sessions 25; Wright County Em. Net—Total QNI 445. Traffic: W0LGG 2038, W0-SCA 721, W0DUA 203, K0MMS 130, W0BDR 98, W0-PZO 64, K0UAA 30, W0BLH 29, K0HBD 27, K0YLN 27, W0LWZ 26, W0PTL 18, W0BTX 14, W0FMZ 14, W0GQ 14, K0KAQ 14, K0GOT 9, K0JYE 9, K0YDV 8, K0EXN 7, W0EJ 6, W0QVZ 6, K0WVK 6, K0-APG 5, K0AFI 5, K0JMA 5, W0NGS 5, K0QKD 5, W0NWX 4, W0NTB 3.

KANSAS—SCM, Raymond E. Baker, W0FNS—
(Continued on page 118)

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U.S. PATENT NO. 3,031 668

Cat. No. 200-509 Frequency Range 130-174 MC*

Cat. No. 200-509 Stationmaster Collinear Gain Antenna is designed to meet the ever increasing need for high antenna gain in minimum space and at lowest cost. This antenna, consisting of a number of collinear radiating elements fed inphase and encapsulated in a continuous weatherproof fiberglass housing, meets the above requirements. Low overall weight eliminates the need for extensive erection equipment required by previous antennas offering equal power gain. The input fitting on these antennas is a standard Type N male connector mounted at the end of an 18" flexible terminal extension. Designed for maximum strength with minimum cross-section, Cat. No. 200-509 is capable of withstanding winds in excess of 100 MPH.

*Exact frequency must be specified

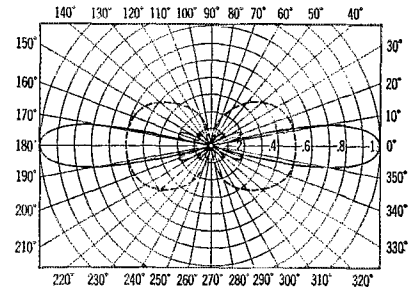
Vertical field strength pattern of Cat. No. 200-509 Stationmaster Antenna. A dipole pattern is shown for reference.

Electrical Specifications:

Nominal input impedance50 ohms
VSWR 1.5:1
Bandwidth $\pm 0.3\%$
Maximum power input 500 watts
Internal feedline RG-8A/U
Flexible terminal extension 18" of RG-8A/U
Termination Type N male with Neoprene housing
Omnidirectional gain 144-174 Mc 5.8 db
130-144 Mc 5.5 db
Vertical beam width (1/2 power points) 18°
Lightning protection Direct ground

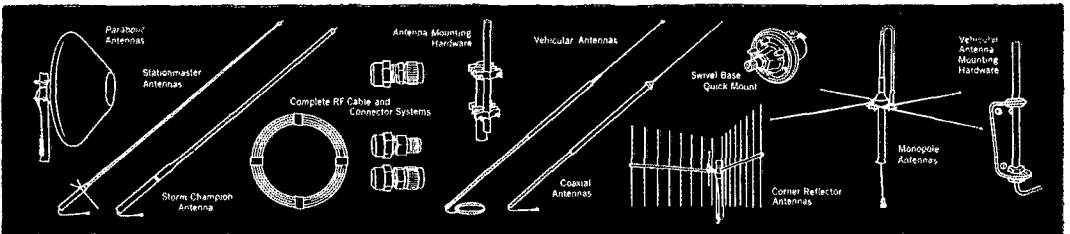
Mechanical Specifications:

Radiating element material Copper
Element housing material Fiberglass
Element housing tip diameter 5/8"
Element housing butt diameter 1 7/8"
Element housing length 19"
Ground plane element length 18"
Support pipe 2 3/4" dia. hot-galvanized steel, 22" available for mounting
Rated wind velocity 100 MPH
Lateral thrust at rated wind 45 lbs.
Bending moment 6" below ground plane at rated wind 450 ft. lbs.
Weight 30 lbs.



Communication Products Company, Inc.
Communication Antenna Systems for American Business

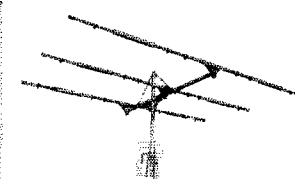
MARLBORO, NEW JERSEY — Telephone: HOPKINS 2-1880 (Area Code 201)
LOS ANGELES 65, CALIF. — Telephone: CHAPMAN 5-1143 (Area Code 213)



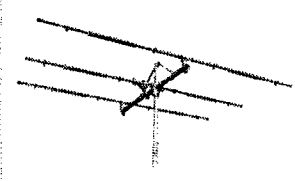
Amateur/CB/ or industrial —
 You can't go wrong with HORNET.



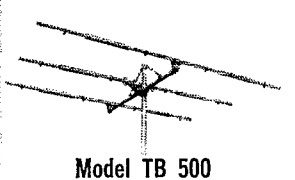
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 Cash Price \$112.50
 Only \$10.50 per month



Model TB 1000
 Cash Price \$89.75
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Model TB 750
 Cash Price \$67.50
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108 to
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Please rush the Hornet Antenna indicated below for a 10-day trial. If not satisfied, I agree to return the antenna prepaid within 10 days without obligation.

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- Payment in full is inclosed.
- I wish to use your Time Payment Plan.

Model	Description	Price

Name _____ Call Letters _____
 Address _____
 City _____ State _____

SATISFACTION GUARANTEED

SEC: KØBNF. Asst. SEC: KØEMB. RM: WØQGG. PAM: KØEFL. V.H.F. PAM: WØHAJ. Nets. KPN. 3920 kc. Mon.-Wed.-Fri. at 1245Z. Sun. at 1400Z. 18 sessions: QTC high 17. low 0. total 84. average 4.66; QNI, high 55. low 12. total 455. average 25.26; NCSS KØQKS. GH. YTA. WØFR. ORB. PHU. QKS. 3610 kc. daily 0030Z. 30 sessions: QTC 127. high 14. low 0. average 4.23; QNI 249. high 12. low 4. average 8.3; NCSS KØBXP. IRL. YRQ. YTA. WØQGG. TOL. SAF. PNS. KSBN. 3920 kc. Sun. 1330Z; QNI, high 14. low 12. average 12; QTC 4. high 1. low 1. The Kansas Side Band Net. KSBN. will now operate 4 sessions per week. Tue.-Thurs.-Sat. at 2345Z. Sun. at 1330Z. KØYRQ will manage as NCS and this new net will work with the KPN and QKS. WØQGG has resigned as Route Manager after 6 years of splendid work and our most earnest thanks go to him. WØSAF will take over and it is hoped everyone will continue to help make QKS the finest of c.w. nets. WØFOS has been named new editor of *Ham Monitor*. KØJHF. Zone 3 EC. has now worked portable-emergency power in 3 of his 4 counties with the help of the Emporia Club. The Emporia Club will sponsor the Annual Kansas QSO Party. dates to be announced later. Traffic: (Apr.) WØOHJ 372. KØYRQ 280. KØHGI 237. WØSAF 223. WØTOL 137. WØABJ 31. WØJFR 63. WØQGG 41. KØBXP 35. WØTWJ 29. KØYTA 29. KØEFL 24. KØHVG 22. KØGHI 18. WØALA 17. KØQKS 15. WØTSR 13. KØTGR 10. KØJJD 4. WØFDJ 3. WØWFD 2. KØZHO 2. (Mar.) KØTGR 15.

MISSOURI—SCM. C. O. Gosch. WØBUL—SEC: KØLTP. Asst. SEC: KØLTJ. RMs: WØOOD. KØONK. PAMS: WØBVL. KØWNZ. WØJFE (v.h.f.). Net reports (Apr.): HBN (7280 kc. 1805 GMT. M-F: 3880 kc. 1905 GMT. M-F) 18 sessions: QNI 501; QTC 262; NCSS KØIVG 2. KØLTP 2. WØANT 1. WØTPY 3. KØWNZ 2. KØYWT 2. WØTWJ 3. KØLTJ 1. WØJFX 1. KØHGI 1. M5N (3715 kc. 2200 GMT. M-F: 3715 kc. 1400 GMT. S) 24 sessions: QNI 87; QTC 63; NCSS KØFPC 5. KØFZY 5. KØVPH 4. WØOABL 4. KØONK 6. MON (3580 kc. 0100 GMT. Tu-S) 25 sessions: QNI 187; QTC 165; NCSS WØOOD 8. WØKIK 7. KØVPH 6. KØFPC 1. WØRTW 1. SMN (3580 kc. 2200 GMT. Su) 5 sessions: QNI 25; QTC 21; NCSS KØFPC 4. WØWAP 1. MØSSB (3963 kc. 2400 GMT. Tu-Th) 8 sessions: QNI 133; QTC 33; NCS WØPXF 4. WØMM 4. MEN (3885 kc. 2400 GMT. MW) 13 sessions: QNI 317; QTC 161; NCSS KØIHA 4. KØONK 4. KØVPH 4. WØTPK 1. PØN (Mo) (3810 kc. 2100 GMT. M-F) 21 sessions: QNI 238; QTC 101; NCSS KØIQJ 5. WØHVJ 13. KØBWE 3. WØHV 1. WØLFE (V.H.F. PAM) reports the V.H.F. (144 Mc.) Net had four sessions with an average attendance of fifteen per session. Appointment: WØTPK as GPS. Officers of the Missouri School of Mines and Metallurgy Radio Club. WØEEE. (Rolla) are KØCWB. pres.; K5YTZ. vice-pres.; WØCAW. secy.; WØASD. treas.; KØHXP. stn. mgr.; KØCWR. act. chm. In an inter-club contest involving traffic handling and traffic reported to the SCM. WØZLN was judged winner over WØEEE. KØGFA now is General Class. An excellent simulated emergency drill was conducted in Springfield with the three hospitals. ambulances. fire department. police department. sheriff. doctors and seventeen amateurs cooperating. Traffic: KØONK 1262. KØLTJ 703. KØRPH 205. WØTPK 152. WØKIK 113. KØVMZ 108. KØFPC 106. KØVPH 104. WØOOD 85. WØOOM 78. WØMKJ 62. WØBUL 36. WØRTW 35. WØBYL 32. W5ZEY/O 28. WØZLN 25. WØAYB 22. KØGØB 13. KØFZY 12. WØKCG 12. KØWNZ 8. WØVY 1.

NEBRASKA—SCM. Charles E. McNeel. WØEXP—SEC: KØTSU. WØNIK reports the Western Nebraska Net had QNI 657. QTC 248. 100 per cent check-in with KØBMQ. WØDYB. WØGGP. WØLOD and WØOCU. WØLXH reports the Nebraska Emergency Phone Net had QNI 573. QTC 20. 46 stations on call. new member WØQWA. KØDGW reports the Nebraska Morning Phone Net had QNI 653. QTC 130. WØOKO reports the Nebraska Section C.W. Net had 26 sessions. QNI 162. QTC 47. New officers of the Soo Radio Club. recently reorganized, are KØGZP. pres.; KØGAT. vice-pres.; WØØBCC. secy.; WØAFG. treas. The Bellevue Radio Club was very active during the flood in eastern Nebraska. maintaining 97 hours of continuous operation with a total of 847 man hours. WØAUH (ex-W7HKE) is back on the air from Omaha on 40-meter c.w. The North Platte Annual Hamfest will be held Aug. 5 at Cody Park. Traffic: WØGGP 202. KØGAT 112. WØBQ 110. WØLOD 58. KØDGW 57. WØNYU 56. WØDDT 55. WØOKO 48. KØRRL 38. KØFBD 32. WØNIK 27. WØFNH 26. WØJZF 26. WØVZ 23. KØIAL 22. WØYFR 20. KØMSS 18. WØOCU 15. WØWUV 15. WØAGB 12. WØRIH 12. KØUWK 12. KØSBP 11. WØBOQ 10. KØCYN 10. KØYDS 10. WØEQG 8. WØFBY 8. WØAJJ 7. KØZBA 7. KØKJP 6. WØKLB

(Continued on page 120)

For DX or contests... for scatter, aurora or satellite tracking...
for "rock-crusher" reports or just plain "chewing the rag"...



HERE'S THE VHF COMBINATION THAT BEATS 'EM ALL!

Put yourself behind this power-packed Clegg VHF ham station... we guarantee you'll "out-talk", "out-receive" any other commercially-built amateur VHF transmitter and receiver now available!

Take, for instance, Clegg's ZEUS VHF Transmitter. It gives you full coverage of the amateur 6 & 2 meter bands and associated Mars frequencies, with maximum TVI suppression. Automatic modulation control with up to 18 db of speech clipping provides magnificent audio with "talk power" greater than many kilowatt rigs. This beautiful unit with its ultra-stable VFO is the ultimate in VHF equipment for amateur and Mars operation.

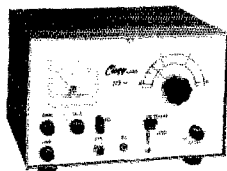
Clegg's all new INTERCEPTOR VHF Receiver, designed for the serious operator on these bands offers performance features unmatched by presently available equipment for these frequencies. Exactly matching the famous Zeus Transmitter, the Interceptor offers reception with virtually no cross modulation. Nuvistor RF stages provide an extremely low noise figure with high sensitivity. Stability is ideal for the exacting requirements of SSB and CW.

Amateur Net Prices:

ZEUS, \$695.
INTERCEPTOR, \$473.
99'ER, \$159.95

99'er TRANSCEIVER FOR 6 METERS

Here's a Transceiver that is ideal for both fixed station and mobile operation. Small in size, low in cost, and tops in performance, the 99'er offers operating features unequalled in far more costly equipments. The double conversion superhet receiver provides extreme selectivity, sensitivity and freedom from images and cross modulation. The transmitter section employs an ultra-stable crystal oscillator which may also be controlled by external VFO. An efficient, fully modulated 8 watt final works into a flexible Pi network tank circuit. A large S meter also doubles for transmitter tune-up procedure.



Write for Complete Information!

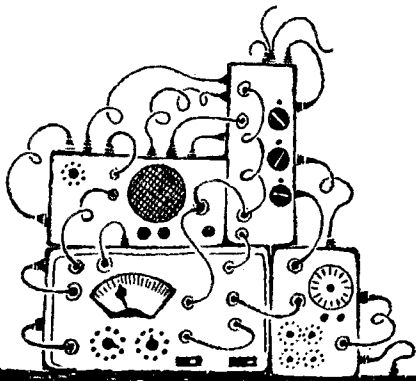
Clegg LABORATORIES

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WATERS UNNETTLES RIGS

COAXIAL SWITCHES

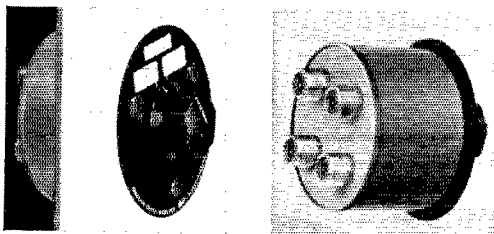


SWITCH IN, SWITCH OUT, OR DO THE 6-WAY SWITCH IF YOU'RE A HAM WHAT AM WITH A WATERS COAXIAL SWITCH.

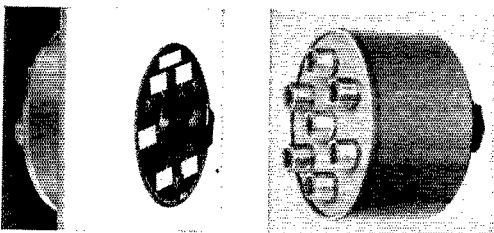
Designed for panel mounting, and featuring in-line orientation of the coaxial connectors, these compact units occupy a minimum amount of space with ready access for connecting and disconnecting. The Waters Coaxial Switches have a negligible insertion loss, low standing-wave ratios (less than 1.1 up to 150 mc.), and a power carrying capacity of 1 kw. They come in two models complete with mounting screws, knob, and escutcheon plate with provision for erasable markings.

COAXIAL TRANSFER SWITCH — MODEL 336. A double-pole, double-throw (internally strapped) unit for in-and-out switching of a Power Amplifier between an exciter and antenna. Connections are made to 4 standard SO-239 UHF connectors. Amateur Net: \$11.45

COAXIAL SELECTOR SWITCH — MODEL 335. A single-pole, 6-position switch used for selection of RF sources, antennas, etc. Connections are made to 7 standard SO-239 UHF connectors. Amateur Net: \$12.95 Available at leading distributors



COAXIAL TRANSFER SWITCH — MODEL 336



COAXIAL SELECTOR SWITCH — MODEL 335

**WATERS MANUFACTURING, INC.
WAYLAND, MASSACHUSETTS**

6, WOLFJ 6, WODPW 4, WOClW 3, KOCGM 2, WODLM 2, WOVEA 2.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, jr., W1CHR—SEC: W1EOR, RM, W1KYQ, LF, PAM; W1YBH, V.H.F. PAM; W1FHP; Traffic nets: CPN, Mon.—Sat. 1800, Sun. 1000 on 3880 kc.; CN, daily 1845 and 2000 on 3640 kc.; CVN, Tues., Thurs. and Sat. 2030 on 145.98 Mc.; CTN, 0900 on 3640 kc., all local times. Congrats to Wis PEP, OJR, LIG, ZGO, PHT and K1SCC for close tolerance performances in the Feb. FMT. W1EOR held a meeting for all ECs at W1AW resulting in formation of the Conn. EC Net with sessions on 3880 kc. at 0930 local time. Eventually CECN hopes to move to 160 meters, K1s EKC, LBQ and RTS were prize winners at Swampscott. K1SCN has his General, KN1s UVR, UVT and VWR are new Novices in the Waterbury Area. KN1TFO has a new Heath Twoer. The Waterbury ARC members planned to monitor Oscar II as a group. W1OJR gave two Novice tests, made CTC and added VU2US/AC5 and HK0AB to his DX total. W1WHL reports a new phone net convening Mon. at 1945 local time on 50.58 Mc. W1BDI has a new rotator installed for his 2-meter yagi. K1MZM now has an Apache and an SB-10. Carl, of K1JAD, will attend Duquesne in Pittsburgh this summer and will take a converted BC-342 and DX-20 to keep in touch with the CN gang. K1PUG has a new Apache. W1CTI has a new NC-303. K1QCK had 3 transmitters on display at the Oak Hill School open house. The school's RC has installed a new tribander and a five-element 2-meter beam. W1LIG has written an article on accurate frequency measurement with the BC-221, a receiver and two plug-in meters. K1ONZ is a new OPS. K1s SDG and TAZ are newly active in CPN. W1ZGO found a good 6-meter opening Apr. 29 working CO2GX. K1IVR has a new HQ-110 and put up a 20-meter antenna. W1FHP is looking for a CVN representative from the southwest part of the state. K1GGG is feeling the letdown after the "Coates" excitement. Check the expiration dates of your appointments and send certificates for endorsement if needed. CN net certificates were awarded to K1s PUG and PQS. Traffic: (Apr.) K1GGG 259, K1PQS 247, W1RZG 211, W1AW 200, W1OBR 190, K1JAD 160, K1PUG 155, K1PPF 122, W1KYQ 121, K1JFJ 100, K1OEH 87, W1NJM 68, W1LXV 60, W1YBH 55, W1BDI 51, K1MBA 49, K4MUT/1 49, W1LUH 38, K1HTV 35, W1CTI 34, K1DGG 27, K1AQE 25, W1FHP 24, K1EIR 20, K1MVG 18, W1FXS 16, W1CUIH 15, W1EJH 15, W1BNR 12, K1ONZ 11, W1LV 9, W1CHR 7, W1ADW 5, K1JVZ 3. (Feb.) K1PQS 247.

MAINE—SCM, Albert C. Hodson, W1CBP—The Portland Amateur Wireless Association held its fourth Hamfest and Supper at Highland Lake Grange and there was a good turnout. K1MBA has worked the HK0AB DXpedition on 15 and 20 meters. BPM now has DXCC and CHC on phone. K1MDM again is active with patients and contacts to their families from Togus V.A. K1ADY and W1EXD went to the QCWA Banquet in Providence. K1LNN has dropped the "N." K1URW now is in Orono. The Bangor Area is having 10-meter mobile hunts Wed. nights. K1GPP arrived back at Rockwood to find twenty inches of ice on the lake. Sorry to report that WINZW is a Silent Key. 2-meter activity is on the increase now that openings are more frequent. Your correspondent has had several requests from Novices for information about appointments in AREC and as OPS. May I suggest that Novices concentrate on license advance first then they can make application for any appointments in the book. Traffic: K1GUP 113, W1GRG 59, K1IMI 41, K1BZD 23, K4BSS/1 16, W1EPN 16, K1MDM 10, K1GVQ 7.

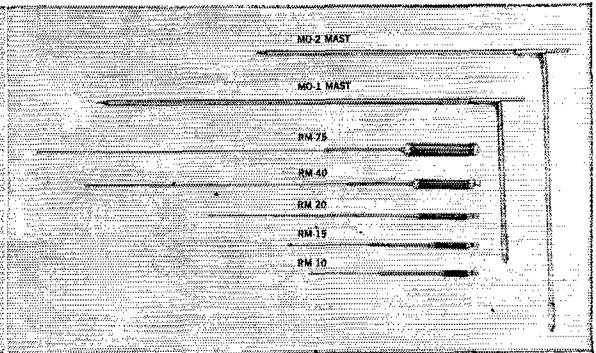
EASTERN MASSACHUSETTS—SCM, Frank Baker, jr., W1ALP—SEC: W1AOG, PAM 75 meters: W1AWA, Silent Keys: Wis UBF and UHV, the wife of W1RSV. Ex-1FVD's wife passed away in Arizona. W1BNS and W1GOU are in the hospital. W1OOQ is on the air some. Wis PLJ, RHN, PXH, BB, WK, TZ and K1IZM took part in the Feb. FMT. EM2N held 21 sessions, 291 stations, 232 traffic. K1HSV has a net certificate. Heard on 2 meters: K1s VIO, KLB, NNN, OSJ and W1ZZZ. K1s TSD and NDE have certificates for EMCWN. The 6-Meter Cross Band Net had 297 stations, 121 traffic. EM75N had 273 stations, 106 traffic. W1MNK is moving to California. The Milton Club had two fits from the Telephone Co. K1LJK has been in the hospital. W1PEG has retired and moved to New Hampshire. W1QUP has a Valiant and an HRO. K1CCL is on 6 meters and 420 and 1215 Mc. K1VBN, on 6 meters, had 109 QSOs in April, is building a five-element Yagi and

(Continued on page 122)

GOOD MOBILES GO...



10-15-20-40-75 METERS NEW-TRONICS MOBILE ANTENNA



● Now, Get Fixed Station Reports with the "HUSTLER"

Buy only the mast and resonators for the bands you operate. No need for matching devices, no feed line length problems. Use any length of 52 ohm cable. This is a new, efficient concept of center loading. Each of the five resonators has a coil specially designed for maximum radiation for a particular band. Center frequency tuning is by means of an adjustable stainless steel rod in the resonator.

The 54-inch fold-over, heat treated, 1/2-inch aluminum mast permits instantaneous interchange of resonators. Mast folds over for garage storage. When opened to full height, the two sections of the permanently hinged mast are held rigidly in position by a shake proof sleeve arrangement. Mast has 3/8-24 base stud to fit all standard mobile mounts. Power rating is 75 watts dc input A.M. — 250 watts PEP input for SSB.

ANTENNA ASSEMBLY CONSISTS OF 1 MAST and 1 RESONATOR

Part No.	Description	Total Height of Antenna	Amateur Net
MO-1	54" Mast folds at 15" from base	(For Rear Deck or Fender Mount)	\$ 7.95
MO-2	54" Mast folds at 27" from base	(For Bumper Mount)	7.95
RM-10	10 Meter Resonator	Maximum 80" — Minimum 75"	5.95
RM-15	15 Meter Resonator	Maximum 81" — Minimum 76"	6.95
RM-20	20 Meter Resonator	Maximum 83" — Minimum 78"	7.95
RM-40	40 Meter Resonator	Maximum 92" — Minimum 87"	9.95
RM-75	75 Meter Resonator	Maximum 97" — Minimum 91"	11.95

ANY MAST OR RESONATOR MAY BE PURCHASED SEPARATELY

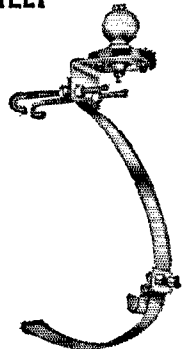
FITS MORE CARS THAN ANY OTHER BUMPER MOUNT!

MODEL BM-1 Flat alloy steel strap fits tightly against any shape bumper yet is inconspicuous. Length of strap permits its attachment to both large and small bumpers.

Assembly is held in place by two "J" bolts at the top of the bumper and strap clamp at the bottom. "J" bolts may be inserted between top of bumper and car body where clearance is as low as 1/4".

Whip receptacle assembly consists of a heavily chrome plated 1 1/2" die cast Zamak ball with 3/8-24 thread. Adjustable so as to maintain whip in true vertical position. Black phenolic base. All metal parts of the bumper mount are heavy cadmium plated. \$6.95

See these outstanding NEW-TRONICS products at your electronics distributor. If he cannot supply you send check or money order for immediate delivery. Write for literature on the complete NEW-TRONICS line.



NEW-TRONICS CORP. 3455 VEGA AVENUE
CLEVELAND 13, OHIO



**INSIDE
TOWER**



**ON TOP
OF TOWER**



ONE PERSON

TALK ABOUT MOUNTABILITY!

Anyway you want to mount your antenna rotor, the HAM-M is the most versatile around! No special parts to buy! (Even the otherwise difficult inside tower mount can be accomplished with some angle iron and a hack saw) . . . Mountability like this is just one more reason why, at \$119.50 amateur net, you just can't top the HAM-M! Ask your local CDE Radiart Distributor for all details.

CDE **CORNELL-DUBILIER**

CORNELL-DUBILIER ELECTRONICS, DIV. OF FEDERAL PACIFIC ELECTRIC CO., 50 PARIS ST., NEWARK 1, N. J.

worked K5SUG in Mississippi. WIMX still is being rebuilt. WIGHB spoke at a QRA meeting. WIBGW got HTH, RTTY, WAC and RGK from Russia. WIEFW, WIEAE and WIALP attended a meeting of the Middlesex ARC, WHEBB, at which the club's ARRL charter was presented. K1OPQ is active on several bands and will be on 6 meters. The Framingham Club, WIGLA, had a station on during Amateur Radio Week at Shoppers World and the following were on duty: K1s IZT, EKO, DVJ, GUU, KAVV, MCL, OFR, OFD, ZTP, KCG, W1s ZEN, RCJ, BK, SQY, ZWJ, W4COW. W1FY printed QSLs for them. W1PEX made BPL. K1TSD has a Knight T-60 transmitter and BC-348 receiver. W1JNV is a member of TOPS, FOC and QCWA. The Nemasket ARC has a new antenna for 10 and 30 meters and had a station at the local Spring Exposition. KNIUTG is new and K1MCE has a TA-33 beam. K1LAD is club secretary. The Malden RA held an auction. W1s HKG and AKY are at it again. K1MAH has a closet circuit flying spot scanner TV camera and he and K1DRB are going to go on 420 Mc. and have a circuit between their QTTIs. K1TGB is working on a receiver for 1292 Mc. and a transceiver. W1HGT says that 6 opened up and a lot of DX was heard. The Braintree Club held a meeting to talk things over. Our Fall River EC, YHY, says he has 23 units now, 20 for 6 and 3 for 2 meters. W1AUP is Asst. EC. The Mass. V.H.F. Society met at W1QXX's. LMU has a nuvistor converter from QST. W1LHV has a new Tapetone converter for 6 meters. W1VYS gave a talk on his trip to the Newton e.d. gang. W1DYS is busy on his QTH. W8UDJ has some s.s.b. equipment. W1QMU needs a modulator for his 6146 6-meter rig. Appointments endorsed: W1AUQ as ORS; W1AKN Sandwich, W1DWY Beverley as ECs; K1MHC as OES. K1BGK was in a bad auto accident. 6-Meter Net certificates have been issued to K1s BKL, QLD, OLN, UCT and W1LFA. The Milton Club held a meeting. K1TTL has his General Class license and says that ex-W1SAD helped him a lot, from Novice up. K1OLN, our Tewksbury EC, says that the radio club has 1 General, 4 Techns, and 6 Novices, and has 5 Communicator III's. Traffic: (Apr.) W1PEX 968, W1OFK 377, W1EMG 232, W1AWA 243, K1GYM 134, K1TSD 80, W1EAE 73, W1ZSS 65, K1DGI 48, W1DFS 47, K1QNZ 47, W1SIV 45, W1AOG 42, W1VYS 30, W1GK 24, W1GKA 20, K1OLN 20, W1GLA 15, K1CM5 13, W1AUQ 10, K1LFA 6, W1JNV 2. (Mar.) W1FJJ 11.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. RM: K1JLV. The Berkshire County Amateur Radio Association has voted to contribute all money left in its treasury in June to the ARRL Building Fund. Congrats! K1OYJ is converting an APX-6 to 1215 Mc. K1LNC has a new Valiant and tribander. Gardner is a hot bed on 6 meters. W1MN handled 146 messages during the month at a rate of .187 messages per minute for the time in session. K1PES was top man in attendance on W1MN, and he is getting to be a topnotch traffic handler. West. Mass. again maintained 100 percent attendance on the First Region Net. Our RM, K1JLV, got out a swell bulletin on traffic-handling procedure. K1IYD is home from the hospital, hamming and convalescing. K1PGT, W1GBR, W1JWV, K1MMX and W1DGA are operating mobile. W1QWJ was a guest speaker at the BCARA. Bill Fake, ex-W1MKR, now works for G.E. in Milwaukee, and Bill Goodyear, ex-W1OKA, is now in Madison, Wisconsin. Among others, W1AZW, W1DGT and W1HNE were very active in the Mass. QSO Party. W1ERC spent a few days in the hospital, but is now around and active again. The Pittsfield 10-Meter Net now includes (in addition to the old standbys W1GFT, W1BKG, W1KZS, W1HNE and W1CTI) W1CWE, W1WCC, W1LFE and W1VVL. By Goodman, W1DX, and Ray Higgs, W6GLI/L, both of ARRL Headquarters, presented interesting talks at the BCARA. Many of you who hold ARRL appointments still are not sending in monthly reports. Continued practice of this will have to lead to cancellation. Traffic: K1JLV 181, W1BVR 116, K1LNC 101, K1PES 57, W1AMT 55, K1LBB 55, W1DWW 13, W1OSK 6.

NEW HAMPSHIRE—SCM, Ellis F. Miller, W1IQ—SEC: K1GQK. PAM: K1JDN. RM: K1ITS. GSPN meets Mon. through Fri. at 2300 and Sun. at 1330 on 3842 kc. C1NEN meets Mon. through Sat. at 1030 on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330 on 3685 kc. Appointments: W1TF5 as OO. Endorsements: W1YHI and W1RMH as ECs. Glad to see so many at the New Hampshire nets' meeting at the convention. A number of subjects were discussed, and it was voted to divide the GSPN into an a.m. only and an s.s.b. time segment. A trial period will be conducted for 30 operating sessions to determine its feasibility. We are pleased to announce the formation

(Continued on page 124)



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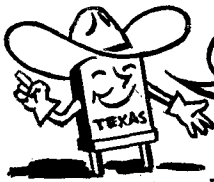
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3rd overtone — .005% tolerance — to meet all FCC requirements. Hermetically sealed HC6/U holders. 1/2" pin spacing. .050 pins. (Add 15c per crystal for .093 pins).

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All 22 megacycle frequencies in stock: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225.

Matched crystal sets for ALL CB units (Specify equipment make and model numbers) \$5.90 per set

CRYSTALS IN HC6/U HOLDERS

SEALED OVERTONE .486 pin spacing — .050 diameter — .005% tolerance
15 to 30 MC \$3.85 ea.
30 to 45 MC \$4.10 ea.
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.005% tolerance \$5.00 ea.
From 2000 KC to 10,000 KC, any frequency, .005% tolerance \$3.50 ea.

RADIO CONTROL Specify frequency. .05 pins spaced 1/2" (Add 15c for .093 pins). \$2.95 ea.



QUARTZ CRYSTALS FOR EVERY SERVICE

All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed! Supplied in:

FT-243 holders Pin spacing 1/2" Pin diameter .093	MC-7 holders Pin spacing 3/4" Pin diameter .125
CRIA/AR holders Pin spacing 1/2" Pin diameter .125	FT-171 holders Pin spacing 1/2" Banana pins

MADE TO ORDER CRYSTALS . . . Specify holder wanted
1001 KC to 1600 KC: .005% tolerance \$4.50 ea.
1601 KC to 2500 KC: .005% tolerance \$2.75 ea.
2501 KC to 9000 KC: .005% tolerance \$2.50 ea.
9001 KC to 11,000 KC: .005% tolerance \$3.00 ea.

Amateur, Novice, Technician Band Crystals

.01% Tolerance . . . \$1.50 ea. — 80 meters (3701-3749 KC)
40 meters (7152-7198 KC), 15 meters (7034-7082 KC), 6 meters (8335-8650 KC) within 1 KC
FT-241 Lattice Crystals in all frequencies from 370 KC to 540 KC (all except 455 KC and 500 KC) 50c ea.
Pin spacing 1/2" Pin diameter .093
Matched pairs — 15 cycles \$2.50 per pair
200 KC Crystals, \$2.00 ea.; 455 KC Crystals, \$1.25 ea.; 500 KC Crystals, \$1.25 ea.; 100 KC Frequency Standard Crystals in HC6/U holders \$4.50 ea.; Socket for FT-243 Crystal 15c ea.; Dual Socket for FT-243 Crystals, 15c ea.; Sockets for MC-7 and FT-171 Crystals 25c ea.; Ceramic Socket for HC6/U Crystals 20c ea.

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of the Midstate Amateur Radio Club at Laconia, with an initial membership of thirty hams from the Lakes Region Area. K1NYS and W1HQ have collaborated in the construction of two Pawnees. The results have been most gratifying. K1KOB is now on a four-year hitch in the Coast Guard. The Hillsborough County AREC plan is working well under W1YHI, EC, Traffic: W1TA 41, K1JDN 17, W1HQ 12, W1JNC 6, K1EEN 5, W1EVN 4.

RHODE ISLAND—SCM, John E. Johnson K1AAV—SEC: PAZ, RM: SMU, PAM: TXL. Report of R1SPN: 30 sessions, 512 QNT, 98 traffic. The W1AQ Club of Rumford held its Annual Spring Cleaning Day with a committee of K1s LXQ, CZB, NSY and QJE. Three WRI certificates were issued to the following: No. 18 to W2N1Y, No. 19 to K1LBB and No. 20 to W8NAN. The PRA Club of Providence now has an s.s.b. rig and is believed to be the first club on s.s.b. The rig is an HT-32, an NC-303 and an anticipated TA-33. Six-meter activity has been increasing with K1s KDI working W4-Land, GRC working W2-Land daily, SXY erecting a 60-ft. tower, DUH working aero-mobile with a Sixer and LII putting his mobile rig in his new auto. Congratulations to K1LPL on having earned his new auto. Congratulations to K1LPL on having earned his WAS and WAC certificates. K1OZI is now using a new Viking Challenger. K1NUQI has received his Novice ticket. The SCM would appreciate all traffic reports and articles for QST to be sent to him before the 5th of the month in order that they will not be delayed another month before publication. Traffic: W1TXL 678, K1NEF 444, W1SMU 378, K1PZY 54, K1GRC 46, K1DZ3 35, K1SXY 11, K1DUH 10, K1GRA 8, K1JOD 8, W1PXI 5, K1OZI 4, W1WED 4.

VERMONT—SCM, Miss Harriet E. Proctor, W1EIB—SEC: K1DQB, PAM: W1HRG, RM: W1KRW. All Vermont amateurs regret the death of W1ZWB in an automobile accident. W1EFW was in Montpelier to present to the CVARC its charter of affiliation with ARRL. The CVARC has the responsibility for a demonstration amateur station at the Girl Scout Roundup. W1LYD and K1AEV have a new son, W1VMC, W1VZE, and W1PWB should be on RTTY by this time. Don't forget International Field Day July 15. W1FPS has worked over 600 counties. W1RWP is CHC No. 538. K1RMI made over 700 contacts as a Novice. Officers of the Bennington Club are K1BJX, pres.; K1AAW, secy.-treas. New officers of the CVARC are K1BGC, pres.; W1PMH, vice-pres.; K1MPN, secy.; K1OMO, treas. Traffic: K1IJJ 21, W1FPS 20, W1KJG 17.

NORTHWESTERN DIVISION

IDAHO—SCM, Mrs. Helen M. Maillet, W7GGV—Farm Net controls are W7s JFA, FBL and K7s KNQ, KRO and CAB. Both roll call and traffic increased during April. AREC members W7s GHY, VQC, WDJ and WDK, of Moscow, were alerted when fire in a warehouse spread over a city block, burned two transformers and plunged the city into darkness. K7KBY and committee are busy planning for the 1962 W1MU Hamfest at Marks Inn Aug. 4, 5 and 6. Frank promises two new contests and one new activity this year. The Gem State Net will continue to meet at 0300Z on 3580 kc. during the summer months, and invites more check-ins. The Pocatello Air Force Reserve now has a ham station with the call K7UEC. W7GGV had an eye-ball QSO with Century 21 official ham station K7USA, located in Alaskan Building. W7ORB and K7s CQQ and GDA have regular skeds on 2 meters. Farm Net traffic: 65. Gem State Net traffic: 58. Traffic: K7KBY 86, K7HLR 56, W7VQC 32, W7GGV 18, W7EEQ 15, K7OAB 14.

MONTANA—SCM, Ray Woods, W7SFK—SEC: W7BOZ, PAM: W7YHS, RM: K7AEZ. The Montana Phone Net meets on 3910 kc. at 1800 hours, M-W-F. MSN meets T-T-S on 3550 kc. at 1830 hours, TSN meets M through F on 7230 kc. at 1200 hours. W7EWR still is getting some fine DX. W7EJC is working on a kw. rig. Word is that the Havre gang is coming out with whiskers for the Centennial. W7RJM has a new electronic class at the college. W7GAH is on 6 meters with a 522. K7MEG is president of the Hi-Line Radio club. The Old Faithful Radio Club has LPL, pres.; W7GEF, vice-pres.; W7ZSS, act. mgr.; W7RZY, secy.-treas. Around Laurel K7MOW is heard from her kitchen, ELW completed his class of seven students, K7JHB has a new mobile, K7MYH is coming up with one also, as is K7ISX. K7JAT winds a lot of transformers, W7SMY mixes hamming with rockhounding. W7LBK reports the ARRL affiliation of the Laurel Club. Officers are W7JBH, pres.; W7ELW, vice-pres.; W7MOW, programs and secy.; W7LBK, program chairman. W7TWH is working on the missile sites. K7CTI

(Continued on page 126)

NEW Sonar - MONO-BANDER



SSB transceiver for any one Amateur Band 80 to 10

- 50 db unwanted sideband suppression; and 60 db carrier suppression
- Receiver has 1 microvolt sensitivity for a 10 db s/n ratio
- Receiver employs full time AVC
- 180 watts P.E.P., 160 watts C.W.
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 1. "S" meter
 2. Transmitter P.A. Grid
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 4. Transmitter "A.M.C."
- Driver stages employ electronic tuning
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reports a lot of SS and CD Party work. DCI and DCH went to s.s.b. K7NHV came up with a third BPL in April. Al is one of Montana's certificate hunters. Traffic: K7NHV 549. K7EWZ 165. K7OGF 12.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP, PAAI: W7NJS, RAI: W7MTW. Oregon State Net (OSN) had sessions 20, QNS 198, traffic 45. BRAT Awards went to W7AJN, W7BVH, W7MAO, W7MTW, W7ZFH and K7IWD. The Oregon AREC C.W. Net (OAREC) had sessions 8, total check-ins 36, 4 stations, Multnomah 25, 1 Clackamas 5, 1 Columbia 5, 1 Klamath 1, traffic 9. For information regarding this net, contact your SCM. K7DYK has been lending a helping hand on building a four-element 6-meter Yagi for a new ham. W7ZE now has a Seneca 6 and 2 on the air but still finds time to handle traffic on TCC. K7IWD has just received his 25th certificate and expects to make CEC membership now. K7CLL reports law school exams will take him off the air for awhile. W7NJS has been active on the AREC and YL nets. W7MEV and W7TCT recently made a solid 2-way contact on 2 meters between Grants Pass and Cave Junction, 25 miles air-line over extremely rugged terrain. W7DEM now is on 2 meters using an ARC-1. K7UQA also is on 2 meters with an HY-75 final. K7BEI, executive chairman for the National ARRL Convention to be held in Portland, and other committee chairmen are working hard to make the convention a huge success. W7SEZ is council chairman. AXJ registration. K7EIS promotion, RFV program, K7BQE finance, ADU entertainment. Traffic: (Apr.) W7ZE 169, K7IWD 67, W7ZFH 64, W7RVN 36, W7AJN 24, W7DEM 19, W7BVH 13, W7MTW 11, W7MAO 6, K7DYK 1, K7IMH 1. (Mar.) K7JVN 12, W7MTW 10.

WASHINGTON—SCM, Robert B. Thurston, W7PGY —The Skagit Club had its Annual Banquet with 187 in attendance at Bryant Grange Hall near Arlington. LFA was M.C. for the big occasion. Washington section nets are as follows: WSN, 3535 kc. at 0200Z; WARTS, 3970 kc. at 0130Z; NSN, 3700 kc. at 0400Z; CBN, 3960 kc. at 0230Z. K7USA, the Century-21 Worlds Fair station, is in operation full swing on 14,225 kc., plus or minus 5 kc. daily from 1000 to 2200 PDST. W7PWA is moving to a new QTH. K7OXL is admiring the new rig in the living room. K7s CPT, DWO, HLR and W7s PWA and UMX are net control stations for the Northwest Slow Speed Net. (NSN). KNs SNN, SNJ and SRG are new Novices in the Walla Walla Area. W7EMP has his tower up at his new QTH. The Radio Club of Tacoma (W7DK) served a Mothers' Day breakfast to all the mothers in the club at the club house. The club handled the communications for the big Daffodil Parade and also will furnish communications for the Garden of Paradise Show at Point Defiance Park. K7AYD had charge of Field Day operations for the club again this year. WA6UTV/7 has been transferred to W6-Land. W7IST is finishing his 220-Mc. converter. The SCM was a visitor at the Puyallup Club meeting during April. W7FQD is an inspector for Boeings. W7JJK is letting to the East Coast. The SCM and SEC met with the Vancouver Radio Club May 17 to iron out problems in the AREC. The Franklin County RACES Net meets every Thurs. at 0330Z on 28.7 and 145.65 Mc. W7RGL was QRT during May on business to W6-Land. K7BKZ is in the Seattle Hospital with a bad back and is operating portable on 6 meters. A New Novice in the Silverdale Area is KN7SSJ. W7AMC and W7BTB were with the QRL Bremerton Hamfest. K7CWO has an S-106 and is looking for contacts on 6 meters. IEU has a 275-ft. long wire on all bands. K7QOM lost gear in the rotator. W7JPH and W7JXR made a sojourn to the Richland Area. A new OBS in the Puyallup Area is K7PIY. The following renewed their certificates: W7AIB as ORS, W7DZX as ORS and OPS, W7LFA as PAM and OO. The AREC membership in the section has risen to 759 as of Apr. 30. Our goal is 1000. Are you a member? Frequencies used in the Seattle Area are 3970 and 3882 kc. and 146.76 Mc. Fair visitors, look on these frequencies for your contacts. W7NL and W7GKS are heard regularly on 3882 kc. working the mobiles. W7RDL works for the U. of Washington. W7HEE underwent eye surgery in Seattle. W7NWK is planning on a Heathkit station. W7CGA and W7FNA flew to W6-Land on business. Traffic: W7BA 836, W7DZX 708, W7PGY 348, K7JHA 320, W7GYF 177, W7AFS 181, W7GIP 103, W7OEB 56, W7AMC 30, W7BTB 22, W7U50 18, W7AIB 17, K7CWO 13, W7IEU 5.

PACIFIC DIVISION

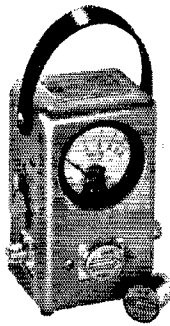
HAWAII—SCM, John E. Montague, KH6DVG—Asst. SCM: Mike Fern, KH6ARL. SEC: KH6CQV. PAM: KH6EGL. RM: KH6DVD. It is with great pleasure that we announced the appointment of KH6ARL as
(Continued on page 128)

THRULINE

DIRECTIONAL RF WATTMETERS



Model 43 and Rigid Line Series
Direct reading . . . "thru" type measure forward or reflected power in complete systems under operating conditions . . . inserted between transmitter and antenna or load . . . full scale power and frequency range determined by plug-in elements.



50-Ohm nominal

Model	Connectors	ELEMENTS	
		Frequency (mc)	Power Ranges
43	QC Type*	2-30	50, 100, 250, 500, 1000 watts
		25-60; 50-125; 100-250; 200-500; 400-1000	5, 10, 25, 50, 100, 250, 500, 1000 watts
4712 4715*	1 1/2" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	.25, .5, 1, 2.5, 5KW
460 4610*	3 1/4" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	1, 2.5, 5, 10, 25KW
4902	6 1/4" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	2.5, 5, 10, 25, 50KW
4910	9" Flanged	Per Customer Specifications	

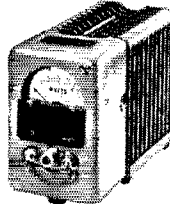
*Double Socket Thruline for monitoring of forward and reflected power.

*to measure rf power... **THRULINE***
***TERMALINE** ...to absorb rf power*

Model	Freq. Range	Max. Power	Power Range Scales	Input Connector
6254	30-500 mc	1 w	25, 50, 100, 250, 500 and 1000 milliwatts	Female "BNC"
61	30-500 mc	80 w	Choice of two compatible scales. Lowest .5 watt	Female "N"
611	30-500 mc	60 w	Dual Range 0-15/60 w	Female "N"
612	30-500 mc	80 w	Dual Range 0-20/80 w	Female "N"
67	30-500 mc	500 w	0-25/100/500 watt	Female "N"
694	2- 30 mc	1000 w	0/1000 watt	QC Type*
6835	30-500 mc	1200 w	0-120/600/1200 watt	QC Type*
67C*	30-500 mc	2500 w	0-100/500/2500 watt	Female "N"

*Water Cooled on High Range

Model	74	71B	72R	72-2
Positions	Six	Eight	Reversing Switch	Two
Coaxial Circuits	One	One	Two	Two
Connector	Type N female connectors are standard on all models to receive UG-21/U series plug. Use adapters with other cables and connectors.			



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RF ABSORPTION WATTMETERS

Portable — Non Radiating

Portable . . . direct reading . . . non-radiating "load" type wattmeter . . . used in field or laboratory to measure and absorb power . . . accuracy $\pm 5\%$ of full scale . . . VSWR 1.1 to 1 maximum over operating range.

COAXWITCH

COAXIAL SELECTOR SWITCHES

Dependable, manually-operated switches for selecting antennas, receivers, transmitters or other apparatus with coaxial connections. Ideal as a system component in electronic equipment where reliable, repeated channel switching is required; pull knob, rotate, and push in to make contact.

TERMALINE

RF LOAD RESISTORS

Quick-Change Connectors

Reflection-free terminations for 50-ohm coaxial lines . . . low VSWR . . . non-radiating . . . water cooled rating 2500 W to 50 KW . . . air cooled rating to 2.5 KW . . . forced air to 5 KW. Quick-Change Connectors (\ast QC Type) available on many models.

COAXIAL RF FILTERS

Our extensive engineering and manufacturing facilities are at your command for the custom design and manufacture of filters to your specifications. Intelligent design, skillful manufacture assure you of highest performance and reliability. New miniature filters, as light as five ozs., are available and can be produced in quantity.

Model	Max. Power	Frequency Range	*Max. VSWR	Input Connector
80 Series	5 w	0-4 KMC	1.25	Male or Female, N; C; BNC
80 A	20 w	0-2 KMC	1.2	Female "N"
8130	50 w	0-4 KMC	1.2	QC Type*
81B	80 w	0-4 KMC	1.2	Female "N"
8135	150 w	0-4 KMC	1.2	QC Type*
82A	500 w	0-3.3 KMC	1.2	Female "N"
8201	500 w	0-2.5 KMC	1.25	QC Type*
8833	1000 w	0-2.5 KMC	1.25	QC Type*
8813	1000 w	0-2.0 KMC	1.25	1 1/2" EIA Flanged
888	1200 w	0-2.0 KMC	1.25	3 1/4" EIA Flanged
8890	2500 w	0-2.5 KMC	1.25	QC Type*
82C**	2500 w	0-3.3 KMC	1.2	Female "N"
8950***	5000 w	0-2.5 KMC	1.25	QC Type*

Other water-cooled loads up to 50KW can be supplied.

*VSWR is 1.1 or less to 1000 mc on all models — with "N" connectors.

Water Cooled *Forced Air

*QC TYPE: Bird Quick-Change Connector, designed for rapid change.

Available in following types:

Female or Male N, C, HN, BNC, LC, LT, UHF, and 1/2" EIA flanged.

Complete Specifications on request.



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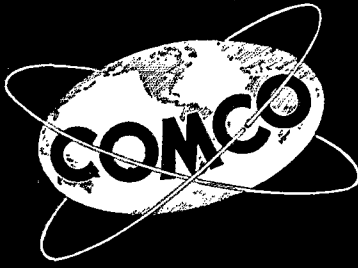
Asst. SCM. KH6DOX is EC for Western Honolulu. KH6BG is a new OPS and is active in the RICE Net. W1MVK/P6, K3GAD/KJ6 and W5HTM/VR3 are welcome visitors in the section. KH6HAA is a new OO. KH6EGL has completed a 100-ke. frequency standard with 10-ke. multivibrator. KH6DVD QNled the POI Net from W4KFC. Two new AREC nets are going strong, the Western Honolulu Net (WHN) at 2200Z each Sat. and AREC Hawaii (AHN) at 2300Z Sat. both on 7225 kc. Every licensed amateur should be an AREC member. Are you? Hawaii section nets: POI Net, 0500Z daily except Mon. (GMT) on 3750 kc. RICE Net, 2000Z Sat. on 7270 kc. Traffic: KH6ARL 51, KH6EFO 17, KH6DVG 7, KH6EGL 3, KH6BZV 1, KH6DVD 1.

NEVADA—SCM, Charles A. Rhines, W7VIU—K7KBN was a new Nevadan in the April CD Party. His DXCC is now up to 61/47 and he has just received Nevada Achievement Certificate No. 77. K7NFU received No. 78. W7YKC, Las Vegas EC, announces the new AREC net frequency is 14,275 kc. W7K01 and W7PBV are new OPSs. The NARA was active on Field Day. W7CFF is busily planning a new rig. W7UPS expects to be on the air from Winnemucca as soon as he gets the antenna problem licked. W7VIU attended a meeting held in Oakland by Division Director W6HC, at which recommendations were made by the SCMs and the clubs for Harry to take back to the Annual ARRL Board Meeting at West Hartford. Appointees: SEC—W7JU. OPSs—W7K01, W7PBV, OBS—K7KBN. ECs—W7HJ, W7PC, W7YKC. OOs—W7KHU, W7YKC. Traffic: K7KBN 18, W7PBV 4.

SANTA CLARA VALLEY—SCM, W. Conley Smith, K6DYX—Asst. SCM: Edward T. Turner, W6NVO. SEC: W6ZRJ. P.A.Ms: W6ZLO, WA6EIC. RM: K6KCB. W6ZLO has taken off for an extended trip across country and will visit his daughter in Philadelphia. WAUC is back from a holiday in KH6-Land where he met many on-the-air friends. San Jose City College is forming a radio club, as is the Naval Postgraduate School in Monterey. K6BBE, EC, reports the SPECS simulated emergency drill in April was a considerable success. One mobile reported from an assigned location in just 4 minutes. The Monterey Bay 2-Meter Mobiles, under WA6TKE, assisted in traffic control for the Laguna Seca Races. K6YKG reports excellent results from the revamped antenna and receiver. K6MTX is mobile on 2 meters with a Pawnee. WA6AEX won the second national prize, an HT-37, in the Hall-craters contest. W6RFF has a new job in coil engineering with Illumitronics. W6UVP is activity chairman for the S.C.V. Section Net, 146.7 Mc. 1900 hours nightly. W6DEF has assumed temporary management of NCN. W6RSY is back with the traffic gang on lower power but has big plans. Nine stations in the section submitted entries in the February PMT. Traffic: (Apr.) K6KCB 307, K6GZ 196, W6A1T 166, WA6NAV 155, W6YBV 107, W6DEF 137, WA6EIC 98, W6AUC 70, W6YHM 50, K6YKG 47, K6YXG 41, W6O1I 35, W6RFF 18, K6YQK 17, W6UVP 12, W6ZLO 10, WA6BZE 7, WA6LQ 5, K6T6H 5, W6RSY 4, K6EQE 2, K6SMH 1. (Mar.) W6YHM 43.

EAST BAY—SCM, B. W. Southwell, W6QJW—SEC: WA6MIE, ECs: W6NOP Napa, W6WAH Vallejo, K6-OSO E. Contra Costa, WA6MIJ W. Contra Costa, K6EDN N. Alameda, K6HJT S. Alameda, WA6RGD Metro-Oakland, W6LLV Acting Lake County. K6ZYZ reports QRN is heavy on 30-meter traffic skeds. W7QOH/6, at Concord Naval Depot, is a regular on NCN. K6FDG, Travis A.F. Base Radio Club, has been reactivated. WA6NFC got his 25-w.p.m. sheepskin. WA6PNC has a new Globe King. WA6OIU is going mobile with an ARC-5. WA6NAM operates a second station. WA6UFO, from Calaveras County on weekends. Here's your chance for an ORC WACC certificate if you need that county. K6QXY and K6YIL worked midwest stations on the 50-Mc. opening. The Berkeley High School Yellowjackets Radio Club got its club call, WA6VRF. WA6IZY is pres.; WA6PUP is club trustee. The Silverado Amateur Radio Society is a new club in the Napa Area with K6BYQ, pres.; W6NOP, vice-pres.; K6BYQ, W6NOP and K6VXK trustees. WA6WRH, in Livermore, is ex-K8 from Michigan. W6DEF is temp. mgr. of NCN. NCN is on 3635 kc. at 7 p.m. PDST or 0200 GMT. WA6SZT is a new General in Walnut Creek and W6YES (XYL) and W6TET are new Novices in the same area. WA6-QAZ is now MDARC vice-pres.; replacing K6QDN who is answering Uncle Sam's call. K6QDN shortly will be in Naples, Italy. WA6RGD will check in to NCN. The LARK is forming an XYL club. Contact WA6RMS for information. The LARK boasts the honor of having the youngest ham in the U.S. He is Michael Avery HAMM, six-week-old son of W6GMQ. The WA6KLLs also are proud parents of a new jr. oper-

(Continued on page 130)



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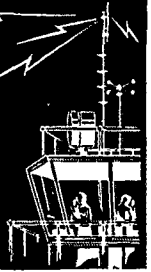
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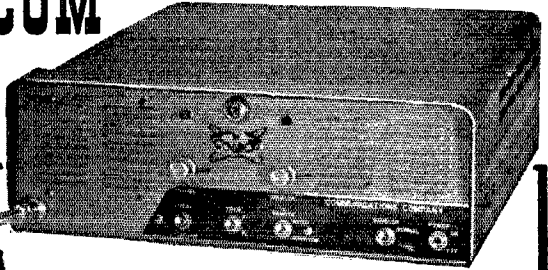
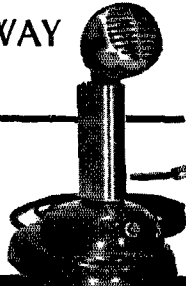
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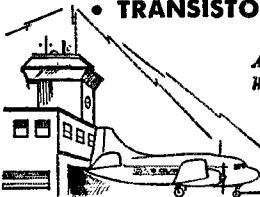
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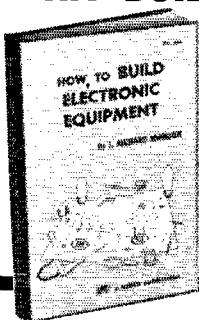
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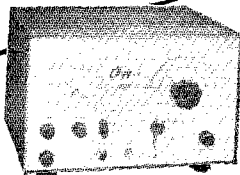
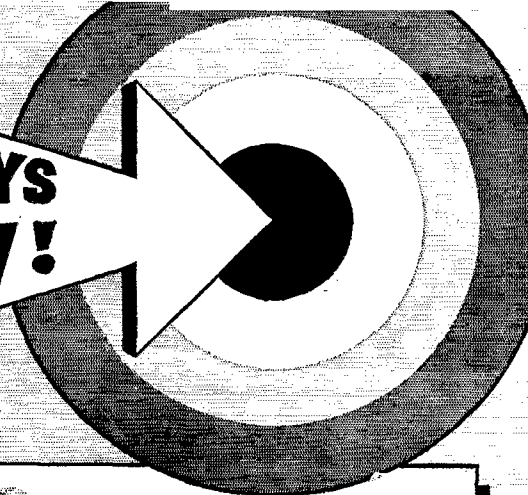
QST-7

ator, born Mar. 2. WA6RBA won two 4CX300A tubes and her OM, WA6QYN, won the Morrow 5BR-2 converter at the BARLARKS Annual Fun-Fest. The MDARC held a mobile breakfast Apr. 29 in Walnut Creek. W6BSE and W6WYA are new members of the HARC. K6KLY is s.s.b. on 50 Mc. WA6GRB, K6LYG, WA6DJD, K6ONX and K6SPP have an early morning net on 50 Mc. going FB. Look for them on 50.25 Mc. between 6:30 A.M. and 7:30 A.M. Thanks for sending in lots of information for this column. Remember it's yours, I only write it. Traffic: K6ZYZ 144, W7QOL/6 13, WA6-MIE 2.

SAN FRANCISCO—SCM, Wilbur Bachman, W6BIP—All the clubs in the San Francisco section were represented at the Director's luncheon meeting held by W6HC for pros and cons to carry back to the Directors' meeting at Hartford, Conn. Each representative brought his club's views on what should be taken up by the Board at Headquarters to further amateur radio. W6NTK was the HAMS guest speaker in April. W6KZF and W6OPL were on the nominating committee for the new Mission Trail Officers. Eleven of the local RTTY fellows attended a dinner meeting at Fishermans Pier May 1 when W6AAE was in the area from Los Angeles. The Society of Amateur Radio Operators held its monthly dinner meeting at the Gold Platter in San Carlos Apr. 30. W6AHH, his XYL and daughter took a trip to Wyoming during April. His daughter Carol is Job's Daughters Representative to that State. W6KKG was guest speaker at the San Francisco Radio Club. He has worked more than 100 countries and has over 30,000 QSL cards in his collection. The S.F. Club members invited the girls club, BAYLAHC, to join them in making Field Day a grand success. W6BSO is active on 40-meter s.s.b. and also on 15 meters. K6MUZ has been working on exhibits for the Seattle FAU. The local gang was very unhappy to hear of the death of W6GB. WA6BTH has a TV station going and some of the other locals also are making plans to go to the higher frequencies. W6VLX is very happy with his new call. W6QMO will not be heard on the air for a while as they have sold their house and are looking for a new QTH. John Molinari, OES, reports that local activity seems to be picking up in anticipation of summer openings on 6 meters. Contact was made with K6RZJ/mm, 150 miles west of S.F. on S.S. and 840 stations were worked on 6 and 2 meters in the past five years. The Tamalpais Radio Club showed the movie, "Path to the Stars," which covers space communications in sub-orbital flight. K6JSJ is real proud of his new 1st-class telephone ticket. K6KEW took a trip to Hawaii. QUA, the Tamalpais Radio Club paper, is full of news and even lists a calendar of coming events which is real good. Marin Club news: W6GPB has plans to improve his DX and ordered a new tower. Plans for a code and theory class this fall are being made by the Marin Club. Members participated in a practice disaster alert with the local Red Cross Apr. 26. W6DEF will be temporary activity manager of NCN 7 p.m. local time. W6KZF says, "Now that summer is here special attention should be paid to mobiles on all bands. They may find an emergency for us to work on, such as auto accidents, forest fires, lost hikers, lost planes, etc." WA6ROJ is converting an ARC-5 to use as a beacon tracking receiver for Echo 2. He was in Idaho on business and is buying a new home in Petaluma. W6BIP now holds an International Drivers License and has received shots for his "trip," but won't know where he's heading until he's on the plane. Traffic: W6QMO 115, W6JWF 15, W6GGC 12, W6BIP, 2.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—SEC: K6ODA. Stockton EC: K6AXV. OES: K6QOO. The new officers of the Delta Amateur Radio Club are W6YGZ, pres.; K6RHX, vice-pres.; K6EUY, sec. The NCN meets at 7 P.M. PDST on 3635 kc. W6DEF is temporary acting manager of NCN. W6UD and W6BJJ are on 6-meter RTTY. W6PET was a recent visitor in Fresno, heard on 3995-kc. mobile. WA6OIB is on 3995-kc. mobile. WA6CVX has a new rig on 3995-kc. mobile. W6JXY and W6JPU are on wide-band f.m. 144-Mc. mobile and fixed. Three separate groups are working on a compatible 2-meter f.m. repeater system which will allow car-to-car coverage from San Diego to Modesto. The frequency is 146.90 Mc. WA6WYN is a new ham in Fresno. W6PIX is using a 200V on 75-meter s.s.b. W6SJJ and W6PIX are holding code and theory classes in the new Visalia Communication Center and have about 30 future hams registered. WA6OQE is using a GSB-100 on s.s.b. WA6LML is on with a B&W rig. W6OHT is on s.s.b. with an HT-37. WA6KIV is on with a 32A. W6QFR has a new Heath receiver. W6LTO is experimenting with proximity relays. Summer is here, but it takes
(Continued on page 132)

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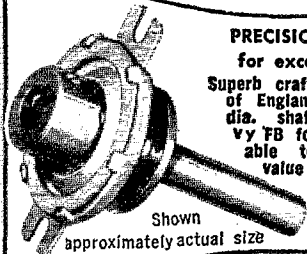
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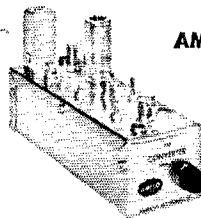
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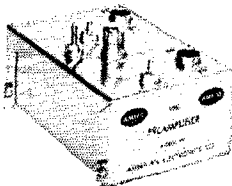
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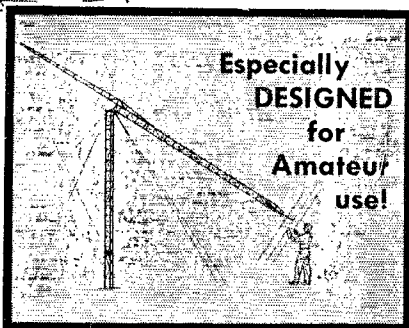
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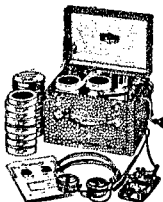
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only a minute to jot down your activities and send the information to me at 6204 Townsend Ave., Fresno, Calif. Traffic: W6EFB 21.

ROANOKE DIVISION

NORTH CAROLINA—SCM, N. J. Boruch, W4CH—SEC: W4YML. RM: K4CPX. V.H.F. PAM: W4ACY. Many thanks to our former SCM, W4RRH, for his six years of service to the Tar Heel hams and ARRL. Congratulations to K4YEP and W4HEL, c.w. and phone winners of the 28th AARL Sweepstakes. We regret to announce the resignation of W4DRC as PAM because of his health. A brief letter or card from friends will bring much cheer to Bobby. We are glad to have K4CPX, who does an admirable job with NCN, as RM again. W4ACY reports the Greensboro gang is very active on 2 and 6 meters and that the Carolina Society publishes the *Ragchewer* every month, edited by W4BUX and K4GPL. W4OAB emphasizes the need for better coordination between our v.h.f.-u.l.f. clubs. Participants in recent ARRL Frequency Measuring Tests with nice results were W4FUI and K4SYN. W4FJM submitted excellent OO and ORS reports. Congratulations to W4PCN, who received the Navy's letter of commendation for emergency service in time of disaster. By all means visit W4MFK's emergency communications van whenever Jim is in your vicinity. K4FMW, EC for Wake and Johnston Counties, has appointed K4FXL and W4ABFG as assistants. K4PBG, Area 10 EC, also has two assistants, K4TSW and K4IOF. Traffic: (Apr.) K4CPX 227, W4FJM 214, W4BAW 100, K4QFV 49, K4YCL 47, W44ANH 39, K4TSM 15. (Mar.) W4RAW 65, K4YCL 45.

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4GQV—SEC: K4PJE. PAM: K4KCO. RM: W4PED. The Greenville Hamfest held May 6 was well attended. There was no planned program but several ARRL Officials were recognized. The S.S.B. Net held a supper on the preceding night in Greenville. The Palmetto ARC held its annual Picnic June 3 at the Sesqui-Centennial Park. W4FFFH and K4JQY made excellent scores in the recent Frequency Measuring Tests. K4ADU has applied for OO appointment and we welcome this very active c.w. man to Charleston. The reports of net activity on phone and c.w. are very pleasing and show much interest. Although attendance was less than expected, the c.w. meeting on Apr. 29 in Columbia was well planned and most interesting. K4OCU was appointed the new net manager; W4AKC and W4GQV gave talks on League affairs. The Mike and Key Club has voted to contribute to the ARRL Building Fund. The XYL of K4ATM is now W4HFZ. Known candidates for the SCM post are W4FFFH and K4HDX. Traffic: W4PED 94, K4LND 50, K4YQD 50, W4AKC 42, K4WOI 35, K4WJR 26, K4NZE 18, K4HDX 14, K4OCU 14, K4YFK 10, K4KCO 9.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM: H. J. Hopkins, WASHJ. SEC: W4VMA. RMs: W4LK, K4MXF, W4SEJ, W4QDY. PAMs: W4BGP, K4JQO, K4PQV, W4DLA, one of our BPLers this month, sacrificed an h.v. power transformer in the process. W4RHA's totals have climbed since his Viking is back on the air. W4FOR has a tight sched. what with EC/OO/CD and traffic, and reports that his County Radio Club has a new station, W44GOA. In Arlington W4NTR has a land-line outlet for APO traffic and an s.s.b.-only station. K4TFL bounces back with a nice traffic total and a report of making WAC. K4YNW blew up his 813 rig during the CD Party and K4MXF got a report of elixs. K4TZF made WAC also, despite being busy in school. K4FMJ is trying for his 25-w.p.m. certificate. W4TE is beginning to feel the summer slump. Up in Roanoke, K4TKF is learning to fly a sailplane. A successful Novice class was completed with the help of W4OOL in Winchester. W4JUJ still is piling up awards with first in Va. in the NYC/LI QSO Party and second in the NJ QSO Party. W4ZM attended the Dayton Hamvention. W4CVO reports while travelling in Missouri, Oklahoma and Arkansas. W4WBC got his antenna and rig working at the same time but was not very active because of other work. K4ARO participated in his first CD Party and liked it. K4QIY and others send their reports from college QTH. W4OWV reports that W4JDS underwent surgery and now is home recuperating. Many compliments were received on the *Virginia Ham* comeback. Traffic: (Apr.) W4PFC 881, W4FOR 600, W4DLA 535, K4PQL 337, W4NTR 327, K4PQV 231, K4FSS 194, K4ARNH 191, W4LK 170, W4RHA 138, K4MXF 127, K4TFL 103, W4SHJ 84, K4YNW 78, K4TZF 72, K4YZT 56, K4JQO 48, W4OOL 47, W4QDY 40, K4AL 38, K4FMJ 36, K4TV 33, K4TSJ 29, W4BZE 23, K4PRQ 17, K4IAN 14, W4LRN 14, K4IKF 10, K4PK 10, W4TE 10, K4QLX 8, K4HIP 6, W4KFC 6, W4KX 6, K4LTK 6, K4QRQ 6, W4UJ 5, W4CVO 4.

(Continued on page 134)

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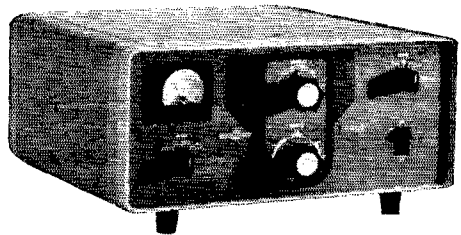
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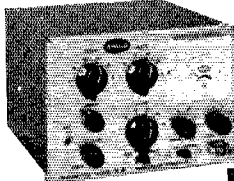
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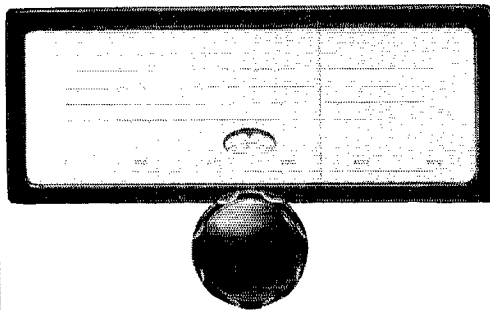
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K4MID 4, W4ZM 4, W4OWV 3, K4ARO 2, K4BAV 2, W4WBC 2, (Mar.) W4PFC 856, K4PQV 232, W4MJH 125, W4IA 54, W4OOL 36, K4PRQ 23, K4DCN 7, K4JYL 6, (Feb.) W4DLA 268.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA, PAM: K8CFT, RM: K8HID. The West Virginia C.W. Net meets on 3370 kc. at 0000 GMT; the Phone Net on 3890 kc. at 2330 GMT. K8CFT reports 17 sessions of the Phone Net with 312 stations and 22 formal messages. K8LOU reports 17 sessions on WVN with 101 stations and 42 messages. K8TSB, W8HZA and K8LOU ran the KRC Net with 45 sessions, 43 stations and 10 messages. K8CSG keeps a sked via RTTY from Army Camp to W8TVO. W8ESH's XYL, K8UVZ, made her first DX contact on v.h.f. Congrats to new General K8ZWN. New Notices in the Fairmont Area are WN8CKO and WN8CUZ. The MARA and the Marion County c.d. group are conducting a code and theory class with over 60 enrolled. K8UQY is chief operator at Marion County c.d. K8ELH, W8IXG, W8DPT, K8HUX and W8GQE have a dependable Morgantown-Fairmont-Crafton link on 144 Mc. New WACWV members are K8MQB, K8MNG, W2QHH and K8KZE. Congratulations. New ECs are K8MRX for Taylor and K8PRC for Monongalia Counties. Traffic: K8LOU 32, W8TUE 26, K8CSG 25, W8HZA 19, K8CNB 15, K8TSB 4, W8JM 3.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald S. Middleton, W0NIT—SEC: W0SIN, PAMS: W0CXW, W0JIR, W0GNK, RMs: W0FEO, K0DTP, OBS: K0DCC, K0IQL and W0ETT located at a Husky Dog Ranch in Elizabeth, Colo., for rare county operation. K0BCW reports the first 50-Mc. E opening of the summer was observed on Apr. 27, 28 and 29. During the same opening W0BAG and K0UYC worked Oklahoma, Arkansas, Mississippi and Washington. Consistent contacts between Denver and Security are being made on 2 meters by use of reflection off Pikes Peak. This type of contact has been enjoyed by W0ISL, K0MNQ, W0EPT and W0BAG. Two-meter schedules are now being set for a try for contact between K0MNQ in Denver and K7HKD in Cheyenne. K0OVQ has been appointed as the RO for Denver. Roy also is the Denver Area EC. W0EXR is the new chairman of the Colorado Call Book. Russ hopes to have the call book out in time for the convention. Colorado amateurs are continuing to promote the Rocky Mountain Division Convention to be held in Denver July 21 and 22. The convention is to be held at the Brown Palace Hotel. K0WWD, at the Air Force Academy, has been Colorado's most consistent BPL award winner. Traffic: K0RTI 282, K0DCW 133, W0ETT 95, K0QGO 66, W0BWJ 53, W0MYB 51, W0CWD 28, K0LCZ 27, K0ZSQ 25, K0WGC 18, W0ENA 14, W0TIV 7.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, W7OCX, SEC: K7BLR, RM: W7OCX. W7BAJ says that DX has been off lately. He hit the CD Contest and should score quite high. W4VIV wants a Utah contact on 6 meters. Any volunteers? Anyone interested in a station appointment, please contact the SCM. Criteria for appointment and continued endorsement is activity and monthly reports to the SCM. Conditions on HUN have been bad. K7BGU, in St. George, has taken up the slack and the traffic has been passed. The UARC (Salt Lake) had a ladies night with a demonstration of electronic cooking. W7OCX, W7QWH, W7VTD, K7BGU and K7QEQ earned BRAT awards on HUN. K7QEQ and K7PPB also earned net certificates. Monthly reports on activities to the SCM are appreciated. Traffic: K7NWP 334, W7OCX 122, W7QWH 37, W7BAJ 3.

NEW MEXICO—SCM, Carl W. Franz, W5ZH—SEC: K5QIN, RM: K5GOJ, PAM: W5ZU, K5CXN is Albuquerque's new EC. W0BWJ visited the Caravan Club at its April meeting and gave a most interesting talk on League affairs. We have every reason to be proud of our Rocky Mountain Director, and should give him our whole-hearted support. The Boiled Owls Club received its certificate of affiliation during his visit. Congrats to the Cavern City ARC on its affiliation with ARRL. The summer sked for NMBIC is now 0630. The Totah ARC meets on 3973 kc. at 1400 MST. The Caravan Club received its Chamber of Commerce membership plaque at its April meeting. K5UYF, K5FXN, K5CXN and W5WZK made more than 120 contacts on their Four Corners trip. W5WZK is recruiting for the Denver Convention and has two carloads already signed up. Congrats to W5JXN, of Gallup, on his Division Award. We hear that K5IQL is having tower trouble. K5FMF is putting up a new LF antenna. W5ZH finally whipped his mobile antenna troubles and is now work-

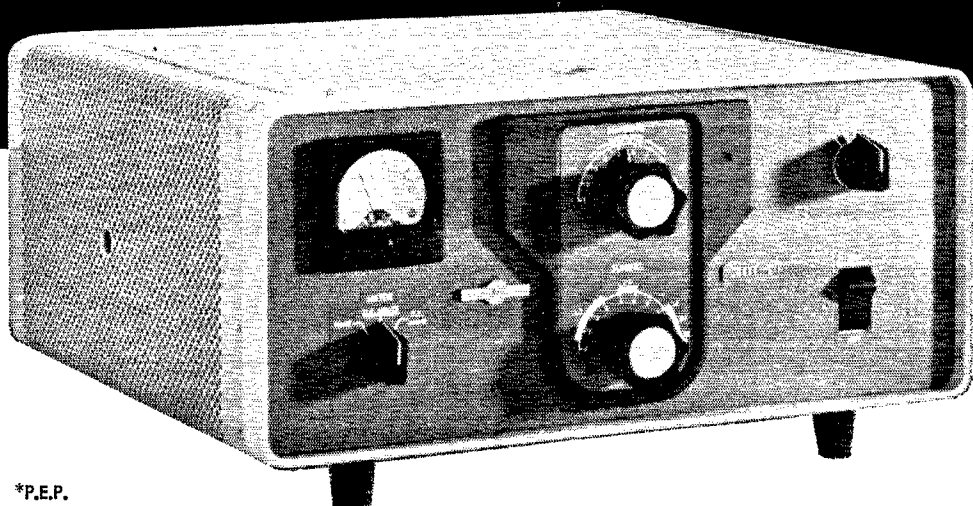
(Continued on page 136)

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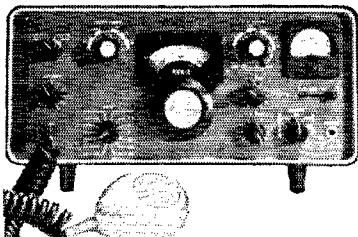
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ing 75 meters agsin. W5ABQ, AREC/RACES, ran a propagation test May 5 and 6. Traffic: W5ZHN 140, W5UBW 66, K5FMF 12, K5ONE 12, W5WZK 8.

WYOMING—SCM, Lial D. Branson, W7AMU—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 1800 MST on 3610 kc. W7HDS and W7Euz called on W7AMU on RACES business. K7MGM was a Casper visitor and spent the night with W7IDO and W7DW. W7AMU is ill with teeth extraction and a heart complication but will be about in a couple of months. The Casper Radio Club assumed the sponsorship of the Wyoming Hamfest, to be held at the Pines Lodge 14 miles west of Buffalo, Wyo., June 30 and July 1. There will be prizes, a banquet, transmitter hunts and a nice time for all. W7HDS, newly appointed C.D. Radio Officer, and her husband W7Euz were Casper visitors in the interest of RACES. They called on W7AMU and others during their short stay. Traffic: W7DXV 68, W7GZC 34, W7AMU 23, K7ONK 22, W7BHH 18, W7HDS 16, W7NMW 8, W7AEC 7, W7CQL 3.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Harvell V. Tilley, K4PHH—SEC: W4FQQ. RM: K4YUD. PAMS: K4BTO, K4PFM, S.S.B.: K4KJD. Congrats to WA4CPF, WA4DBS and WA4DOG on passing the General Class exam and also to the XYL of K4WSS, WA4AHX, who is now on 6 meters. The AENV of Morgan County held a successful S.E.T. Apr. 7. W4CIU is building a 6-meter beam. K4DJJ will be set up in Lanett soon. K4KDE is running an Invader. K4DJR is installing a 75-meter mobile rig. K4ZY0 is on 2 meters with a "Twoer." K4WPZ is on with a 75A-3 and a 32V-3. The Cradle of the Confederacy Award has been received by K4ZTT. K4UMD has been swapping interesting articles with the Birmingham Radio Society of England. WA4AZA now is Tech. Class. New 2-meter activities in mobile are W4LPU and W4EWA. W4G0J has an Invader. The Desoto ARC ended its first training period with three new hams: WN4GNI, WA4AFF and WA4DYD. The second training period is underway with ten youngsters preparing for the Novice test. Club meetings are held the 2nd and 4th Mon. nights at 1104 N. Gault Ave., Fort Payne. The AENV meets Mon. instead of Tue., as previously reported. Traffic (Apr.) K4PFM 139, WA4BDW 126, K4YUD 107, K4UDK 92, K4AOZ 78, K4PHH 64, K4WHW 52, K4WOP 38, K4TDJ 34, W4CIU 31, K4GXS 30, WA4AVM 29, K4KJD 27, K4DJR 26, K4KDE 26, K4YTT 23, K4WSH 22, K4RIL 21, K4FZQ 20, W4YRO 14, WA4BSE 13, K4G0J 13, K4BTO 12, WA4CPF 11, W4PVG 11, K4SUY 9, W4ZNI 7, W4MI 6, K4WPZ 6, K4JDA 5, W4RLG 5, W4VWG 5, K4ZTT 5, WA4BTA 4, W4DGH 4, K4UMD 4, WN4AZK 3, W4DS 3, K4FTC 2, W4WGI 2. (Mar.) K4CFD 6, K4GRA 3.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4YIT. RM: K4KDN, RM RTTY: W4EHU. PAMS: 40 W4SDR, 75 K4LCF, V.H.F. W4RMU, S.S.B. W4CNZ. OES applications are coming in slowly but surely. Take an interest and help boost v.h.f. useful participation. Apply to the SCM. Qualified OOs for 6 and 2 meters are sorely needed throughout the section. In spite of heavy DX activity W4QVJ is on the spot in emergencies—cite Milton for one. The Gator Club station, W4DFU, can now work just about every normal mode, including RTTY, and wants traffic. W4DVR, Ocala, relayed much emergency traffic Milton back to N.W. Fla. Thanks to all who helped put E. Fla. on top for 1961 for general traffic and activity rating. Knew all along you could do it. Is it a one shot deal or do we stay there? Read your manual and see if you are not qualified to apply for one of the ARRL appointments. Be recognized for what you are. Traffic: (Apr.) W3CUL/4 1801, K4SJH 1068, WA4BMC 850, K4BY 329, K4KDN 291, W4TUB 244, W4AKB 239, K4TBG 221, W4DVR 196, K4COO 193, W4TRS 164, W4EHV 148, W4WHK 132, W4VLH 117, W4MIN 112, K4AHU 105, K4LCF 104, W4LDM 95, WA4DMV 88, K4JZU 79, K4XN 77, W4CNZ 77, W4DFU 75, K4DAX 68, K4VNA 68, K4ENW 62, K4JLO 58, W4ZAK 57, K4NVD 55, W4IYT 48, K4AKQ 45, K4DBT 42, W4CWD 40, W4VCX 38, K4ILB 37, K4RDY 35, W4BKC 28, WA4RGL 27, W4HHT 25, K6SXX/4 24, WA4BGV 23, K4JWM 21, K4ZIF 21, WA4CJC 20, W4EAT 18, K4GUE 18, K4MTP 18, W4HMT 18, K4PPX 18, W4WPD 18, WA4AZZ 17, W4LMT 17, K4QQE 17, W4SMK 16, W4IAGM/4 15, W4TRU 15, WA4DCI 14, W4HFR 12, K4OZS 12, W4ACOR 11, K4NXW 11, K4S0Q 10, K4RNG 10, K4ZK 9, K4MZR 9, W4AII 8, W4LSA 8, W4BZ 7, K4CMK 7, W4MTC 7, K4LML 7, K4LVE 7, W4RUT 7, W4DTS 6, W4REH 6, K4VGD 6, W4AYD 5, K4DAD/4 5, W4Y0J 5, K4ODS 3, W4RNE 2, K4KVJ/4 2, W4LVY 2, W8LDU/4 2. (Mar.) K4LLI 67, K4EYH 57, K4PMA 55, WA4DMV 47, WN4BSH 39, W4SVB 33, K6SXX/4 32, W8LDU/4 29, K4FPQ

(Continued on page 138)

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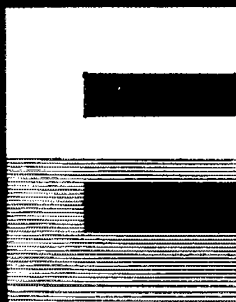
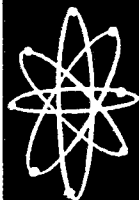
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18, K4LVE 17, W4SMK 16, K4OZS 8, W4UHB 3, K4-UKF 2, K4MXH 1. (Feb.) K4OZS 4.

WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE, PAM: W4WEB, RM: K4-UBR. A recent program of the PCARC was a tour of the telephone office and microwave equipment. W44FLJ and W44JF are on s.s.b. with an Invader 2000. Quincy: K4QDN is on 10 meters and works into Tallahassee on groundwave. W4CCA, in Wewahitchka, and W4AAKT, in Blountstown, also made a 10-meter contact. Port St. Joe: K4RZF, K4LQJ, W4MXN, W4WEB, K4LIX and W4CCA aided in the search for two men missing in a boating accident. The c.d. communications van was used for several days. Two-meter v.h.f. gear purchased by the c.d. will be ready for tests between St. Joe and Wewahitchka soon. Fort Walton/Eglnin AFB: W44EVU is on from Destin. The Explorer Scouts held their own Field Day on Santa Rosa Island, with four separate rigs on all bands. K4CZA is a new 8- and 2-meter mobile. K4WTF keeps 10 and 75 meters hot. Val-P. c.d. purchased a 10-meter Communicator. W4-VWI is chief op. W4ZGS is equipping the new camping trailer as a mobile ham shack. Tallahassee: W4MLE was awarded an RN5 traffic certificate. W4AXP was honored at his retirement from NAS. K4YYE is on s.s.b. with an HX-500 and a vertical. Traffic: W4GAA 13. W44FLJ 10, W44JF 3.

GEORGIA—SCM, James A. Giglio, W4LG—SEC: W4TJS, RM: W4DDY, W4LME will be inactive for awhile because of USAF duty. K4PQY is an amateur astronomer. K4YID has a new jr. operator born May 5. The GCEN meets on 3995 kc. at 1800 EST Tue. and Thurs., 0800 on Sun. K4MCL has a new 75C-3 which works FB with the 32S-1. He is conducting a Novice class of 28 civilian and military personnel at Albany Marine Corps Supply Center. The GSN meets Mon. through Sun. on 3595 kc. at 1900 EST and 2200 EST. W4PIM has received the A-1 Operator Award. The Georgia Cracker Mobile Net meets each Sun. at 1330 EST on 3995 kc. with W4LG as NC. Virgil, jr., K4CFN (father) and Virgil III, K4CFO (son), have busy RTTY stations. W4HEG is conducting advanced theory and construction classes on alternate Mon. nights for the Atlanta Radio Club. The Kenneshochee Emergency and Traffic Net meets on 28,680 Mc. at 2130 EST Sun. with a rotating NC each month. K4YSU and K4IZO have plans for the Georgia RTTY Net. The 4th Region Day Net meets daily on 7125 kc. with W4PIM as net manager. The GPYL Net meets each Thurs. on 7260 kc. at 0900 EST with K4KIH as NC. Also the GPYL Roundtable meets each Wed. at 1630 EST with K4RHU as net manager around 3900 kc. The Georgia S.S.B. Net meets Mon. through Sun. on 3975 kc. at 2200 EST. Traffic: K4-MCL 295, W4DDY 173, W4PIM 164, K4WWY 114, K4-ZYL 66, W4LME 61, K4VTH 51, K4NGI 48, K4BAI 38, K4BVD 30, W4LG 5, K4RHU 5.

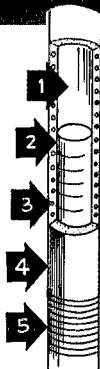
WEST INDIES—SCM, William Werner, KP4DJ—C.D. Radio Officer: KP4MC, WP4BBI and WP4BBN are now KP4s and AREC members. Ramey AFB: KP4-BAU, a new OPS, reports his station consists of B&W5100-B, Drake 2B, TA-33, a.c.r. switch, D104, s.w.r. bridge, oscilloscope, BC-221, BW-650 s.w.r./dummy load. Also available but not connected is a B&W515B s.s.b. generator, 2000 p.e.p. linear, all-hand trap antenna, 2-kw. emergency power plant and an ART-13 transmitter. All this is set up in a 6000-lb. metal mobile communications van bolted and locked to the earth with hooks and can withstand winds up to 200 m.p.h. and has been designated emergency communications link between base hospital, air police, local police and Red Cross on the air base and Red Cross in disaster areas. KP4BAU is setting up code practice classes for newcomers and Novices. He is MARS and reports to the net Mon. 2200-2300Z on 7305 kc. Fort Buchanan: KP4-BDO operated an HT-37, an HQ-170 and a vertical antenna at the Antilles Boy Scout Circus at Fort Buchanan Apr. 7. Sgt. Robertson, MARS operator, is now K3IGM, General Class, operating with an HT-40 transmitter, an SX-110, and a vertical antenna. KP4BCA operates club station KP4UH at the Navy receiving station, Sabana Seca, Arecibo: The PRARC Annual Hamfest held at Arecibo Apr. 29 was attended by 250. KP4CL won a Clegg 9er. KP4AET was host at the rum distillery that bears his name. KP4RA's XYL is KP4BCT on 50 Mc. K2KGU, an ex-KP4, attended the hamfest with his XYL and daughter. San Juan: KP4-AVB is now General Class and building a linear around a pair of 4X150s, WP4AYM is now KP4 and building an Eico modulator to match his 720 transmitter. KP4-AOO received the WPR25 Award before going on sea duty with the USCG. KP4AXB installed a Heath Cheyenne, a Heath transistorized power supply, a Gon-set Super-12 converter and a Mosley trapmobile antenna. KP4AXN replaced the DX-60 with a 300-watt 813 transmitter modulated by a pair of 811s. KP4CH added

(Continued on page 140)

Shakespeare

loaded antennas with their rugged efficiency built in

Optimum coil efficiency begins with air core (1), reinforced by hollow fiberglass cylinder (2). To lower loss, coil (3) is wound only in lower section of antenna — embedded in thousands of parallel glass fibers (4) — that extend full rod length, for high flexural strength. Tapered wrap of fiberglass (5) produces superior impact strength.



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30-35 MC	73-1	
35-42 MC	73-2	
42-50 MC	73-11	
10 Meters	73-3	
15 Meters	73-4	
4 Ft. antenna	\$11.25	

RANGE	STYLE	
20 Meters	73-5	
40 Meters	73-6	
80 Meters	73-7	
6 Ft. antenna	\$15.90	

RANGE	STYLE	
40 Meters	73-8	
80 Meters	73-9	
Channel 5 4.58 MC	73-10	
8 Ft. antenna	\$18.75	



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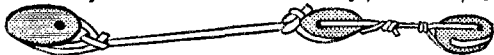
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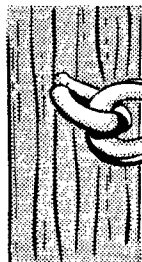
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a Drake speaker/Q-multiplier to a 2A receiver. KP4MO finds the WRL vertical works F'B alongside his house. KP4BDS and KP4CH placed first and second in the ARRL C.W. Sweepstakes Contest. KP4AWH was in front in the phone portion of the Sweepstakes, followed by KP4BCA and KP4CH. The Metro Amateur Radio Club is being formed in the metropolitan San Juan Area with meetings each Thurs. night in members' homes. The Government's Dept. of Tourism is accepting requests from KP4 hams for supplies of QSL cards, as sponsored by the PRARC some time ago. Send requests to the PRARC. KP4CH skeds K2KGU daily on 15, and has installed a 15-meter beam. *Mayaguez*: KP4AFL reports that he skeds W4JVT in Tampa daily on 15 meters at 2200 GMT and reports to the Civil Defense Net every Sat. at 1700 GMT on 7205 kc. KP4AFL installed a Heath transistorized power supply in mobile and enjoyed working 40 meters from Mayaguez to the PRARC Annual Hamfest. Traffic: KP4WT 82, KP4AFL 14, KP4BAU 14.

CANAL ZONE—SCM. Thomas B. DeMeis, KZ5TD —KZ5s M/Q. HR and KGN set up a DX-20 hi-fi amplifier modulator, an SX-43 with RME preselector and a folded dipole for display at the recent Balboa High School Science Exhibit. KZ5LW moved from Margarita to France Field. The Crossroads ARC had a barbecue. The CZARA members, at a recent club meeting, were divided on recent proposals to the FCC to bring Technician Class operators to 10 meters. The biggest complaints, though, seem to be that although 10 meters has been open every afternoon to the U.S. the chaps find little activity there. KZ5OA/KZ5OB received their HX-10 and are patiently building it. KZ5RW, newly licensed, is now operating with a DX-40 and tribander while awaiting his new HT-37 and Drake 2B. The Army MARS Net has been very active with full participation of all members. A.F. MARS nets, as always, are very active. KZ5KR and KZ5JT were active on Field Day. Traffic: KZ5JW 131, KZ5TF 85, KZ5SS 60, KZ5CD 27, KZ5HR 15, KZ5OA 15, KZ5OB 12, KZ5LM 3.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM. Albert F. Hill, jr. W6JQB—Asst. SCM: W6KGC. SEC: K6YCX. RMs: W6BHG, W6AROF. PAMs: W6ORS, K6PZAI. The following stations earned BPL for April traffic: K6EPT, W6WPF and W6GYH. Congrats, fellows! W6UGA is deferring 2-meter operation until 5 eggs hatch that were found in the converter! W6WAW now is mobile on 6 through 80 meters. W6GRG was busy on term papers. W6NAA made a trip to Ohio and worked on the 29 Palms Run. W6DWP took a nice vacation in Las Vegas. W6JDB traded his 2-meter rig for s.s.b. gear. W6KVA is working 7 days a week. Look at the overtime! W6CK moved down the mountain to Hemet. The SoCal 6 Net has a noon session (1200 PDST) daily—a good place to put your daytime traffic. 29 Palms Run was a wonderful workout for the AREC, including K6MDD, K6YCX, K6JNP and many others. W6ODF and W6FNE are new ORS appointees. Congrats, fellows! W6SLF operated portable from a storage battery in Ladera Park, Inglewood. W6CKR has a new Drake 2B receiver, and expects to make the Seattle World's Fair. The Los Angeles EC Net now meets Sun. mornings at 1730 GMT on 3880 kc. W6TNS is in Dayton, Ohio, on business. An excellent time was enjoyed at the So. Calif. Chapter of the QCWA. Support your section nets: On phone, the Southern California 6 Net (SoCal 6) meeting at 0230 GMT on 50.4 Mc. daily; on c.w., the Southern California Net (SCN) meeting at 0300 GMT kc. daily. Traffic: (Apr.) K6EPT 1060, W6WPF 916, W6GYH 517, W6JDB 307, K6OZJ 276, W6ODF 264, K6MDD 263, W6AROF 236, W6QAE 201, K6YVN 160, W6BHG 109, W6KAW 98, K6SIX 95, K6HOV 42, W6USY 36, W6CKR 29, W6GRG 29, W6KVS 23, W6NAA 20, W6QMC 19, W6DWP 6, K6JNP 4, W6SRE 2, W6SLF 1, W6VOZ 1. (Mar.) W6FNE 135, W6AOK 53, W6ODF 36, W6NKR 10, W6IBD 1.

ARIZONA—Kenneth P. Cole, W7QZH—Asst. SCM/SEC: K7NIY. PAM: W7OIF. RM: W7LND. The Copper State Net meets at 1930 MST Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 3880 kc.; the Tucson AREC Net Wed. at 1900 on 3880 kc.; the Cochise County AREC Net each Sun. at 1400 MST on 7260 kc. A c.w. net, the Arizona Interstate Net, meets Mon. through Fri. at 1900 MST on 3555 kc. The C.W. Net now has 10 active members and handled over 400 pieces of traffic in April. The Old Pueblo Radio Club of Tucson boasts of the largest membership in the history of the organization. K7CRO has an inexpensive and efficient 40-80-meter antenna only 20 feet high and 37 feet 8 inches long. The Catalina Radio Club, Tucson, has been conducting classes for Novice and General Class in both code and theory. Volunteer instructors are W7CUR.

(Continued on page 142)

7mc

W.A.C. in 1 hour 11 minutes

An Amazing Accomplishment with the Hy-Gain Hy-Tower by W6BYB

"... I can honestly tell you that after over a year's use with this (Hy-Gain 18HT) tower it is the best thing I have ever used — especially on 40 and 80M. I'm not running a California KW into it either . . . On February 12th, 1961, I worked all continents on 7mc in 1 hour, 11 minutes . . . I have all cards confirmed* . . . I also have worked all continents on 80M — receiving a 599 report from ZSIA, Capetown — 579 report from G5WP, etc. Also last March I won the plaque from the North California DX Club for best total 40/80M score in our annual low frequency contest. So you see I am really happy with the performance . . ."

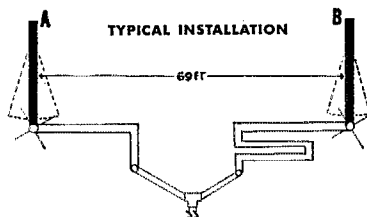
John Mayes, W6BYB Sebastopol, California

*EA 8 CG 0838 GMT
LA 8 FG/P 0850 GMT
PY 5 OF 0910 GMT

JA 3 CB 0927 GMT
VK 2SA 0942 GMT
VE 4 MZ 0949 GMT

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For the ultimate antenna system on 80 and 40 meters, two 18HT Hy-Towers may be mounted 69 ft. apart with the phase switched in order to obtain gains of the order of 2.2db end fire, 3.9db broadside and 4db cardioid on 80 meters. The Hy-Gain Hy-Tower is a multi-band vertical antenna system with automatic band selection of 10-80 Meters by means of an unique stub decoupling system. Single 52 ohm coax fed. Completely self-supporting tower 24 ft. high. Top mast extends to 50 ft. No guys required.



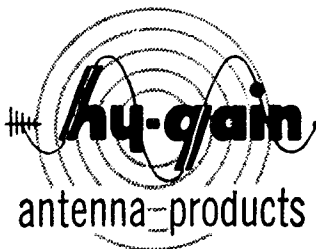
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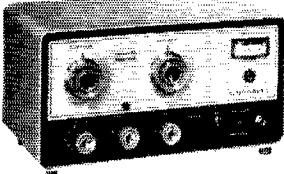
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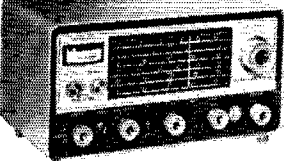
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matched feed points, with
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W7IWI, W7IHN, W7WUC, W7ZFC, K7EVE and K7-
GVP. Through their efforts over a period of 60 days
the club has seven new Novices. Maricopa County is
the first county in any of the U.S.A. to complete all series
of Sabin Oral Poliomyelitis Vaccine. In the six Sun, set
aside by the Maricopa County Medical Association,
1,854,200 doses were administered. Over 100 amateurs
participated in this program, expending a total of well
over 4,000 manpower hours. Three nets, on 2, 6 and 75
meters, respectively, complete with mobiles, delivered
vaccine and established communication links between
the 60 clinics and the distribution point. Among those
amateurs donating their time and equipment were W7s
CS, FQW, PWA, JJP, KOY, KYE, LND, LXX, MAE,
OUE, PMQ, QFL, QZH, RBA, WFY, WVF, K7s AWI,
BAM, BGG, BGL, BXT, CEH, CIN, DSB, DVO,
ENN, GAG, GES, JNY, JTC, JTF, KAW, KCB, LBP,
LBT, LFS, LSQ, MSD, OBB, OCT, ORE, OXS, PLR,
QCT, SKT, WA2PCZ/7, K5ZDP/7 and K0DON/7. Civil
Defense communications tests, planned by W7LAD,
W7SXQ and K7CET, were carried out by Tucson ama-
teurs on 75, 40 and 2 meters. W7NTY, Arizona SEC,
was an observer. New calls: KN7s SBI, SBJ, RQL,
RQE, RZN, SEC and 8ME. Traffic: WOWHE/7 351,
W7AMM 26, K7CET 8, K7RUR 3.

SAN DIEGO—SCM, Don Stansifer, W6LRU—
The May meeting of the Newport Amateur Radio So-
ciety featured a talk by WA6KPF on "Propagation of
Radio Waves." Chief operator at W6LAB is now K9-
UNC, and this station reports a traffic total of 2392 for
April, tops for this section. W6UUS made BPL again
in April with a traffic report 567. WA6PFA, of Fullerton,
registered in the AREC for Orange County. He operated
a 6-meter station at Red Cross Headquarters in Beau-
mont, Tex., during Hurricane Carla last year. W6WNN
vacationed to the Midwest during April and May. K6-
BX attended the Dayton, Ohio, Hamvention. K6DJO
was a recent San Diego visitor, and spent an evening
seeing how the San Diego DX Club Bureau operates.
The June meeting of the DX Club was held at the home
of K6UOM, W6RCD and his family drove to Seattle
and took in the Fair. The Orange County Amateur Ra-
dio Club held its Annual Picnic Apr. 22. A good time
was had by all. WA6SBO is now counting each QSL
card received as he approaches his DXCC. Congratu-
lations to a recent high school graduate, WA6BUX, SS
winner for the section, who was the fifth highest scorer
in California per May QST. W6RCD continues to han-
dle QSL chores for VR6AC. W6MGT is studying Span-
ish at night school. W6KSE has been heard working
good DX on s.s.b. recently. Please keep the reports
coming in this summer so we can have a full column.
W6DLN, in El Centro, continues to be top DXer in the
Imperial Valley Area. Traffic: W6LAB 2392, K6BPI 2266,
W6YDK 1899, W6UUS 572, W6EOT 484, K6KGR 96, K6-
LKD 84.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR
—Appointments renewed: W6UUL as OES, ORS and
OPS, W6PWK as EC and OBS. The RADIO Club now
has 26 members, most of whom belong to the AREC.
Another 20 are in the code and theory classes. The RA-
DIO Club has 2 pilot models of a 2-meter handie-talkie
intended for AREC use. Also a part of the same pro-
gram is to encourage more mobile activity. W6YK had
trouble rotating his 20/40-meter beam with a TV rotator
so he got something bigger—a prop pitch motor. The
Santa Barbara ARC had W6DOB as a speaker at a
recent meeting. His topic was F.M. Stereo—Multiplex.
The Poinsettia ARC elected W6OHX, pres.; W6CQO,
vice-pres.; K6RRO, secy.; WA6EZA, treas. The club
frequency is 146.7 Mc. at 1630 GMT Sun. K6ARK re-
signed from the Ventura ARC. Reason—reassignment
overseas. He certainly will be missed in this area. Traf-
fic: W6YCF 3, W6JTA 2, WA6KMG 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG
—Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX
PAM: W5AYX, RM: W5LR. The Annual Picnic of the
NTEN was held at Lake Brownwood Apr. 29 and was
a big success with 150 registering. Something new was
tried this year, there were no speeches or prizes which,
judging by the number present, proves that hams enjoy
a get-together for an informal gabfest. There was
plenty of discussion about RACES, AREC and club and
net activities. K5TRY, Texas RACES Communications
Officer, was kept busy answering questions about
RACES. W5HPH is the new EC for Brownwood and
Brown County, replacing K5LEZ who resigned. W5LR
reports good outlets for traffic into Tyler, Longview,
Greenville and San Antonio. K5JTQ is doing a fine job
with the TEX Net. K5BYS is on the air with a home-
brew 6-meter transmitter. It is gratifying to know that
some hams still build their own. I am of the opinion
(Continued on page 144)



"WES" FLEURDELYS, WØBIG/K1UAR, takes a break from riding herd on a new microwave project to check out his temporary QTH set-up.

FIELD ENGINEERING WITH A FUTURE

Stretching Microwaves Coast-to-Coast

J. W. "Old Wes" Fleurdelys, WØBIG/K1UAR, enjoys off-time QSO-ing with his fellow hams — including many members of the Raytheon field engineering team out on far-ranging assignments. Continental U. S., South America, Europe . . . their beat is world-wide.

As Program Manager for Raytheon's MLD-4B — an ultra-sophisticated cross-country microwave communications program — Wes and his group are now completing the first installation in California. Additional stations will follow in seven mid-western states, Pennsylvania, New York and Maryland.

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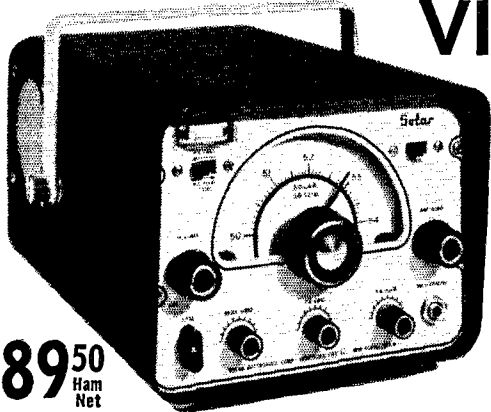
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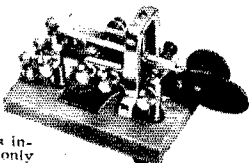
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that the ham who has never built his own rig has missed part of the fun of hamming. W5YIJ is back on the air after a short stay in the hospital. The Tarrant County Disaster Control Net held a picnic Apr. 15. Much ham gear changed hands and a good time was enjoyed by all 75 who attended. My XYL said the yard work must come first so I was unable to get on the air to collect much news. I hope to do better next time. Traffic: W5BKH 258, W5GTY 245, K5JTQ/5 216, W5LR 117, W5GNF 66, K5HTM 55, W5EUY 34, K5PNV 20.

OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—The North Fork Club did a very fine job at the Quartz Mountain Hamfest. The North Fork Club members are to be commended for their fine work from year to year. New ORSs are K5CWR and W5DNG; a new EC is W5VVQ; the new PAM for 2 meters is W5LOW. The SCM had an on-the-air meeting with Oklahoma Six-Meter Central Club members from W5VCJ's station. K5MTC now is operating in the phone band with a new ticket. K5IXS informs us that he is getting his diploma from college this spring. Our sympathy to K5-FZM's family. Loyal is a Silent Key. The Explorer Scouts of Bartlesville built and equipped an emergency communications trailer. It was given a workout on a recent camping trip. There are several amateurs in the Post, and the trailer is completely equipped for any communications emergency. Congratulations to W5JLR, Tulsa County EC, for his fine work with the AREC; also special appreciation to W5FKL and K5JOA for their fine work on the phone nets. W5HFZ is working in the Northwest Oklahoma AREC Net. Traffic: W5-ICQ 1039, K5DLP 203, W5PEC 174, K5CBG 168, W5-DRZ 133, K5AUX 120, W5VVQ 99, K5TEY 67, W5FKL 58, K5JGZ 54, K5OCX 47, K5IBZ 46, K5FSU 28, K5-SWW 25, K5ZEP 23, K5ZCJ 21, K5LZF 20, W5CCK 18, K5JOA 15, W5UYQ 13, K5CWR 12, W5PNG 12, K5VNJ 10, W5FWW 8, K5RWL 6, W5WAF 3, K5OOV 2.

CANADIAN DIVISION

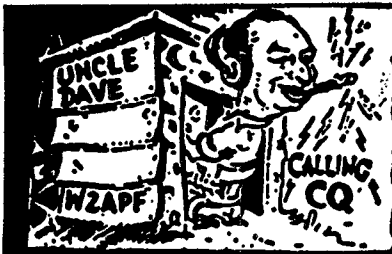
MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A. E. W. Street, VE1EK, and H. C. Hillyard, VOICZ. VEIAGT is back from south of the border and active on s.s.b. with an SP-10. VE1PS now has an SP-10 Apache combination and other s.s.b. stations active from Cape Breton include VE1WI, VEIAGD, VE1PB and VE1PK, VE1PR and VO2NA (over 40 awards) have joined the Certificate Hunters' Club. VE1AJE is a new call from Halifax. VE1ADH has a Saturn 6 antenna on his Volkswagen! Newly elected officers of the Goose Bay Club are VE1MVO2, pres.; VO2UA, vice-pres.; VO2NA, secy-treas, and awards mgr. VO2NA reports that the Annual Goose Bay QSO Party has been delayed to the period Oct. 12-22. This will be an opportunity for you to pick up your "Worked All Goose" Award. 287 WAG certificates to 26 different countries have been issued to date. More details desired on the Worked All Goose Award? Contact Jack Willis, VO2NA, Aeradio, D.O.T., Goose Bay, Labrador. The NBARA announces, in addition to its Worked New Brunswick Counties Award (WNBC), a new award called the Worked All New Brunswick (WANB). Details from Whit McCarthy, VE1AFA, 791 King Ave., Bathurst, N.B. Traffic: VE1ADH 12, VE1OM 9.

ONTARIO—SCM, Richard W. Roberts, VE3NG—VE3AJA is on the airwaves from Trout Lake, ON was maritime mobile for Field Day. DZA was the other operator on board. W1IKE visited Sudbury. The committee for the ARRL Ontario Convention is getting plans and ideas under way for Oct. The OARF, Inc. is the sponsor. BWL is a new OO. VE3CFR is back from W4-Land. VE3BIV is at Lake Mazinaw for the summer. The North Shore ARC held a very successful Annual Dinner in early May. VE3DNU is portable K4 in Tennessee. VE3DHS is 2-meter mobile. Belleville was the site of the meeting of the Quinte and Kingston Clubs for the talk by Canadian Director Noel Eaton. The D.O.T. has requested that the OARFI (Toronto) write a booklet covering TVI problems and cures. This fall should see about one hundred 2-meter handie-talkies on the air in the Metro Toronto Area. The London ARC

(Continued on page 146)

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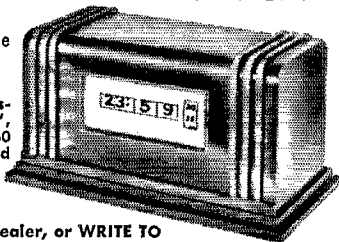
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has a new meeting place. Mr. Harry Savage, Public Relations Officer, and your SCM wish to thank the Sky-wide ARC for the FB on presenting amateur radio to the public during the Sportsman Show at Toronto. A big thank you to the Gateway ARC of North Bay for the same deal at its Hobby Fair held in North Bay. 75-meter mobiles in the Toronto Area assisted the local Army Militia on a test in the north end. The Nortown Club was host. VE3EGN is off to Israel. VE3BOH is away to Toronto. Niagara will have a club crest soon. The amalgamation of the OARFI and the OARA soon will be in effect, the new name to be the Radio Society of Ontario. VE3AGB is on 2 meters. VE3DWL now has a Valiant. The Windsor crew assisted with mobiles on the May Day parade. VE3DKE has worked 90 countries. VE3BQL/SU will be in Toronto for the ARRL Convention. VE3RN celebrated having his ticket for thirty years in May. VE3DH is in England on a trip. VE3-EMF is now in Australia. VE3BBW is pres. of the Vimy Barracks ARC in Kingston. Traffic: (Apr.) VE3CYR 158. VE3DPO 137. VE3NG 130. VE3FAS 120. VE3BSY 89. VE3AML 68. VE3DRF 42. VE3GP 40. VE3BAQ 35. VE3RN 30. VE3BUR 29. VE3ELQ 28. VE3CFR 25. VE3LK 23. VE3FES 16. VE3CFI 10. VE3VD 5. (Mar.) VE3FES 6.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM, Jean P. Achim, VE2ATL. Our caps are off to VE2SX, Police Chief of Richmond, who saved a young girl from drowning by diving into icy waters. *RAQI invites you to its Annual Convention at Chicoutimi, July 27, 28, 29.* VE2AVC celebrated the arrival of a fifth harmonic. VE2IJ's quad suffered from sleet and will be replaced by a new beam. VE2AZG, Noranda, reports 6 new licenses from the training programme: VE2BLP, VE2BLK, VE2AZD, VE2AAY, VE2AZM, VE2ACF. The Rouyn-Noranda Club is very active with several new projects. VE2ZO, Baie d'Urfé, works out well with a KWM-2 and a four-element beam. VE2EC reports VE2AGI is active on mobile operations. VE2TI talks to friends in FG7-Land. VE2AIM is on 2 meters. VE2-AMA is a new voice on 75 meters. VE2ANK did well during the DX Tests. OQN Mgr. VE2AGM reports steady activity despite poor conditions. VE2BE attended the ARRL Board Meeting. RTTY activity is increasing. VE2ATL reports: AN: Opère maintenant avec un 75A-1 et 32V-1. PX: Est en train de se monter une ant. en "V." ATL: A reçu son certificat CIM de J.C. SO: Sera bientôt on s.s.b. BCZ: Est maintenant O4-ANZ à Iquitos au Pérou. AJV: Est actif sur 20 m. BKE: Expérimente sur 2 m. RAQI: Vous invite à sa convention les 27, 28, 29 juillet à Chicoutimi. AGR: Travaille à Manicougan. PY: Sera de retour sur 2 m. bientôt. AWR: Fait du DX sur 15 m. BJJ: Est maintenant actif sur 30 m. 11 membres du CJO ont assistés à la partie de sucre du Radio-Club de Québec. Félicitation à notre Gérant des QSL, YA pour son travail toujours magnifique. Les amateurs VE2 ont accueilli avec joie, les nouvelles en français dans cette colonie. Traffic: VE2-DR 86. VE2AGM 61. VE2CP 45. VE2EC 29. VE2BG 18. VE2SD 15. VE2BAC 9. VE2BDV 7. VE2AJD 5. VE2SC 5. VE2BHD 3. VE2BLR 1.

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FS, PAM: VE6PV, RM: VE6EAN, ECs: VE6IU, VE6SS, VE6FK, OO: VE6HM, ORS: VE6WG, OPS: VE6CA, OES: VE6DB, VE6HO, our PAM, reports the Alberta Phone Net now is on its summer sked at 2130 MST. VE6HM reports the bands are not very good these days. VE6DB reports activity is very spotty and there is not much doing these days. The Calgary boys are looking forward to seeing lots of you fellows at Stampede time. Don't forget to try for the very fine certificate put out by the Stampede committee for ten Calgary contacts. The Edmonton group is very quiet these days. The VE8 boys of the N.W.T. are now displaying 1962 call letter license plates. The Western Polar Net can handle any traffic for the north with VESCW as control station, on Mon., Wed., and Fri. on 3765 kc. at 0300 GMT. VE6FS, our SEC, will be running tests with the different EC groups across the province in a combined group and all ECs will be notified in plenty of time, whenever the time arises. Traffic: VE6HM 127. VE6FK 13. VE6BC 12. VE6AHL 11. VE6AEX 9. VE6-BA 8. VE6SU 6. VE6IS 5. VE6PZ 4. VE6UH 4. VE6SF (Continued on page 148)

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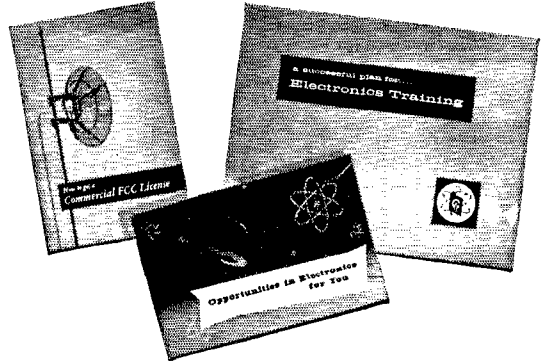
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Manchester, N. H. **Craft**

3, VE8CW 3, VE6OR 1, VE6VE 1, VE8AA 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—VE7AAF is now on s.s.b. VE7AIK also is back on with s.s.b. VE7AMT is now married and reports he is working ZLs and VKs on 40 meters. VE7BGE and VE7BEN are Chilliwacks Area AECs. Did you fill in your Form 7? The Village of White Rock is becoming real active with VE7BHE, VE7CF, VE7DZ, VE7HJ and VE7LM. VE7DX held down that place for years. VE7BBB, Eva, is a Charter Member of CHC Chapter 4. The Royal City ARA Net meets on 3755 kc. at 0300 GMT Tue. and Fri. Break in, you are welcome. The Boy Scout Jamboree is shaping up. Are you ready for this year's event? I have seen the QSL cards and they are tops for such an occasion. VE7AHT is away on a trip to Europe. The BCEN is on with two sessions, 0300 and 0600 GMT, on 3650 kc. Everyone is welcome and will make the new net manager happy. Congratulations are in order to VE7BGE, the BCEN's new manager. The BCARA is planning this year's picnic to be held in the Vancouver Area in August. VE7AQW reports that he is setting up RTTY equipment. Still looking for that letter from Comox and the Albericis. Surely there is an amateur in there. Traffic: VE7BFK 62, VE7BDP 52, VE7BFK 31, VE7AMW 28, VE7AAF 10, VE7AMT 5, VE7AOY 2.

MANITOBA—SCM, M. S. Watson, VE4JY—At the April meeting of the ARLM, Peter Cuthbert, instructor at TECH-VOC, gave a fine lecture on Transistor Fundamentals. Congrats to VE4OX, newly appointed as QSL Bureau Manager following the retirement of VE4LC. The Spring Social of the ARLM was held May 11. New licenses reported are VE4AP, VE4KY, VE4LU, VE4RW, VE4UF, VE4UK, Winnipeg, and VE4LY, Fort Churchill. The Brandon ARC reports a successful Banquet and Social Evening Apr. 21. The v.h.f. boys are active with VE4CJ winning the transmitter hunt. At the WARA April meeting the highlights were an auction and a talk by VE4DX on the Mantle Wave Trap. VE3ASL now is located in Brandon working FB mobile. The Dauphin Hamfest will be held Sept. 1-2. Traffic: VE4QD 18, VE4JY 10, VE4JA 6, VE4KN 4, VE4FO 3, VE4GB 2, VE4TW 1.

SASKATCHEWAN—SCM, Jack Robinson, VE5BL—On Apr. 26 the Regina Club station, VE5NN, was set up at the noon luncheon of the Wascana Kiwanis Club and greetings were exchanged with Kiwanians in Liberal, Kans. via KQUS to celebrate Canada-U.S. Week. The KWM-1 loaned by VE5DG did an FB job. Operators assisting were VE5JI, VE5JS, VE5DG and VE5QA. VE5JG, in Swift Current, also broke in. VE5GO has moved to Wadena. VE5KZ is back on the air at Moose Jaw. VE5EO, VE5LK and VE5GQ now have phone tickets. VE5HQ, VE5PJ and VE5GQ are in the hospital. VE5EQ and VE5EJ are on s.s.b. VE5HX has an Apache and an HQ-170 with an antenna farm. VE5GD and VE5BN are new calls heard in Regina. VE5JU has a new car complete with mobile. VE5JK has moved to a new QTH in Regina. Traffic: VE5HP 126, VE5LM 56, VE5JU 6, VE5CC 5, VE5RE 4, VE5YR 4.

Rtty Test Equipment

(Continued from page 13)

terminals should be connected to the audio output from the receiver, in parallel with the TU-unit input. "Calibration" consists of placing a transparent mask over the scope face and tracing on it the vertical and diagonal lines obtained at the three frequencies.

From the foregoing, it can be seen that RTTY is not highly complicated. The basic simplicity of the system explains the reliable results that are commonly obtained. You will find even greater fascination in watching your own equipment respond to an unseen hand than that which always attracts a crowd when a teletypewriter is put on display in a window or exhibition booth.

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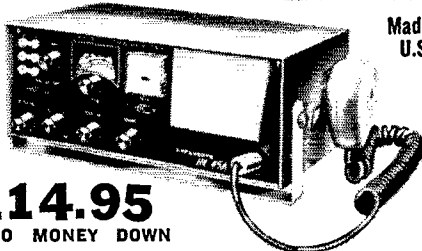
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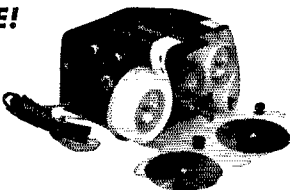
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Technical Correspondence

(Continued from page 32)

SOME TIPS ON SATELLITE MONITORING

R.F.D. 1, Scotland Drive
Chagrin Falls, Ohio

Technical Editor, *QST*:

There is a growing interest on the part of amateurs in listening for the many transmitting satellites now orbiting the earth, as evidenced by your item in April, 1962, *QST*, describing various ways of monitoring the 136-Mc. tracking transmitters of Echo A-12 and other satellites. Perhaps *QST* readers would find the following information helpful in this pursuit. It was accumulated in the course of solution of problems arising the Sohio Moon-beam Tracking Project in Cleveland.

A difficulty encountered with 136-Mc. reception was images from strong f.m. broadcast stations of the Cleveland area, when the converter injection is on the low side of the signal frequency and an i.f. around 14 Mc. is used. Traps can be made to handle this, though if the stations are spread over a considerable frequency range, a tunable trap may be required. Often a better solution is to put the injection on the high side, or around 150 Mc.

On the general problem of "converting converters," we have found that 144-, 220- and 432-Mc. converters, as well as those for 108 Mc., can be altered easily to cover a wide range of satellite frequencies. We had a Tapetone TC-108 converter which was modified for 90 Mc. (U.S.S.R. 62081, 1962 Theta I) by changing all the r.f. slugs from white to green, and substituting a 52-Mc. crystal in the oscillator. The slugs are available from CTC, and come in some of their coil kits. The noise figure at 90 Mc. is even better than it was at 108.

The U.S.S.R. satellite launched March 16 had a c.w. beacon on 90.018 Mc. Our nearest f.m. station was on 90.3 Mc., so not much trouble was encountered with interference. The satellite is no longer operating on this frequency, but it is likely that U.S.S.R. will use 90 Mc. in the future, so anyone with a 108-Mc. converter can get on this frequency with a minimum of trouble, for listening or Doppler recording. A simple f.m. antenna received this satellite signal with well over 1 μ v. developed at the converter input. Vertical polarization was helpful in reducing f.m. interference, but it made ignition noise worse. A small problem was created by f.m. tuner local oscillators swishing through the frequency. These can be recognized by their characteristic 60-cycle frequency modulation hash and erratic center frequency. Some f.m. and television receiver oscillators still radiate a measurable signal, even at a distance of several miles.

A few years ago a Centimeg 432-Mc. converter was altered to 378 Mc. for some Pioneer shots, by changing the local oscillator and loading the quarter-wave r.f. tank circuits capacitively. A 432-Mc. converter was also used on 324 Mc. (Transit program) by similar capacitive loading, so that the injection was on the high side, with an i.f. in the 50-Mc. region. The same converter was also used at 327 Mc. for an elementary attempt at some radio-astronomy observations (deuterium line). A 220-Mc. converter was made to work on 235 Mc. for reception of TIROS TV signals, by changing the crystal and spreading the r.f. coils slightly.

For frequencies above 216 Mc., cavity-type parametric amplifiers have been altered to cover various frequencies by adding or subtracting line lengths. Sometimes it is necessary only to change the line tuning capacitance slightly, in order to cover the desired range. For example, a 220-Mc. paramp will invariably be usable at 235 Mc. without much retuning.

A home-brew 960-Mc. converter and paramp system (Pioneer and Ranger programs) has also been operated at 922 Mc. (U.S.S.R. space program) by slight changes in the

(Continued on page 152)

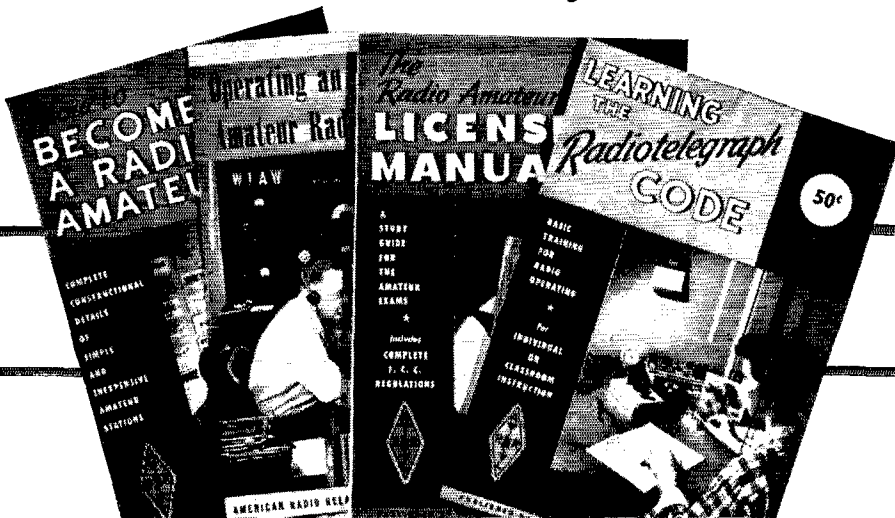
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r.f. circuits and changing i.o. crystals. No signals have been received yet on these frequencies, but we are attempting to get prepared for the future.

Several years from now many of the U. S. NASA space probes will be on frequencies like 2380 Mc., using narrow-band techniques. Amateurs who may plan moon-bounce experiments in our S-band range, 2300-2450 Mc., might be well equipped to do some deep space probe monitoring, also. Perhaps this would be an added incentive for some radio-club projects?

We have had some success with use of wide-band antennas of the log-periodic type for satellite reception. Most of the existing satellites do not require high antenna gains for simple tracking observations, and the log-periodic type enables one to have one antenna covering a sizable frequency range. At one time we had a log-period feed in an 8-foot dish covering a range of 200-2000 Mc. At the lower frequency end the performance was not much better than a dipole-plus reflector, because of aperture blocking and s.w.r. problems. A similar type of feed has been designed for use in a 30-foot dish which we hope to have operating sometime in the near future. Another type of antenna for satellite work is a discone, which works reasonably well for Doppler work on most satellites. Depending on the converter system used with these wide-band antennas, there may be some problems with stray r.f. pickup from f.m. and TV stations, etc., but this can be cured by use of cavity filters at the converter input.

— Ralph W. Burhans, W8FKC

Novice Roundup

(Continued from page 31)

Eastern Florida

WN4EEN... 2573- 73-31-17
WN4BMC... 476- 19-14- 4
WN4BYW... 38- 6- 6-20

Western Florida

WN4CDN... 3922-106-37-37
WN4BPO... 450- 25-18-13

Georgia

WN4ARY... 4815-107-45-14
WN4ARE... 3675-105-35- -

West Indies

WP4BBN... 7585-170-41-40

San Diego

WV6SBO... 20,345-313-65-29
WV6UCF... 10,340-220-47- -
WV6SVV... 8476-163-52-27
WV6WVM... 4788-116-38-29
WV6QJX... 3584-108-28-33
WV6RUS... 3164-113-28-40
WV6QJF... 1216- 54-19-20
WV6HXY... 731- 45-16-17
WV6UQK... 188- 21- 8- 4

Santa Barbara

WV6TIF... 800- 50-16- 9
WV6UQL... 385- 35-11-12

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Northern Texas

KN5KKG... 13,560-228-60-30
WN5AZB... 5480-160-53-37
WN5AKH... 5004-139-36-32
KN5LZP... 3492- 97-36-28

Oklahoma

KN5JLL... 1474- 57-22- 6
KN5JIT... 1020- 41-20-21
WN5AGJ... 960- 38-20-20
WN5DAZ... 532- 28-14- 6

Southern Texas

WN5AFL... 3811-103-37-39
WN5ACA... 3060- 75-34-34
KN5LQJ... 1288- 56-23-24

**SOUTHWESTERN
DIVISION**

Los Angeles

WV6TBB... 8262-147-51-39
WV6QNN... 8131-173-47-23
WV6GJ... 1971- 63-27-36
WV6STC... 1302- 62-21-35
WV6SNK... 1005- 42-15- 5
WV6VKY... 880- 40-22- 4
WV6TMY... 478- 28-17-17
WV6STJ... 120- 12-10-10

Arizona

KN7OWD... 15,732-276-57-36
KN7QPO... 4620-105-44-31

Check logs: W5LJT, WA6RWM, W8IBX, W9VSW.

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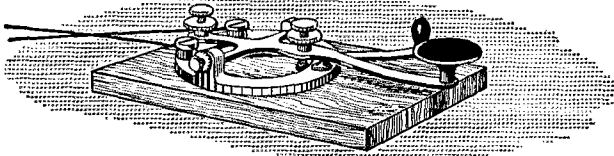
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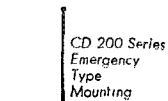
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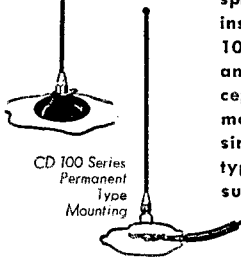


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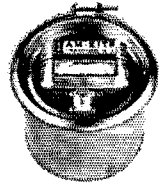
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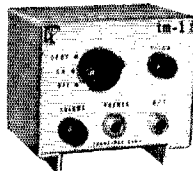
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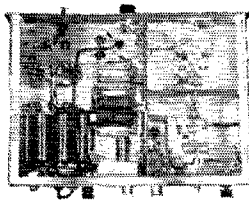
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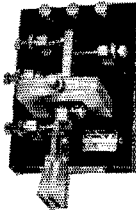
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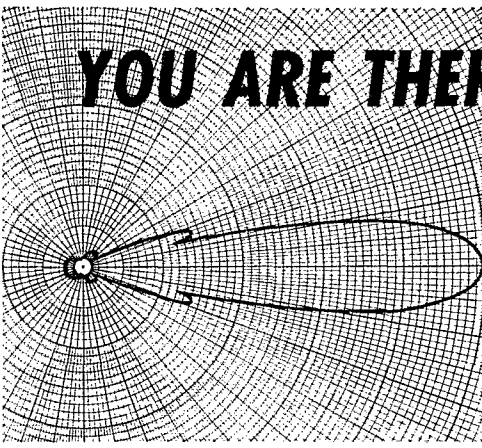
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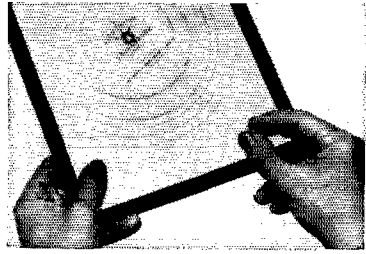
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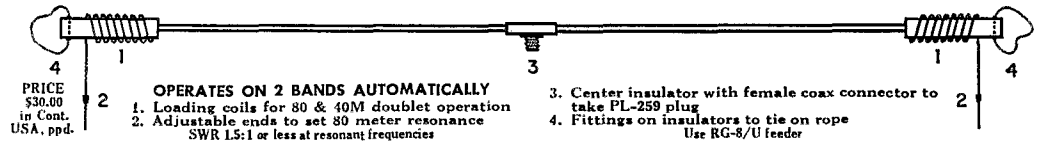
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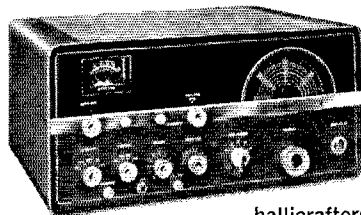
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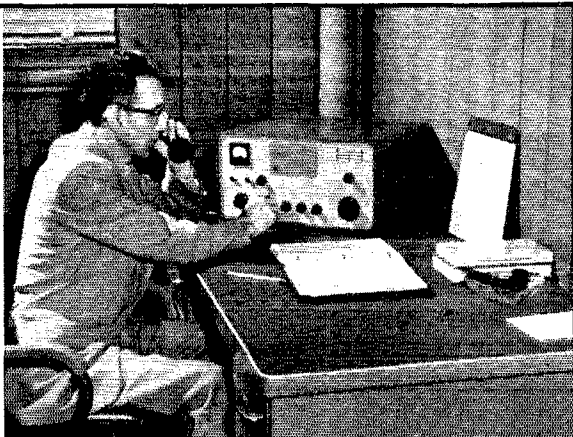
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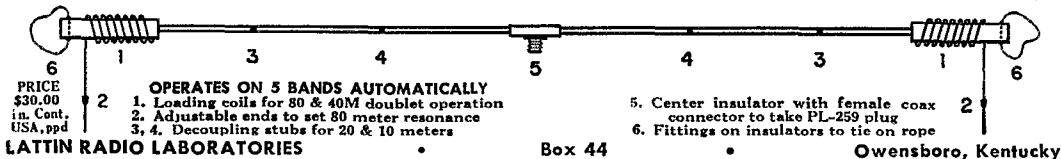
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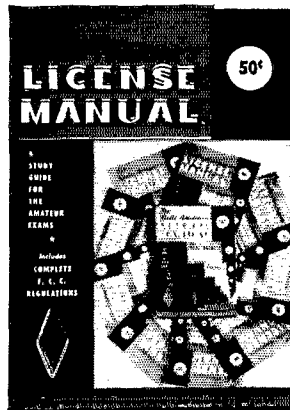
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HAM TV Equipment bought, sold, traded. Al Denson, WIBYX, Rockville, Conn.

KWSI, \$900, W2ADD

TOROID Bonus: Free 033 (space) and .068 (mark) 200 V. mylars during June, July; August 1962 with order of five toroids, .88 mhy., uncase, like new, with mounting hardware; information sheet, \$1.00 each, 5/\$4.00 postpaid. KCM, Box 88, Milwaukee 13, Wisconsin.

304TL tubes wanted. Also other transmitting 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 Place, Kearny, N.J.

CASH For Vantron Q-Probosc CQ all issues 1945. W4ID, 461-3rd Ave., Sea Park, Ga. Gallie, Fla.

SELLING new Hallicrafters S10 receiver, \$62; Chuck Harmon, WA6NPP, Hq Co 501 Inf., 121 Airborne Div., Ft. Campbell, Ky.

CUP-CORE Inductances, excellent for sharp or band-pass 50 to 100 Kc. I.F. or B.F.O. Very high Q. Unused, cased, ad-justable; solder terminals, Type 1, 2.9 Mh., Type 17, 3.7 mh. Dollar each postpaid U.S. Circuit suggestions included. H. Woods, 2346 Clover Lane, Northfield, Ill.

WANTED: Ham gear, Will trade Chore-Master garden tractor, electric welder, Lionel train set, Beta 24 in. scroll saw. Write for details to Jim Lundy, WA5BMM, Box 26, Deming, N.Mex.

DID You hold a radio license forty or more years ago? If so, you are eligible to membership in the Old Old Timers Club. Initiation fee covers life-time dues, lapel pin and bi-monthly issues of the "Spark Gap Times" for the rest of your life. For information, write Sec.-Treas. Earl C. Williams, W2EG, 507 Wayside Rd., Neptune, N. J.

EXCELLENT CE-100V: late model #E-620, all modifications. Perfect in every respect, \$575. Also HRO60T, with seven coils and calibrator, \$295. W8YBZ, 1716 Sierra Road, Charleston 4, W. Va., Tel. DI. 4-3233.

PROCEEDINGS OF THE I.R.E. 1914 through 1949, 1923, 1928, 1931, 1932 complete. Will sell any copy or copies. Excellent price on entire set. Mrs. William Knap, W1ZIM, 191 Bechtwood Rd., West Hartford 7, Conn. Tel. 521-2055

COLLINS 75S-1, \$380; 32S-1 with AC, \$520; 399C-1, \$120; 516E-1, \$180, K8YEL.

COLLINS 75S-2, \$375; URA-8A converter, \$225; 51J2, 51J3, 51J4 reconditioned Collins receivers 500 kc., -30-30.5 mc. 32V, \$195; 75A-A \$525. Teletype and Kleinschmidt equipment taken in trade for new amateur equipment. Write Tom, WIAFN, All-tronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

WANTED: KWM-2 Transceivers and any old issues of QST from inception through 1925. Al T. O'Neil, Camp Lakeview, Lake City, Minn.

KWS-1, with station control center, also 75A-4. Both used very little, in mint condition. Latest modification by factory authorized service. If you want a real clean, new condition station, write W8BPB, 5210 Three Mile Drive, Detroit 24, Michigan, for photo or demonstration. Detroit area parties, phone TU 4-3800 days for appointment.

HAMMARLUND HO-100 receiver with clock. Never used! Swap for guns. Leo Soulek, 418 Riverview, Springfield, Oregon.

SELL: NC-300, calibrator, 6M converter, spkr, \$200; Ranger, \$125. Both for \$300. K3JFK, 402 Crest Rd., Wilmington, Del.

WILL Swap. Millen grid-pit oscillator with all coils, perf. condx in original box. Want C-B, SSB slicer, #A or B. George V. Ruos, W3SBR, 104 Walnut St., Bridgeville, Del.

KWM-1 AC supply and noise blanker, in exc. condx, \$575; 3 element Hy-Gain Triband Thunderbird, \$50, W2OZD, 3 Elizabeth Lane, West Paterson, N.J. Tel. LAmbert 3-0991.

ANTENNA Rotator with cable and control console. W4EY, Temple Terrace, Fla.

HO-140XA, spkr, Heath O-mult., \$170 and in exc!nt condx. Will deliver in NYC area. K2IVB, 1062 Virginia Ave., Bronx, N.Y.

SELL: Ranger \$185.00; NC-183D, \$200; Gonset Super Six conv. magazines, other gear. K2PSR, 75 Carlton Ave., Trenton 8, N.J. Tel. TLuxedo 2-2303.

WANTED: NC-183D receiver with matching speaker, list condition, accessories, price, serial and ER numbers. Reply to John P. McDermott, 86 Greenlawn Ave., Stratford, Conn.

HEATH LG-1 with W4GZ modification for antenna measurements. QST Dec 1955, with cables and SWR curves. \$40. F.o.b. New Orleans. W5FTW

HY-GAIN Monoband beams for 10, 15, 20 for sale as a package for \$50.00 cash and carry. You carry it away. W6GMC, Monrovia, Calif.

WANT E-Z Tiltover tower with ground post. State model, price condition. Want CD ant. rotor, "Sarge" Sears, K6QOI, 4725 Bridle Trail, Santa Rosa, Calif.

FOR Sale: Collins 75A3 with 3 Kc and 8 cyl. filter 100 kc, xtal geared knob FM unit and speaker, \$320. E. Shafer, 3479 Kersdale Rd., Cleveland 24, Ohio.

NC-300 for sale, with crystal calibrator and matching speaker, \$195; recently aligned by authorized laboratory; will not ship, sry, Tom Jardine, K2SAO, 77 Ridge Road, Rumson, N.J. Phone 842-1209.

Palo Alto Area: Collins 310C-2 PTO VFO xmitter, new! Modified BC-348Q; S-meter, noise limiter, crystal filter, speaker, 30 new HK-254 type tubes, Misc. All guaranteed. Best offer all or part. K6HFK, 1005 Bryant, Palo Alto, Calif.

SELL: BC610F transmitter with spare set of tubes; coils included. Instruction book, mint; BC614E speech amplifier. Best offer arrange own shipping. Model T6S12 revr and xmitter combination. Best offer, G66B and G77A Gonset Twins, 12 volt pwr. supp., \$325.00. Write to Dr. R. M. Adelman, Slocum Lake Road, Wauconda, Ill., or phone JA 6-4391.

RME 4350A and 4301, \$200; 20A and 458A VFO, \$200. K9AXO, 543 Hermitage Deerfield, Ill.

A-1 Reconditioned equipment. On approval, Trades, Terms. Hallicrafters S107, \$69.00; SX-99, \$99.00; SX100, \$199.00; SX-111, \$199.00; SX-62, \$159.00; SX-101 III, \$249.00; SX101A, HT37, HT32B; Hammarlund HO-100, \$129.00; HO-110, \$179.00; HO-170, \$289; HO-180, \$349.00; Heath MR-1, \$79.00; MT-1, \$99.00; RX-1, \$199.00; Collins, Central, Elmac, Gonset, Heath, Johnson, RME, many other items. Write for free list, Henry Radio, Butler, Mo.

FOR Sale: Globe Champion 300-A, gud condx, \$200 or your best offer, K8UEI, Tim Longstroth, 3051 Dresden Road, Zanesville, Ohio.

SELL: Viking Valiant transmitter, \$250.00; GPR-90 receiver with matching speaker, \$300. Both like new, Robert Galpin, 8004 S. Hilcrest Drive, Oklahoma City, Oklahoma.

FOR Sale: Johnson 6N2 transmitter factory wired, two 6-meter xtals, like-new condx, deliver within 75 miles. \$99.50. WIJLX, 7 Sheffield Rd., Danvers, Mass.

SELL Or trade for good general coverage receiver complete unmodified SCR-522 with antenna, coax, connectors in trunk; Tecraft 220 Mc. station, transmitter, converter, pwr. supply, ant. relay, etc.; converted surplus 160, 80, or 40 meter plate-modulated 8-tube 807 mobile or fixed transmitter built in antenna, PTT relays; used ACX300A's with sockets; signal generator I-122; 8-15 and 50-75 Mcs. Prefer not to ship. Richard Greenberg, WA2CSE, 216 DeMott Ave., Rockville Centre, N.Y. Tel. 516-R06-2395 evenings.

VIKING II with Knight VFO, excellent team. Both for \$165.00. K0TBO, 201 East Cedar, Cherokee, Iowa.

FOR Sale: Central Electronics 20A wired, in perf. condx, like new, \$125.00. Gerald Sherman, 346 Birchwood Ave., Elk Grove, Ill.

FOR Sale: Super Pro 779 with Collins mechanical filter, product detector and other modifications in new cabinet with power supply. Best offer over \$125.00. Thomas Ferguson, 375 Wilbraham Road, Hampden, Mass.

CG Final 4-811's, 14 x 8 x 10. Separate pwr. supply, \$100. PP, USA, W6RET, 8831 Sovereign Rd., San Diego, Calif.

SELL: Knight R100 receiver with xtal calibrator, S-meter, speaker, \$80. Heath AM-2, \$12. Will ship, K9VSK, RFD 2, Roanoke, Ill.

WANTED: Viking Ranger and Matchbox, WA8AHG.

XMTTR Knight T-50, like new, \$29.00; Knight VFO, new, \$25. WA2WRK, 166 East 78th, NYC, RE 4-6972 evenings; PE 6-4536 days.

HAMMARIUND HO-145 revr, w/spkr, in exc. condx, \$150.00. No shipping, sry. Aramburg, 80-20 Broadway, Elmhurst 73, L.I., N.Y. Tel. TW 8-0134.

FOR Sale: Apache, \$180; SB-10, \$70; HQ-170, \$300. Ray E. Davies, K6OMO, Rte. 1, Baxter, Iowa.

TRADE! 3/4 x 4/4 Graphic, with case, flash, holders, Want: Hy-Gain vertical tower, Dossce, 724 SE First St., Little Falls, Minn.

JOHNSON Kilowatt, new condition, \$750. K4AOZ, 572 Park Ave., Birmingham 16, Ala.

SELL M-15 teletypewriter, like new, Ballantine V7VM model 300, New Dumont 'scope sweep range 2-1250 6K-30K freq. meter 125-20,000 kc less batteries. Will sell whole package only: \$265.00. Robert T. Lambert, 185 Tami Drive, St. Paul Park, Minn.

IMMEDIATE Sale! Viking II with VFO built-in electronic T-R switch, exc. condx. Make an offer above \$200. Ronnie Gann, W1FGF, 177 Andover St., Hartford, Conn.

HEATH Mobile, \$200; Cheyenne, Comanche, MP-1 supply. Works well all bands. William Livengood, K3EQI, 565 Main St., Ford City, Penna.

GONSET Supereceiver 12 mobile converter, model 3261, very hot, \$39.95; Hy-Gain 2 meter 7 element beam, \$4.95; SCR-522 2-meter rig (converted), \$24.95; Hy-Gain 80-10M horizontal trap antenna, kilowatt, \$9.95. K5HXO, 109 Main, Elk City, Okla.

SELL: Collins 75A2 with xtal cal. National NC-57, Elmac AF67, Elmac PMR677 Multi-Product M1050 power supply and Gonset Super-Six. Write for details. W0AML, 2900 7th Ave., Marlon, Iowa.

SELL: 2A-2AQ-2AC-2QA, OT1, 458VFO, LA4GOB, all FW clean, A-1. A steal at \$475.00. Package deal only! U pay shipping. W8VXH, 2580 Ashton, Saginaw, Mich.

6 & 2 METER FM gear. Surplus police units, Receiver strips, \$15.00. Transmitter strips \$10.00. Write for details. Two-Way Radio, 11 5/2 Ward St., Boston 20, Mass.

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.

HEATH TX-1 and SB10, \$250; RX-1 and XC-6, \$250; OM3 'scope, \$25; Palco mobile rig w/PS, \$90. W9TGH, 7904 East 71st, Indianapolis 26, Ind.

COMMUNICATOR III, 6 meters, 2 PR crystals, halo, Drake TV-100-I.P. \$170; National VFO-62, \$35. Will deliver 30 miles. WA2LXK, Ditzian, 76 Wilson St., Hackensack, N.J.

HT-32A, immaculate. In original carton. Less than 35 hours logged. Perfect condition. Going to college in the fall. \$450.00. Randy, K5KNR, 2220 Avenue "O", Huntsville, Texas.

WANTED: Heathkit VC-3 voltage calibrator. W1SAO.

WANTED: SSB xmitter, K3LIY.

SELL Or swap: RDO—\$65.00; BC-348Q, \$45.00; APR-5, \$35.00. W7PVE, 2312 South 124th, Seattle, Wash.

FOR Sale: I offer my one-owner Collins 32V3, in exc. condx. No alterations or modifications, \$315.00, with new spare 4D32. Also, like-new condx, factory wired Johnson Invader 2000 just returned from factory with latest modifications and tests. Still in factory carton, \$899, F.o.b. Joplin, Mo. No trades! Karl Lipscomb, 87 Canterbury Lane, Joplin, Mo.

RECEIVER, National HRO-60, with speaker and coils, \$389. Joseph Albino, 221 Hillbrook Road, Syracuse 9, N.Y.

WANT To Buy Lampkin 105 and Ham-M Rotor. State price and condx. K8UZX, 601 Reed Street, Parkersburg, W. Va.

COMPLETE Printing outfit with 5 x 8 Kelsey Press, \$150.00 value, trade for transmitter. WA6FNQ, 2132 Rockhurst Court, Santa Clara, Calif.

HEATHKIT 10 transistor general coverage "Mohican" receiver. Wired by professional technician, perfect condition, \$90. D. Baird, K4VMA, 1408 Harvard, Cocoa, Fla.

N.Y.C. Hams - Going sideband. Sell Ranger II, Terrific value. Jay Klein, WA2PKD, 2195 Grand Concourse, Bronx 53, N.Y. Tel. CY 8-7981.

VIKING Keyer, \$95; Hammarlund HO-145, \$175; Hallcrafters T.O. keys, with key, \$40.00. All new 1961 factory-wired, used ten hours, other items: Viking 122 VFO, \$15.00; Dow-Key ant. relay \$7.00. WV2SOR, H. Strumpf, 328 Broadway, Lynbrook, N.Y.

SALE: Mosley CM-1, \$135; Harvey-Wells T-90, \$85; PE 103A, \$10; 12VDC Dow-Key relay, \$8; 6V dynamometer. Write, F.o.b. W3NCX, 1005 Wyoming, Allentown, Penna.

COLLINS 32V-1, gud condx, \$195.00. M. W. Chambliss, W5PAR, 7115 Richmond, Houston, Texas.

WANTED B&W L1000A, State condx and price. E. C. Drake, K0ZWB, 819 Millercrest Ct., Clinton, Iowa.

SELL: Valiant, factory-wired, \$275.00; HRO-60-T, nine coils, NBFM adaptor, xtal calibrator, \$325.00. Both in A-1 condx. Pietropalo, P.A. 866 CES, Box 8265, McConnell AFB, Wichita, Kans.

SELL: Best offer or trade for test or VHF gear. Dictet recorder with case and extras. New condition. W2OGD, Frank DeHaven, 727 Fairmont Ave., Chatham, N.J.

KWS-1, 75A-4, TH-3, 50 ft. tower and associated extras. Will consider any reasonable offers. W0MFK, 4412 C. Ave., N.E., Cedar Rapids, Iowa.

WANTED: Hallcrafters receiver Model S-40A, State price and condx. Fred H. Shaw, Jr., 3102 Stony Creek Rd., Norristown, Penna.

NEVER Used 15 ft. Lone Star Deauville boat, trailer, 75 Hp Evinrude Unicharger. Valued at about \$2300; Consider ham gear or car in trade. Ted Besesparis, Fracksville, Penna.

JOHNSON 6N2 Transmitter, VFO; Heathkit color generator, \$60; Supreme audio generator, \$19. Tecraft transmitters 144 and 220 Mc, \$30; Bendix 220 Mc transmitter 4X250 final, \$30; VecDx rotorator \$15; Lakeshore SSB audio generator, \$7, other items. List, W4APl, 1420 South Randolph, Arlington 4, Va.

WANTED: Viking Valiant or DX100-B. Must be perfect. Richard Hennis, K5YBB, 3912 Cedar, North Little Rock, Arkansas.

ANYONE Have P.S., which changes 6VDC to 12VDC 100W to trade for 6V 100W inverter and Blue Racer bug. K0RID, Brueschoff, 610 West 64th St., Minneapolis 23, Minn.

SELL: Central Electronics 100-V, factory modified. Original shipping case, \$495. W9JWV.

HEATH HD20 crystal calibrator, \$13.50; Heath PM-2 R.F. power meter, \$17.50. Both new and expertly wired. Dow-Key coaxial relay, \$5.00. W2EPN, 63 Cooper St., Babylon, L.I., N.Y.

KNIGHT G-30 grid dip meter, \$15.00. Assembled. Used only one year. K3NKV.

NEED 49 Mc. crystal. Sell 3-el. Telrex 10-M beam, \$18.00; T22 Rotor, \$15; Rotor, \$15; 45 watts, \$10; PM6A rec. with supplies, \$70; mint HO-160, \$270; DX35, no am. but two Simpson meters, \$30; Vibroplex Champion, \$12, John Windward, 7423 Claridge St., Philadelphia 11, Penna. Tel. RA 5-1047.

SELL: SX-111 w/Prod. Det., clean, stable, \$180.00, K9WZH, Joe Godar, 110 W. Church, Waucunda, Ill.

FOR Sale: Gonset mobile twins, G-77A and G-66. In mint condx, complete with new mike and all band antenna. Price \$350.00 or best offer over \$300.00. Wanted: 200V transmitter, KWM-2, 312-B3, and 516F-1, 6 months old, \$1050 cash for all three. W0IOC, 12301 E. 47th Terr., Independence, Mo.

FOR Sale: Hy-Gain 18HT vertical tower antenna, \$80. Local sale only. Bob, W2OPP, Rosedale, N.Y.

SEND SASE for list of real radio bargains. K2GKU, Tel. BA 9-2738.

DUE To sudden circumstances in family, obliged to sell Radio and Technical publications in perfect condition, in sets from earliest date. Historical value. Also antique Wireless apparatus and modern test equipment. Send for list. D. Simpson, 85-39 152nd St., Jamaica 32, L.I., N.Y.

COLLINS 75S-1, 32S-1 516F-2, 312B4, Excellent condx: \$995. Will ship. K1ELZ, 165 Grant Ave., Portsmouth, N.H. Phone 603-436-8829.

FOR Sale: QST runs: 1942-1961 complete, random issues 1939-1940. Best offer, W9MHE, 724 Park Ave., New Haven, Indiana.

FOR Sale: Complete six-meter station barely used; \$225. Gonset Communicator III, Shure crystal mike, five-element Yagi beam, CDR rotor and indicator, all cables and leads. John Esty, 272 Lincoln, Amherst, Mass.

HEATHKIT Complete mobile rig, used just hours, Cheyenne xmtr, Comanche rcvr with speaker, 12 volt DC mobile and AC fixed power supplies and mount. Make an offer. G. Probst, 823 North 18th, Quincy, Ill.

COLLINS: Sell complete only: KWM-2, 516F-2, 312B-4, 30S-1, new condx: \$2300. W1NVB, C. H. Lebrun, Peabody, Mass, Tel. JE 1-4836.

DX-40 Professionally wired, very clean, little use, \$50.00 express collect. Complete 80 meter 813 rig with VFO, supplies, modulator, \$100 or two-meter Gonset, Sam Bases, 19 Standish Ave., Yonkers, N.Y. SP 9-6425.

WANTED: Commercial or Surplus Airborne, Ground, Transmitters, Receivers, Test sets, 18S, 17L, 51R, 618S, BC611, 180L, GRC, PRC, ARN14, Bendix, Collins, others. RITCO, Box 156, Annandale, Va.

TRADE: New matched pair walkie-talkies BC-611 75 meters for older good receiver. Ameco ACIT-Xmtrr, \$12, F.o.b. W1KVG, Mirror Lake, N.H.

JOHNSON Challenger and Harvey-Wells R9A revr. Both in excellent condx, \$125.00. You pick up in Levittown, N.J. Tel. TR 7-6649.

HUNDRED OSLS: 80¢. Samples, dime. Meininger, Jesup, Iowa. DEMAMBRO Says. Sell our guaranteed used equipment: B&W 370 SSB adaptor, \$119; Central Electronic 20A-OT1, \$175; Collins 75S1, \$375; Eico 723 trans., \$54.95; filter King VHF144, \$32.50; Gelsco G209 revr, \$209.95; Gelsco G212 trans., \$199.95; Globe DSB100 trans., \$74.95; Globe LA1, \$74.95; Gonset G28, \$169.00; Gonset GSB100, \$339.00; Gonset GSB101, \$279.00; Hallcrafters HT32, \$349.00; Hallcrafters HT33A, \$489.00; Heath Seneca \$160.00; Johnson Ranger, \$179.00; National NC125 \$105; many more. Terms: Cash, No trades! Send for list to Al Jones, W1NW, or Jack Doherty, W1EUN, DeMambro Radio Supply Co., Inc., 1095 Commonwealth Ave., Boston, Mass. Tel. ALgonquin 4-9000.

VHF Men! ARC-3, as in Feb. CO. Unmodified, 100-156 Mc. W/PS, \$30.00, K0DHH.

WANTED: DX-100, HQ-129X, State price, condition. Sell: S-40B, Jonathan Pederson, Atlington, S.D.

FOR Sale: Collins 51-S-1 receiver (same coverage as 5114) for the highest bidder. Will accept other commercial gear as part pay on this brand new item. M. E. Smith, K8GDR, 2760 N. High St., Worthington, Ohio. Tel. TU 5-6886 after 5:00 GMT.

VALIANT. In exc. condx: \$280.00. Bill Overdorff, W3POZ, 8 Rangeley Ridge, Winchester, Mass.

SELL: Johnson Viking II and VFO, Factory-wired, guaranteed like new condx, \$200. F.o.b. W2VOR, 709 Seventh Ave., Asbury Park, N.J.

SELL: Gonset Twins with power supply and mounting brackets, \$210. G66B with Universal P/S and sprk. G77 with modulator and 6/12 volt p/s, "Rich", WA4DMH, 20 N.E. 17th Ave., Pompano Beach, Fla. Tel. 941-8280.

WANTED: Manual or diagram for Navy frequency shift keyer, Model FSA, also XRT-34, XRT-210 and metal table for Model 19 or 15. W4NZY, 119 N. Birchwood, Louisville 6, Ky.

MAXIMUM Efficiency, 1400 PEP linear, solid cooper chassis and paneling. Two guaranteed not surplus and never used Eimac 4-400A's, would trade for SSB exciter, (10B or 20A) or for cash. Angel, K1RYT, Greenriver Road, Williamstown, Mass.

COMPLETE Rig: Johnson Pacemaker and Courier, National NC-109, Dow-Key relay, B&W low-pass, Turner 251, K2PQO keyer for \$666 or will sell separately. Also, Heath SB-10, hardly used with power supply, \$75. Howard Nurse, K2MSP, 241 Mountain Ave., Ridgewood, N.J.

SELL Or Swap. Tape recorder, recording tape, old QSTs, CO, diving equipment, seiger, scintillation counters, FM mobile equipment, antique tubes, 147.3 Mc. base station, BC-639, BC-1267A, ARR-5, meters, Wilcox VHF AM crystal-controlled rcvrs, etc. Want: aircraft radio equipment; mobile FM gear. Send for complete list. Dave Hale, W9RBX, 635 S. 21st Ave., Maywood, Ill.

WANTED: 75A2 or 75A3, 2347, rotor for 3-el. 3 band beam, H. F. Cushing, W1EUS/6, t.ware, Menzel Place, Santa Clara, Calif.

R-100 Knight rcvr, \$90. K9TVC.

SELL Johnson Matchbox 275-watt model 250-23; two months old—\$40 F.o.b. K2MYW, Dr. Mortimer D. Solomon, 41 Westbrook Lane, Roosevelt, N.Y.

TRADE Or sell: Hornet beam TB500, never used. What have you? W0RO, Larrabee, Iowa.

HQ180C, \$335, CE20A with VFO, \$145; Globe 680, \$40; Hy-Gain 14AVS with 14RMC, \$20. W8ZBD, 1605 Iowa, Midland, Mich.

TWO New Eimac 4-250A tubes, \$65/pair. Singularly as last resort \$35 each. Also McElroy bus—best offer, WA2SEU, David Burmaster, 3823 Mackleim, Niagara Falls, N.Y.

POLY-COMM. "62" B, 6 & 2 mtrs, transceiver, 4 months old, in perf. condx., first M.O. for \$250 takes it. Postage paid. George J. Harris, (W5JTC), 3221 42nd St., Metairie, La.

CODE, Teach yourself with EZ Code Jr, Just draw "Electric Pencil" down alphabetical slots contacting "Code Plate". Built-in buzzer sounds letter. \$3.98 postpaid USA. Blackman, Dothan, Ala.

HT-37, \$325.00; SX-111, \$180.00; 15-meter 3-el. Hy-Gain beam, \$17.00. All latest models, guaranteed in like-new condx. W9-DFB, Boys' Farm School, Durand, Ill.

COMPLETE SSB Station, HT-32, SX-101, Mark III, Tri-Band beam and rotator. All in excnt condx: \$700.00, Bill Kulhanek, K2ASN, 28 Longfellow Dr., Huntington Sta., N.Y.

MUST Sell: Gonset II Communicator 6-meter, with xtls, mike, as new, \$110. New Mosley 3-el. 20 meter beam, \$30. Other ham items. Write, Samkofsky, 201 Eastern Parkway, Brooklyn 38, N.Y.

HALLICRAFTERS SX-100, \$150; also 20A with QT-1, \$150; both are in A-1 condx. You pay shipping. Charles Morris, K4-HGX, 421 Shelby St., Frankfort, Ky.

SELL: Super Pro BC-779, built-in p.s. updated circuitry. In gud condx. \$75 or swap??? Also many tubes, parts, K4EZY, 5109 Sylvan Road, Richmond, Va.

SELL: Viking Valiant, Just like new and perfect: \$315.00. David Tranberg, W0RRK, Hallock, Minn.

SELL: 17 months old SX-110 with sprk, \$90, APW, 206 Wilson, Mt. Horeb, Mt. Horeb, Wisc. EX KN9APV.

SELL: Eico 720, used 3 months, \$90, WA2ZVJ, 2115 East 27th St., Brooklyn, N.Y.

SELL Hallcrafters HT-37, \$350.00; SX-96, \$100; R-47, \$8.00 Dow-Key Antenna relay, \$3.00. All for \$450.00, W9AEN, 4629 No. 100th St., Milwaukee 18, Wis.

6 Meter mobile, NBFM, 30-watt transmitter, \$19.50; 152/172 Mc. receiver, 12 volt, \$35.00. Whip antenna, \$5.00. BC-348, as is, \$15; G-E 450 mcs. rcvr, \$19.50; 450 mcs. xmtr, \$15.00. B. C. Higley, W2OE4, 62 Main, Matawan, N.J.

QUICK Sale necessary! National NC-400 w/mech. filter, spkr, cost \$1,000. One month old. Must sell, need the cash. Name a price. HQ-129X, w/calibr., in exc. condx, \$110.00. Will ship if necessary. Dan Verut, 83 Blackheath Road, Long Beach, L.I., N.Y., tel. G.E. 2-0707.

FOR Sale: DX-100B excellent condition. First \$140 gets it. Shipment made from Nevada. Robert Ball, W7GBF, 125 Edgemoor Lane, Ithaca, N.Y.

1 KW phone-c.w. VFO xmtr, 20-40-80 meters, in 6 ft. cabinet. Will be willing to deliver within 50 miles. \$295; 20 m. beam, \$20; Army model HRO, \$65; Hammarlund HQ-100C, used 3 hours, \$85. Call W2PLS at PRescott 3-5188 in Passaic, N.J.

SAVE \$450.00. Buy my KWM-2 with 516F2 AC pwr. supply, 312B3 speaker MP-1 mobile power supply, 351D2 Mobile Mount and MM-2 mobile mike, all for \$1,195.00. Equipment purchased new 17 October 1961 at cost of \$1,645.00. Now in like-new condx, will sell KWM-2 AC supply and speaker for \$990. W4CRJ, R. Odom, 1410 Converse Ave., Fayetteville, N.C. Phone HU 4-8888.

WANTED: GRC-10 transmitter T-125, GRC-10 receiver R235, TM 11-263, GRC-9, TA219, AM682, Autodyne, Bethpage, N.Y., HAM Discount House. Write us for lowest prices on ham equipment. Factory sealed cartons. H D H Sales Co., 327 Greenwich Ave., Stamford, Conn.

SELL: HT32, \$375, used very few hours, new condition. K2-SL, 4058 Herman Ave. S.W., Grand Rapids 8, Mich.

SALE: Apache, 2 yrs. old, \$175; SX-111, speaker, 1 yr. old, \$235; Hallcrafters BC-610 KW xmtr; Lyco 600S exciter, all coils, excnt condx, \$350. Doug Lutz, K8HFJ, 1109 Luray Drive, Ashland, Ohio, Phone 27561. Photos available.

FOR Sale: G-28 tested, unused, \$179.50; S-53A, \$48.50; Super Six, \$28.50; Hornet V-75, \$12.50; DX-100 cabinet, \$12.50; ST-203A, \$20. Heath balun, \$7.50; two 810's and two 866, all \$10.00, new. C. W. Hines, 1309 Fikewood Dr., Wilson, N.C. All items excellent.

QST, CQ, Radio Electronics, Electronics World. Selling nearly complete file 1947-1961 for best offer, all or part. List sent for stamped envelope. K. Blandin, Jr., W1QPS, 7 Pearl St., Attleboro, Mass.

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SELL: 4125A, \$10; 829B with sockets, \$5. Never used. 6 of each. Joseph Liska, 64-12 Gates Ave., Ridgewood 27, N.Y., GL 6-9027.

EXCELLENT HQ-110C, \$145.00. Factory calibrated, never used. SB-10, \$70. Johnson Matchbox, \$35. All f.o.b. 2222 W. Anderson Ave., Phoenix, Ariz.

COLLINS 75A2-A, B&W 5100-B, Astatic D-104 mike, trap antenna; all best offer over \$600. Al Stancel, RFD 4, Box 314, Opelika, Alabama.

COLLINS 75A-4 receiver, Serial No. 4921, excnt condx, \$500. Kenneth H. Engstrom, W5CUM, 833 Oak Forest Dr., Dallas 32, Texas.

WANTED: HRO-7 plug-in coil, "AC" 21-21.5 mc. W5JH, Harry R. Lord, 4143 Sunberry St., Dallas 27, Texas.

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SELL: SX-99 with xtal calibrator, \$100; Heath QF-1, \$8.00; Knight 150 xmtr, \$30; VFO, \$20.00. Perfect condx. Take all for \$150.00. What's your offer? W2KHY, 408 Bradford St., Brooklyn, N.Y.

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FOR Sale: G-E Pyranols 4 mfd. at 3000 VDCW, \$4.95 ea.; complete 4-1000A GG transmitter. Write for details and price. Henry Martin, W8DYA, 613 Pearl St., Bluefield, W. Va.

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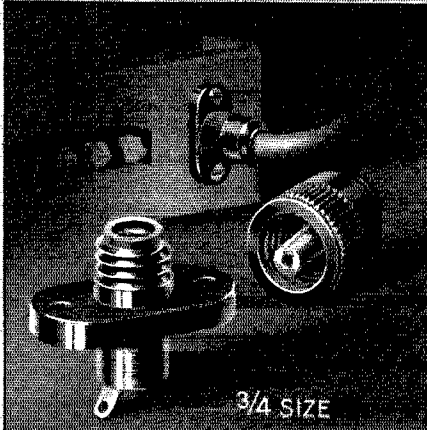
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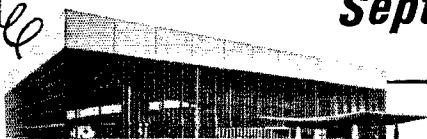
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SX-100 Receiver 179.00
SX-101 MK1A Receiver 199.00
- Heath**
SB-10 SSB Generator 79.00
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HX-500 SSB Transmitter 479.00
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- Gonset**
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- Lincoln**
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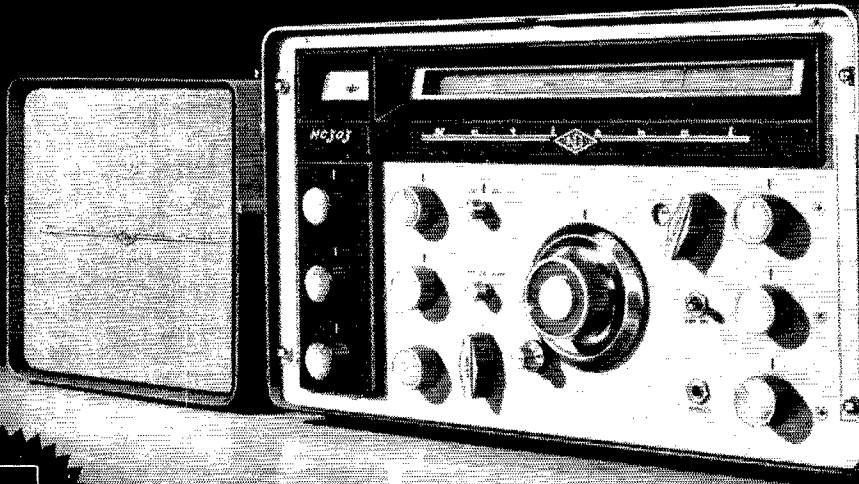
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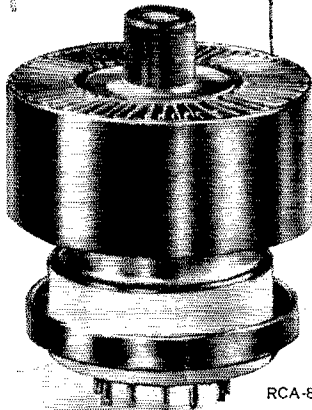
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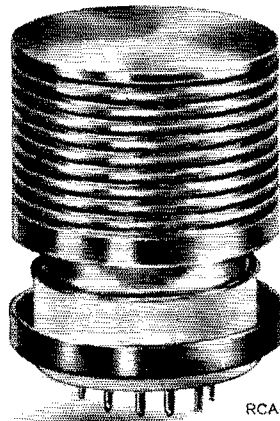
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TUBES SHOWN ACTUAL SIZE.

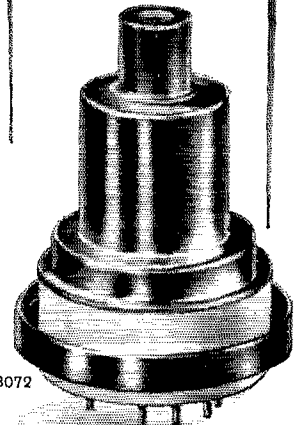
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RCA-8121



RCA-8072

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8072	Conduction	700	50	110
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			470	85
8121	Forced-Air	1500	up to 500	235
8122	Forced-Air	2000	up to 500	300

For a technical bulletin on RCA-8072, RCA-8121, or RCA-8122 write: Section G-37-M, Commercial Engineering, RCA Electron Tube Division, Harrison, N. J.



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