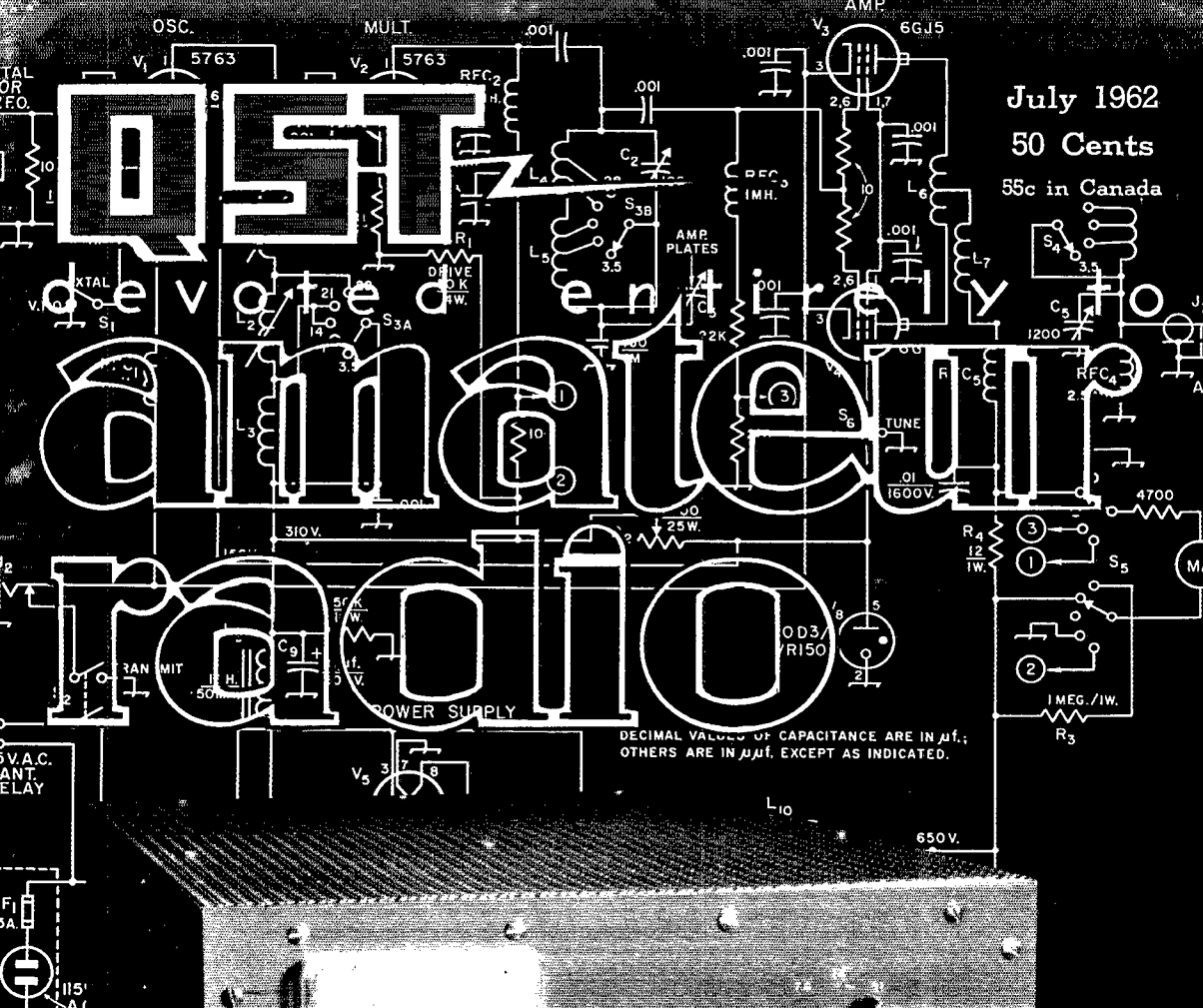
July 1962
50 Cents
55c in Canada

QST

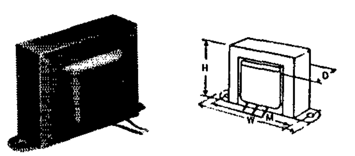
devoted entirely to amateur radio



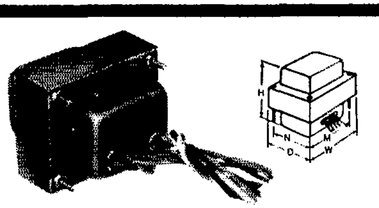
PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

REPLACEMENT TYPE TRANSFORMERS & REACTORS

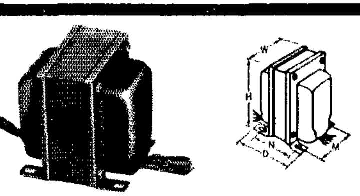
PIONEERS IN MINIATURIZATION



CHANNEL TYPE



DOUBLE SHELL TYPE



VERTICAL SHELL TYPE

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	2⅞	1½	1 11/16	2⅜	¾
FT-2	6.3 VCT-1.2A	2⅞	1½	1 11/16	2⅜	¾
FT-3	2.5 VCT-6A	3 5/16	1⅞	2	2 13/16	1
FT-4	6.3 VCT-3A	3 5/16	1⅞	2	2 13/16	1
FT-5	2.5 VCT-10A	3¾	2⅛	2 5/16	3⅛	1½
FT-6	5 VCT-3A	3¾	2⅛	2 5/16	3⅛	1½
FT-7	7.5 VCT-3A	3¾	2⅛	2 5/16	3⅛	1½
FT-8	6.3 VCT-8A	4	2½	2⅝	3 5/16	2½
FT-10	24 VCT-2A or 12V-4A	4	2⅝	2⅝	3 5/16	2½
FT-11	24 VCT-1A or 12V-2A	3¾	2⅛	2 5/16	3⅛	1½
FT-12	36 VCT-1.3A or 18V-2.6A	4	2⅝	2⅝	3 5/16	2½

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

FT-13	26 VCT-.04A	2⅛	1⅜	1¼	1¾	¼
FT-14	26 VCT-.25A	2⅞	1⅝	1 11/16	2⅜	¼

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	2½	3	2½	2	2½
R-102	350-0-350	70	3A	3A	3	2½	3⅝	2½	2	3½
R-103	350-0-350	90	3A	3.5A	3⅜	2⅞	3 15/16	2 13/16	2¼	4½
R-104	350-0-350	120	3A	5A	3¾	3⅛	3⅞	3⅛	2½	5½
R-105	385-0-385	160	3A	5A	3¾	3⅛	4 5/16	3⅛	2½	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	2⅝	2 13/16	3¼	2	1¾	2½
R-111	350-0-350	70	3A	3A	2⅝	3 7/16	3¼	2	2⅜	3½
R-112	350-0-350	120	3A	5A	3 5/16	3 11/16	4	2½	2 5/16	5½
R-113	400-0-400	200	3A	6A	3⅞	4 5/16	4⅝	3	3⅛	8

CHANNEL FRAME FILTER REACTORS

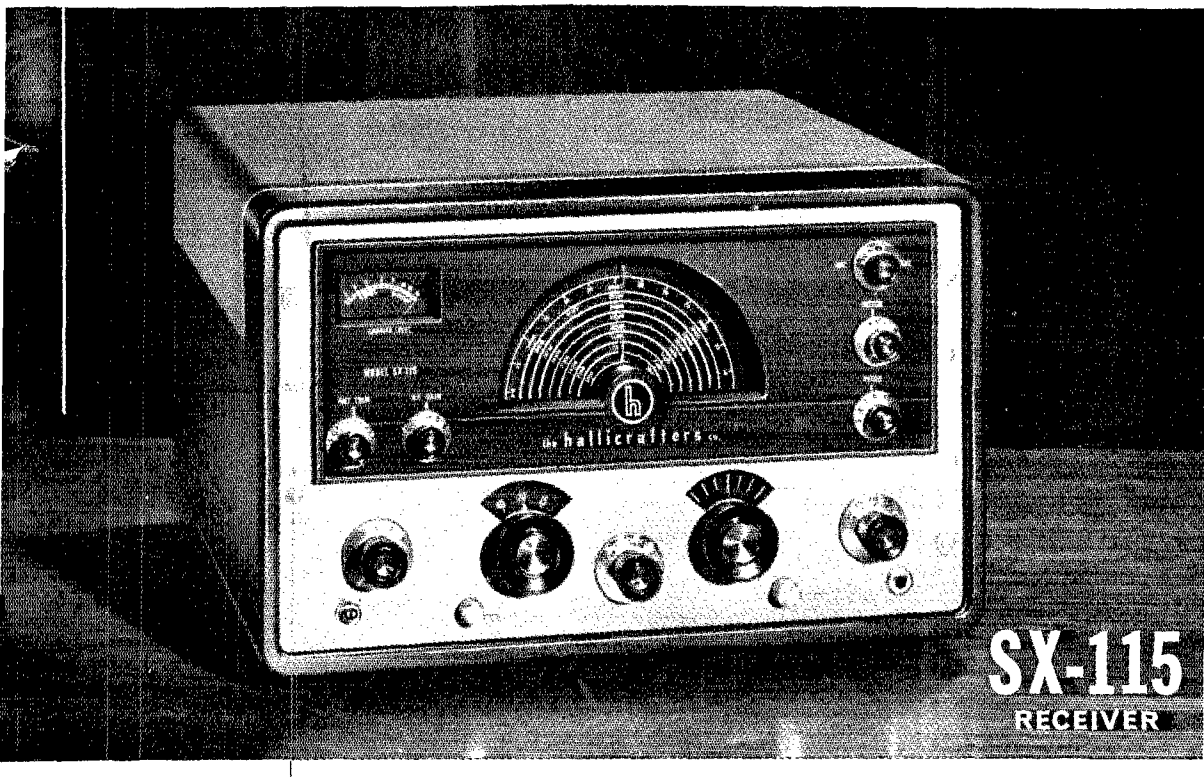
Inductance Shown is at Rated DC ma—Test Volts RMS: 1500

Type No.	Induct. Hys.	Current	Resistance Ohms	Dimensions, in. W	D	H	M	Wt. Lbs.
R-55	6	40ma	300	2⅜	1⅜	1⅞	2	½
R-14	8	40ma	250	2⅞	1½	1 11/16	2⅜	¾
R-15	12	30ma	450	2⅞	1½	1 11/16	2⅜	¾
R-16	15	30ma	630	2⅞	1½	1 11/16	2⅜	¾
R-17	20	40ma	850	3 5/16	1⅝	2	2 13/16	1
R-18	8	80ma	250	3 5/16	1⅝	2	2 13/16	1
R-19	14	100ma	450	3¾	1⅞	2 5/16	3⅛	1½
R-20	5	200ma	90	4⅛	2¼	2⅝	3 5/16	2½
R-21	15/3	200ma	90	4⅛	2¼	2⅝	3 5/16	2½
R-220	100/8 Mhy 25/2 Mhy	2.5A 5A	.6 .16	3¾	2	2 5/16	3⅛	1½

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.



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 microvolt; perfect match for Hallicrafters HT-33 and HT-32 series exciters and transmitters.

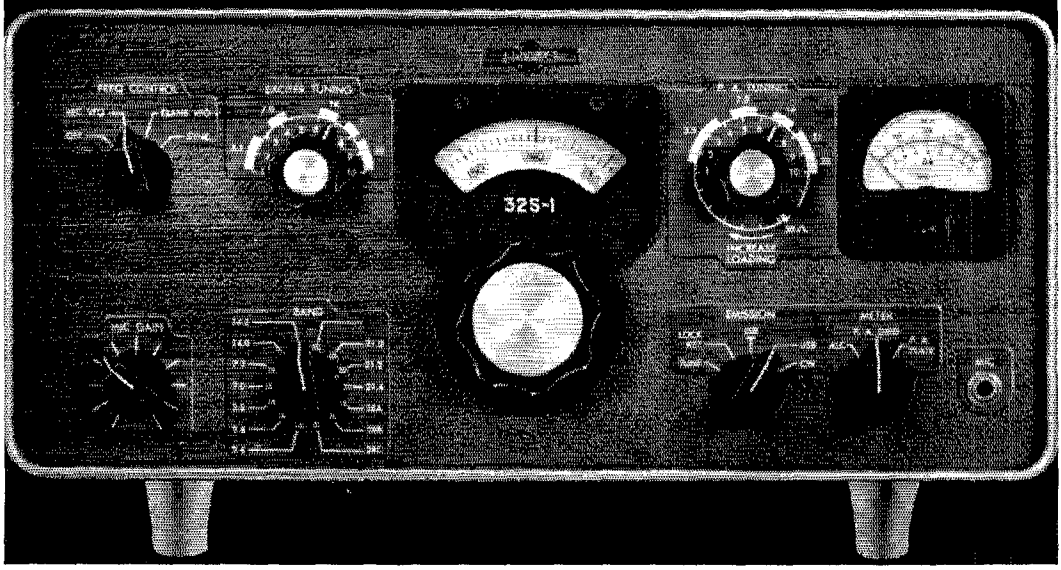
the new ideas in communications are born at...

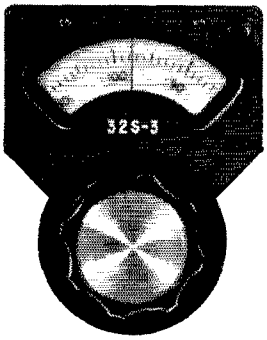
hallicrafters

5th and Kostner Aves. Chicago 24, Ill.

Overseas Sales: Contact Hallicrafters Commercial Products Division
Canada: Gould Sales Co., Montreal, P.Q.

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.

COLLINS

QST

JULY 1962

VOLUME XLVI • NUMBER 7

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

OFFICES

38 La Salle Road
West Hartford 7, Connecticut
TEL.: 236-2535
Area Code 203

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—CONTENTS—

CHART YOUR COURSE TO EIMAC

for dependable, high quality power tubes

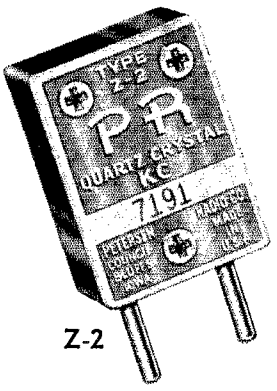
EIMAC TYPE	CLASS OF OPERATION / SERVICE	TYPICAL OPERATION — SINGLE TUBE								
		D.C. PLATE VOLTAGE	D.C. PLATE CURRENT (AMPERES)	D.C. SCREEN VOLTAGE	D.C. GRID VOLTAGE	APPROX. MAX. DRIVE POWER (WATTS)	APPROX. D.C. SCREEN CURRENT (AMPERES)	APPROX. D.C. GRID CURRENT (AMPERES)	APPROX. MAX. POWER OUTPUT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

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

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

Use PR and know where you are!!

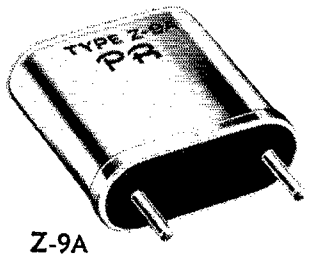
No matter where you use them... in SSB exciters... receivers... AM or CW transmitters... in CB transceivers ...wherever circuits call for crystals... PRs are OUTSTANDING!



Z-2

With PR Crystals you are ALWAYS SURE of—

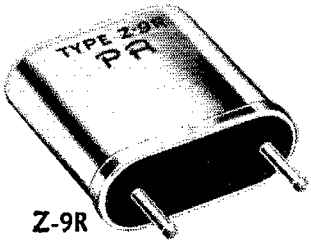
- *Accuracy*
- *Dependability*
- *High Activity*
- *Low Drift*
- *Unconditional Guarantee*



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**

PR Crystals

Standard of Quality since 1934

PETERSEN RADIO COMPANY, INC.
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EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.

Section Communications Managers of the ARRL Communications Department

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

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Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.	Tamaqua
Maryland-Delaware-D. C.	W3JZY	Andrew H. Abraham	RFD 1	Smithburg, Md.
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.	Palmyra
Western New York	K2HUK	Charles T. Hansen	211 Rosemount Drive	Buffalo 26
Western Pennsylvania	W3UHN	Anthony J. Mroczka	475-5th St.	Donora
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Mississippi	W5MUG	Floyd C. Teetson	2469 Paden	Jackson 4
Tennessee	W4OGG	David C. Goggio	1419 Favell Dr.	Memphis 16
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Ohio	W8AL	Wilson E. Weckel	2118 Tuscarawas St., W.	Canton 8
HUDSON DIVISION				
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N. Y. C. & Long Island	W2OBU	George V. Cooke, Jr.	3 Daisy Lane	Commack
Northern New Jersey	WA2APY	Daniel H. Earley	216 Grove Ave.	Metuchen
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Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.	Westfield
New Hampshire	W1HQ	Ellis F. Miller	Box 395	Wolfeboro
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket
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Sacramento Valley	W6BTY	George R. Hudson	2209 Meer Way	Sacramento
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno
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South Carolina	W4GQV	Dr. J. O. Dunlap	P. O. Box 447	Rock Hill
Virginia	W4QDY	Robert L. Follmar	1057 Dune St.	Norfolk 3
West Virginia	W8JM	Donald B. Morris	1111 Alexander Place	Fairmont
ROCKY MOUNTAIN DIVISION				
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Utah	W7QWH	Thomas H. Miller	1255 East 17th St.	Salt Lake City 5
New Mexico	W5ZHN	Carl W. Franz	2323 Krogh Court, N.W.	Albuquerque
Wyoming	W7AMU	L. D. Branson	342 South Elk	Casper
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Eastern Florida	K4SJH	Albert L. Hamel	1300 N. E. 42nd St.	Pompano Beach
Western Florida	W4RKH	Frank M. Butler, jr.	494 Elliott Rd.	Fort Walton Beach
Georgia	W4LG	James A. Giglio	1378 Metropolitan Ave., S.E.	Atlanta 16
West Indies (P R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman Rio Piedras, P. R.
Canal Zone	KZ5TD	Thomas B. DeMeis	P. O. Box 1111	Balboa
SOUTHWESTERN DIVISION				
Los Angeles	W6JQB	Albert F. Hill, jr.	861 No. Millard Ave.	Rialto
Arizona	W7QZH	Kenneth P. Cole	4132 North 18th Ave.	Phoenix
San Diego	W6LRU	Don Stansifer	4427 Pescadero	San Diego 7
Santa Barbara	K6CVR	Robert A. Hemke	728 W. Mission	Santa Barbara
WEST GULF DIVISION				
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Oklahoma	W5DRZ	Adrian V. Rea	Box 33	Ketchum
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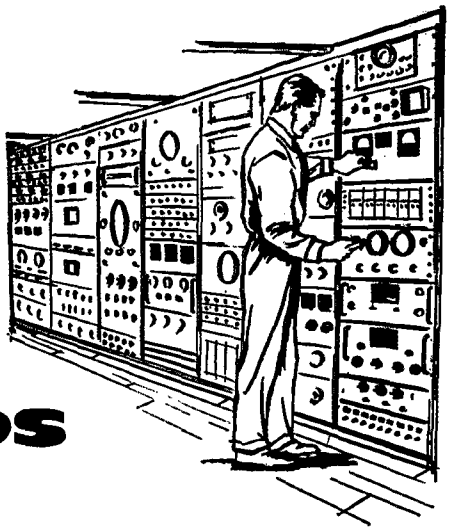
Alberta	VE6TG	Harry Harold	1834-5th Ave.	N. Lethbridge, Alta.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4JY	M. S. Watson	249 Lanark St.	Winnipeg
Saskatchewan	VE5BL	Jack Robinson	4527 Elgin Rd.	Regina

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

50 OHM

DUMMY LOADS



TMC MODEL NUMBER	MILITARY NOMENCLATURE	FREQUENCY RANGE	AVERAGE POWER (In watts)	PEAK ENVELOPE POWER (In watts)
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.

To meet an increasing requirement, a 5 KW Average power (10 KW PEP) dummy load at 50 ohm with measured VSWR of 1.1 to 1 has been added to

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Request Bulletin 8009

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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.

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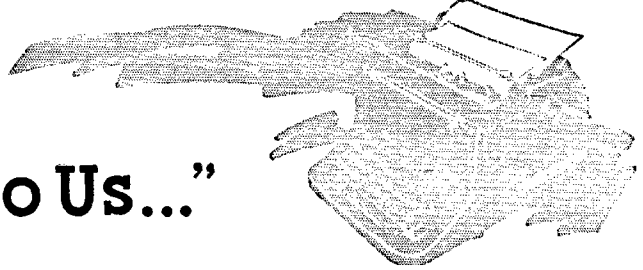


"It Seems to Us..."

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, Freedoms 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. QST

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, WØBWJ, with John Huntoon, W1LVQ, ARRL General Manager, and a discussion with FCC Engineer in Charge Andy Bahlay, KØOOA answering questions. There will be equipment displays, a hidden transmitter hunt for mobileers, and the club station WØOUI, 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.

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,* WØAGD

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 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.

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

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

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

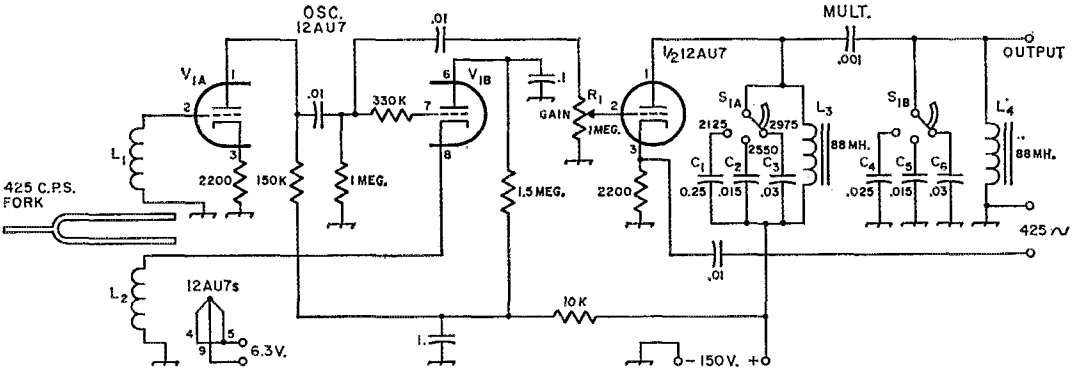


Fig. 1—Circuit of the fork-driven oscillator. Resistances are in ohms and resistors are ½ watt. Capacitances are in μf. and capacitors are tubular molded paper.

C1—C6, inc.—Approximate value; adjust for resonance as described in text.

L1, L2—1000-ohm coils removed from headset (must be properly phased to obtain oscillation).

L3, L4—88-mh. toroid (old telephone loading coils).

R1—Linear-taper control.

S1—Two-pole three-position progressively-shorting rotary switch (Two Centralab PA-2042 ganged, or equivalent).

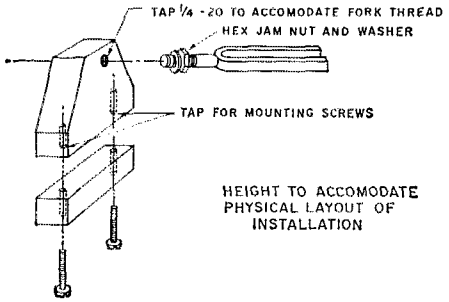


Fig. 2—Tuning-fork mounting bracket and stiffener.

2) is tapped to accept it. Jam nuts and split lockwashers 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 attentuation 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-$\mu\mu$f. broadcast-replacement-type variables with the sections of each connected in parallel to provide maximum capacitances of 650 to 700 $\mu\mu$f. 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-

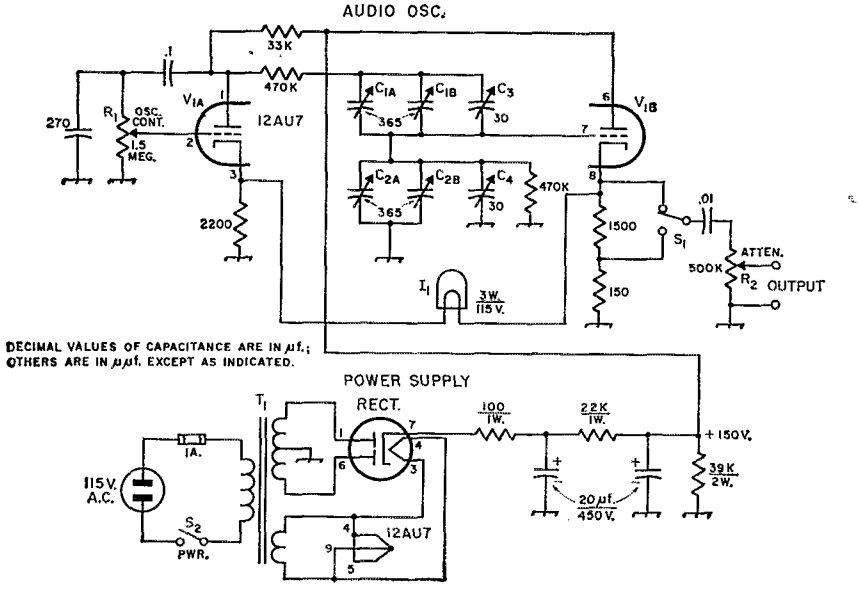


Fig. 3—Circuit of the variable audio oscillator and its power supply. Resistances are in ohms, and resistors are ½ watt unless indicated otherwise. Capacitors marked with polarity are electrolytic; other fixed capacitors may be ceramic or paper.

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.t. 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).

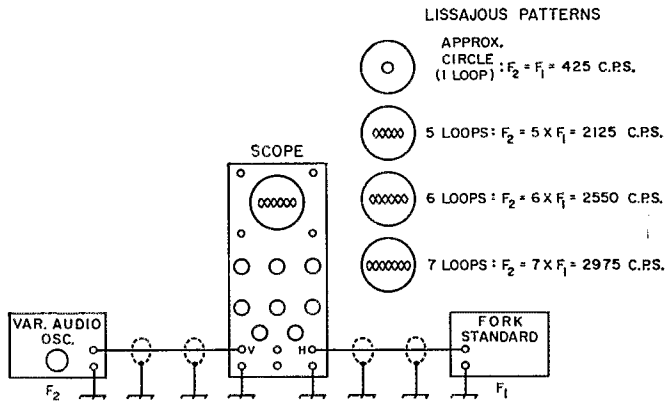


Fig. 4—When the variable audio oscillator is set to a frequency that is an exact multiple of the fork-standard frequency, the number of loops displayed on the scope screen indicates the order of multiplication.

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

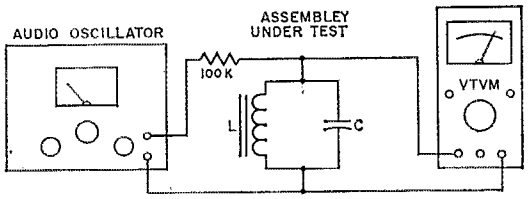


Fig. 5—Setup for measuring the resonant frequency of an audio *LC* circuit using the variable audio oscillator and a vacuum-tube voltmeter.

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 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 × 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. R_1 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

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

(*Continued on page 148*)

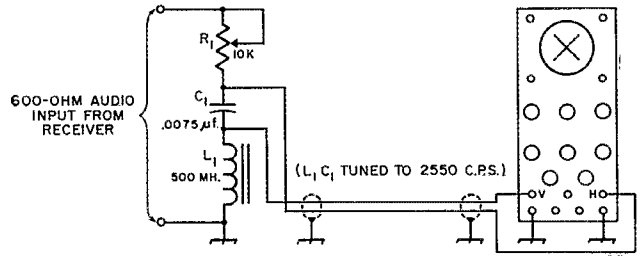
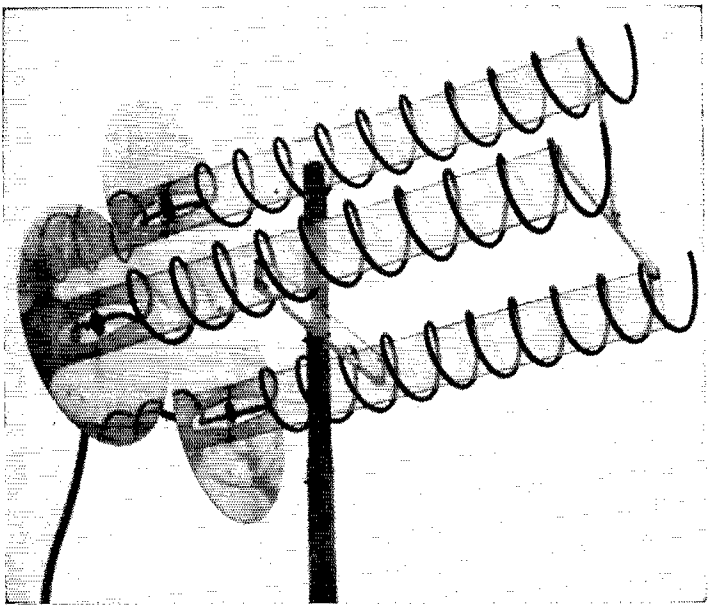


Fig. 6—RTTY tuning-indicator circuit. Individual values of C_1 and L_1 are not critical, but the combination should be adjusted to resonate at 2550 cycles as described in the text. R_1 is a linear-taper control.



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, fo lowing 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 = 0.32λ.
G = 0.8λ or more
S = 0.22λ.
g = 0.12λ.
Bandwith = 0.75 to 1.3 × design λ.

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

Pitch angle = 12.5 degrees.

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

10 turns = 36 degrees
8 turns = 41 degrees
6 turns = 47 degrees.

Gain is maximum if each turn is 1.2 wavelength long.

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:

λ = 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 materia for the helix is the light ¼-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 3¼ inches in diameter. Material to support the helix in use

* 340 East Drive, Oak Ridge, Tennessee.
** 100 Elliott Circle, Oak Ridge, Tennessee.

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

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

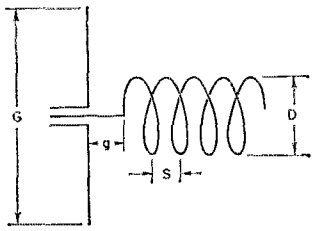


Fig. 1—Schematic diagram of the helical antenna. Optimum dimensions, as given by Kraus, in wavelength, appear in the text. Dimensions in inches given are for a design center of 1100 Mc., which is well suited for amateur 1215-Mc. use. The feed impedance of the single helical antenna with reflecting plane 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 3¼ 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 4¼-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 1¼ 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 2⅜-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

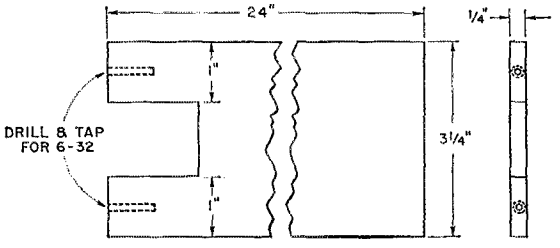


Fig. 2—Insulation in the antenna should be of good quality and kept to a minimum. The authors use polystyrene blocks of the dimensions given. Any other insulating material used should be thoroughly dry, and treated so that it will not absorb moisture.

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 po arization 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.

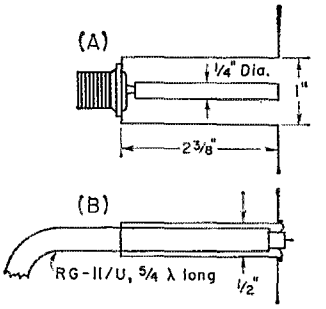
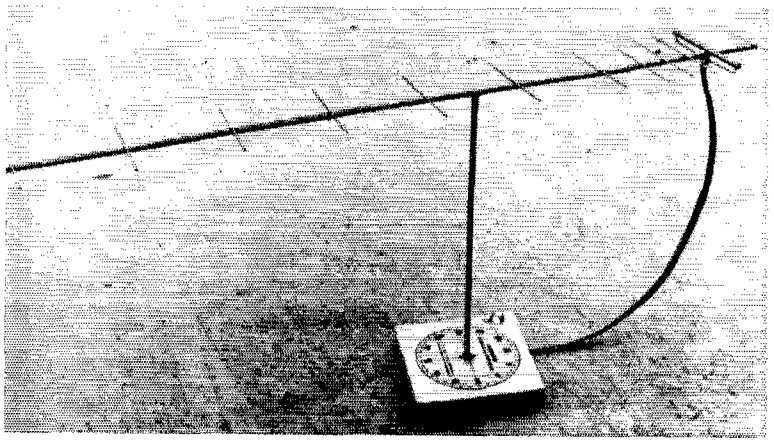


Fig. 3—A typical "Q" section for matching the single helix to 50-ohm coax is shown at A. The decoupler for use with each of the three helices in phase is shown at B. The outer conductor is soldered to the reflector surface, but insulated therefrom at all other points of physical contact.

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 ½-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



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

A.R.R.L. QSL BUREAU

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W2, K2 — North Jersey DX Ass'n, P. O. Box 303, Bradley Beach, N. J.
W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
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W5 K5 — Brad A. Beard, W5ADZ, P.O. Box 25172, Houston 5, Texas.
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W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
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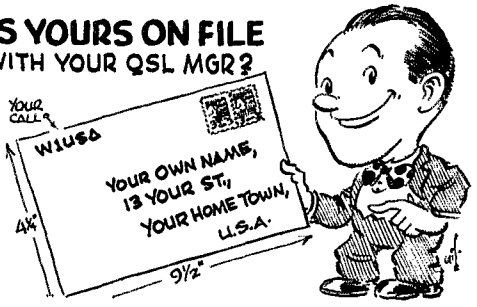
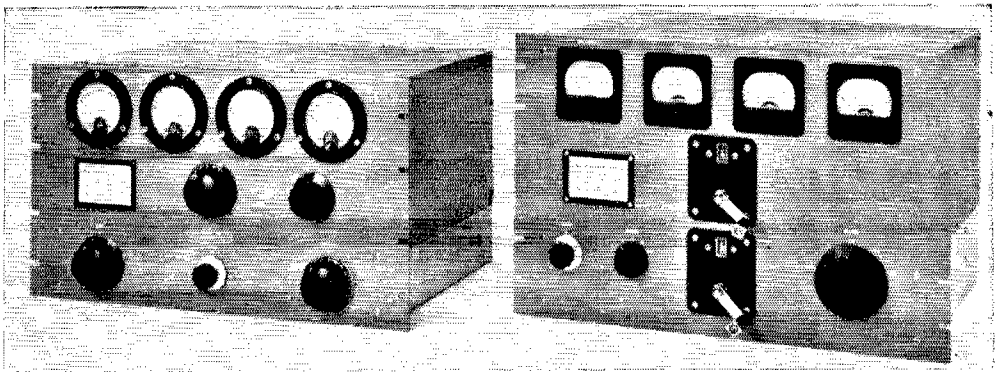
KZ5 — Ralph E. Harvey, KZ5RV, Box 107, Balboa, C. Z.





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 pi [1] 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.

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

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

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 TVI.

6) Harmonic radiation via the feed line to be minimized.

7) A minimum amount of cash to be involved.

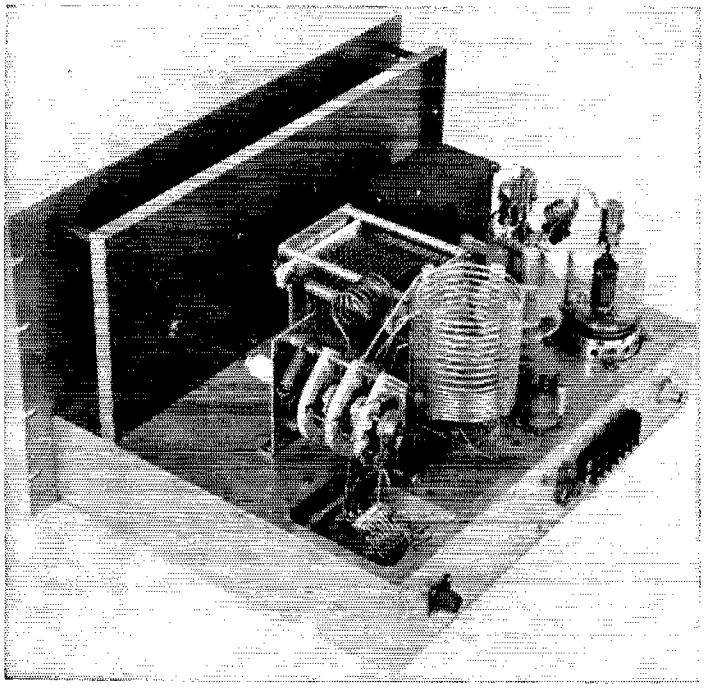
The result of the above design is the 4-125A amplifier shown in the photographs.

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 × 17 × 3-inch aluminum chassis behind a 10½ × 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 $\mu\mu$f. is used on 3.5 Mc., 150 $\mu\mu$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.

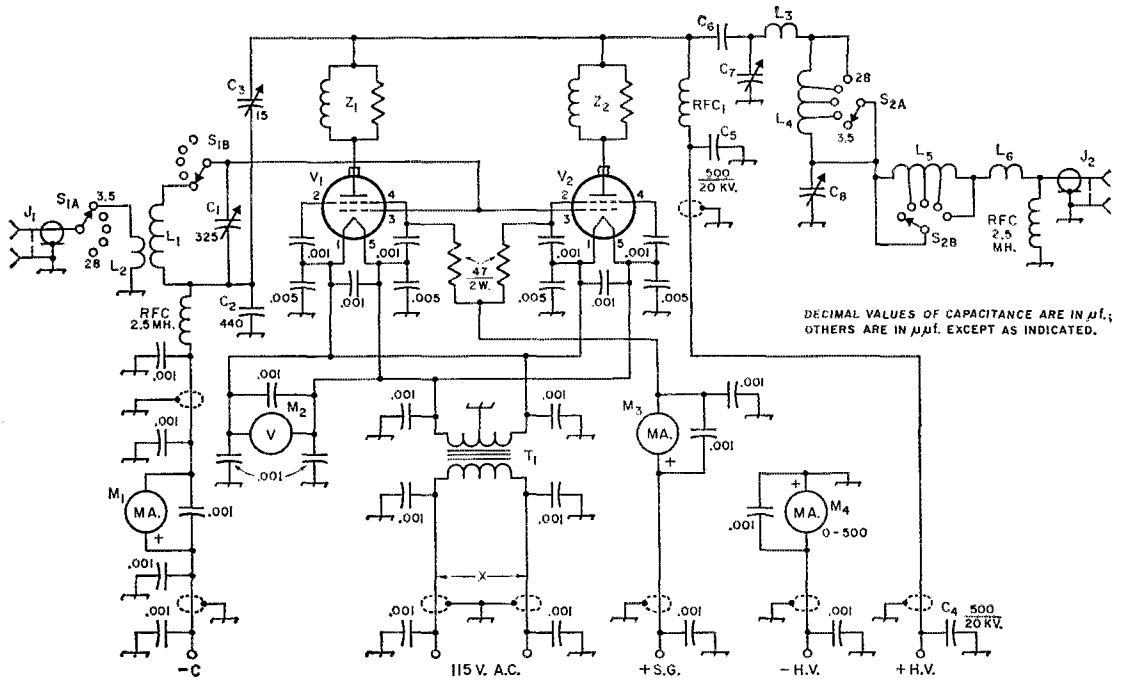
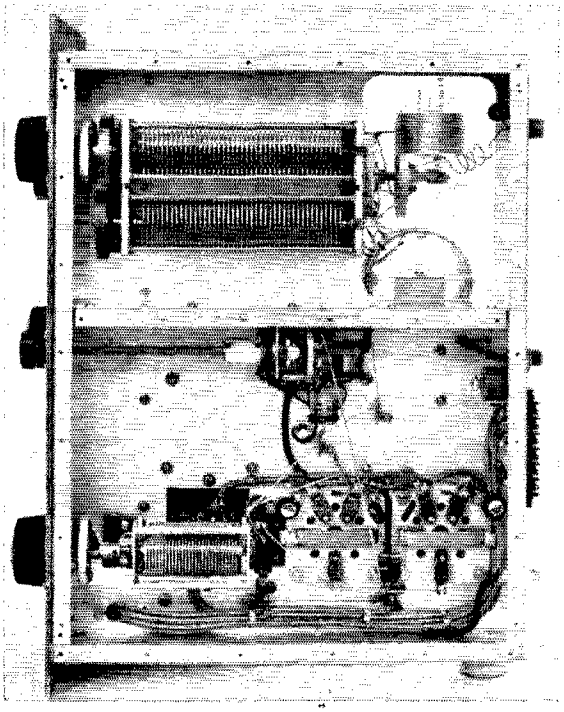


Fig. 1—The amplifier circuit. Either 4-125As or 4-250As may be used at V_1 and V_2. See specification below for circuit values that differ with the two types. "X" indicates point where the two cooling-fan motors are connected in the 4-250A amplifier. Shielded wiring in supply leads is continued up to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

C_1—320 μμf., 0.0245-inch spacing (Hammarlund MC-325-M).
C_2—440 μμf., silver mica (two 220-μμf. in parallel).
C_3—Disk neutralizing, 2.2–15 μμf. (Millen 15011).
C_4, C_5—500-μμf., 20-kv. ceramic (Centralab TV-20).
J_1, J_2—Coaxial chassis-mounting connectors.
L_1—3.5 Mc.:32 turns no. 20, ¾-inch diam., 16 turns per inch (Air Dux 616T).
7 Mc.: 14 turns No. 20, ¾-inch diam., 16 t.p.i. (Air Dux 616T).
14 Mc.: 11 turns No. 18, ⅝-inch diam., 8 t.p.i. (Air Dux 508t).
21 Mc.: 9 turns No. 18, ½-inch diam., 8 t.p.i. (Air Dux 408T).
28 Mc.: 6 turns No. 18, ½-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.
RFC_1—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, ½-inch diam., ½ inch long, with four 220-ohm, 2-watt composition resistors in parallel.

	For 4-125As:	For 4-250As:
C_6—	0.001-μf., 20-kv. ceramic (two Centralab TV-20s in parallel).	0.002-μf., 20-kv. ceramic (four Centralab TV-20s in parallel).
C_7—	250-μμf., 3000-volt variable (Johnson 154-9).	300-μμf., 10-kv. variable (Jennings UCS-300).
C_8—	0.001-μf., 2000-volt variable (two Johnson 154-3 in parallel, ganged).	0.0012μf., 3000-volt variable (Jennings UCSL-1200).
L_3—	6 turns No. 10, 1-inch diam., 1½ inches long.	See text.
L_4—	Vari-pitch Air Dux 2408D4, modified as described in text.	Illumitronic Pi Dux No. 195–2, modified as described in text.
L_5—	Indented Pi Dux 1411A, modified as described in text.	Vari-pitch Air Dux 1608D6, tapped as described in text.
L_6—	4 turns No. 14, ½-inch diam., 1¼ inches long.	6 turns No. 12, 1-inch diam., 1 inch long.
M_1—	0–50 ma. d.c.	0–100 ma. d.c.
M_3—	0–100 ma. d.c.	0–200 ma. d.c.
S_1—	1 section, 2 poles, 5 positions (Centralab 2505).	2 sections, 1 pole per section, 11 positions, 5 positions used (Centralab YD sections with P-270 index assembly); see text.
T_1—	5 volts, 13 amp. (Triad F9A or F15U).	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 AB_2 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 AB_1 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 S_1, 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.

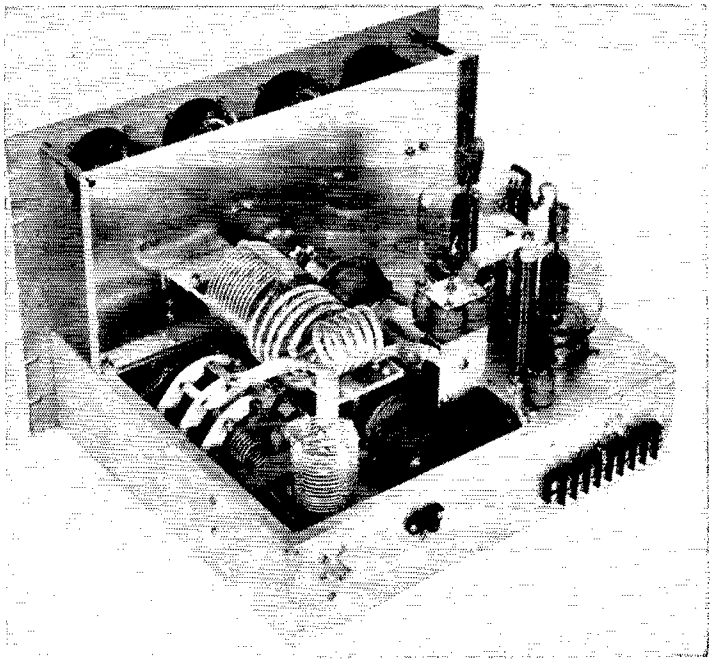
When the amplifier was completed, it was first tested for parasitics without suppressors of any kind. As is almost always the case with a tetrode or pentode amplifier, it oscillated merrily in the v.h.f. range — at about 150 Mc., as a check with the grid-dip meter showed. The parasitic was killed by 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 AB_1 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 AB_1 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 AB_1. The exact value of bias for AB_1 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.

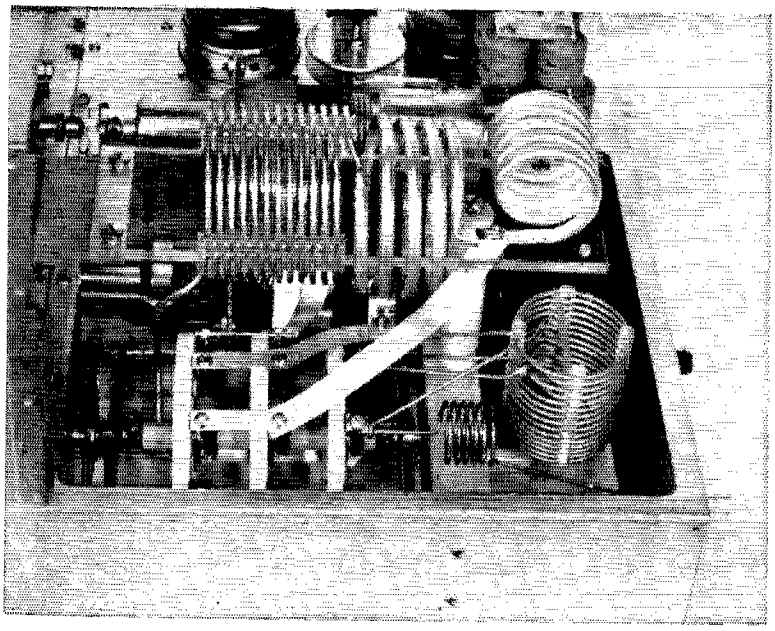
The screen voltage for Class C operation should come from a separate supply of reasonably good regulation. A series dropping resistor from the plate supply is not recommended. For Class AB_1 service, the screen voltage should be well regulated. While an electronically-regulated supply can be used, the simplest method is to use a string of VR tubes in series with a resistor from the plate supply. The reason that Class AB_1 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 cutout 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

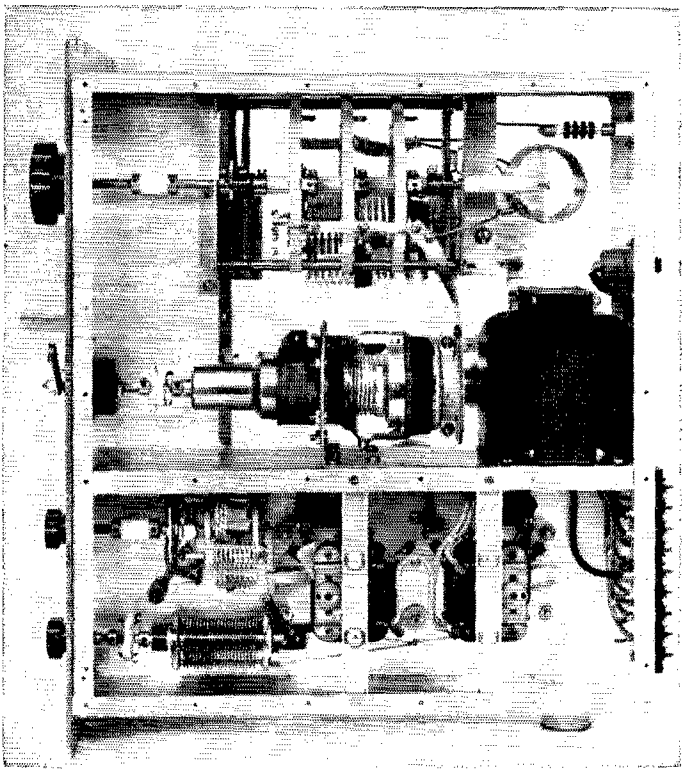
used, the second amplifier turned out to have a better appearance both inside and out than did the first one.

The 4-250A amplifier is built behind a standard 19-inch rack panel 12¼ inches high. The chassis is 17 by 15 by 4 inches and the shield enclosure above the chassis is 17 by 12 by 7¾ inches. The vertical sub-panel is set back three inches from the front panel. The grid-circuit compartment is 6¼ 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 ⅜-inch hole. A ¼-inch diameter sleeve ¼ 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, 1⅝ 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 12½ 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.: 2¾ turns from the 28-Mc. tap; 14 Mc.: 5¾ turns from the 28-Mc. taps; 7 Mc.: 9¾ 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 economy 4-125As.

Design of the Pi-L Network

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

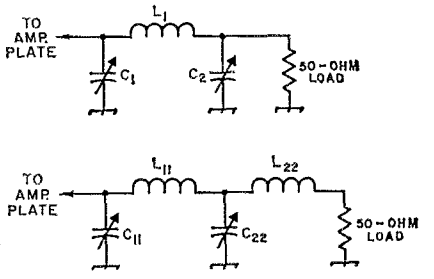


Fig. 2

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

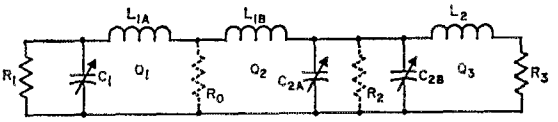


Fig. 3

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_{2A}. 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.

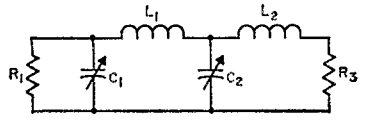


Fig. 4

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_3). 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:

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

and

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

where C = Capacitance in $\mu\mu$f.
L = Inductance in μh.
f = Frequency in Mc.

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

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.

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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.

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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*)

Some Technical and Legal Hurdles Encountered

in Setting Up an Amateur Mobile Relay Station

V.H.F. Repeater Problems and Possibilities

BY JAMES P. GREEN,* K6QNY

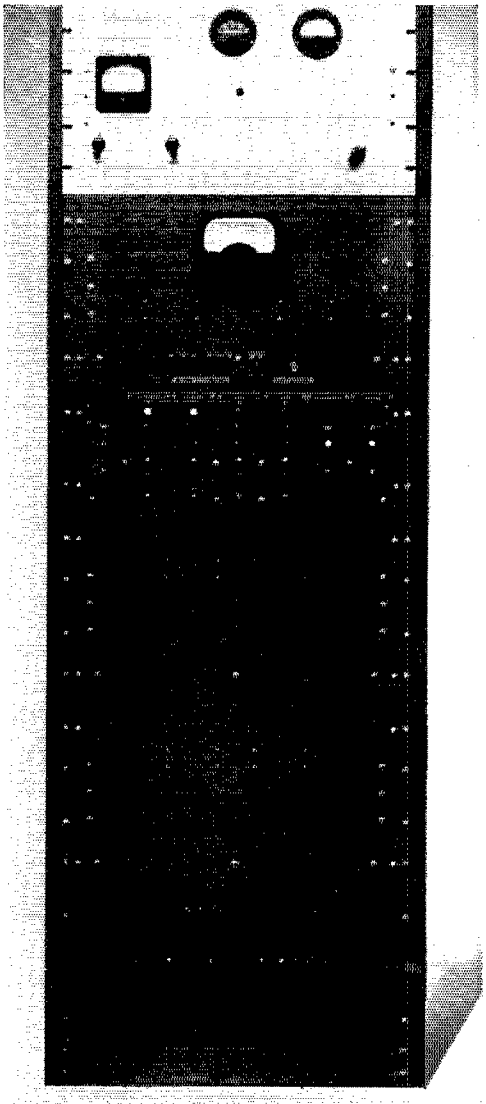
THE v.h.f. amateur bands provide reliable line-of-sight mobile communications. Depending on receiver sensitivity, only moderate power is necessary for generally noise-free reception. But in mobile-to-mobile work over paths that are not line-of-sight, results are highly variable.

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

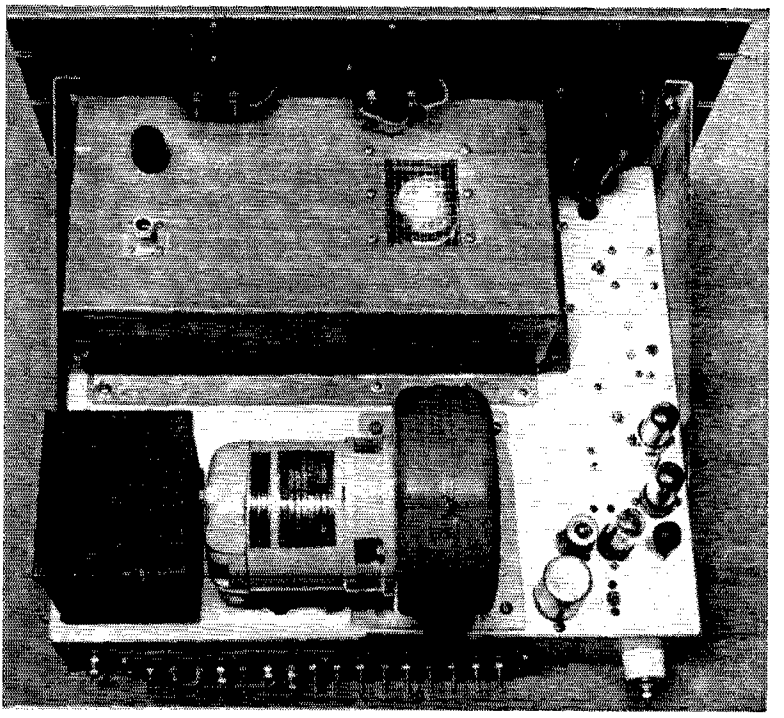
The type of emission to be repeated determines the over-all complexity of the station. No successful attempt has been made to repeat amateur s.s.b. signals. C.w. presents many of the same frequency control and stability problems. A.f.s.k. teletype works through an a.m. system, but better copy can be 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 characteristic 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.



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

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.

*4448 Marlborough Ave., San Diego, California.



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

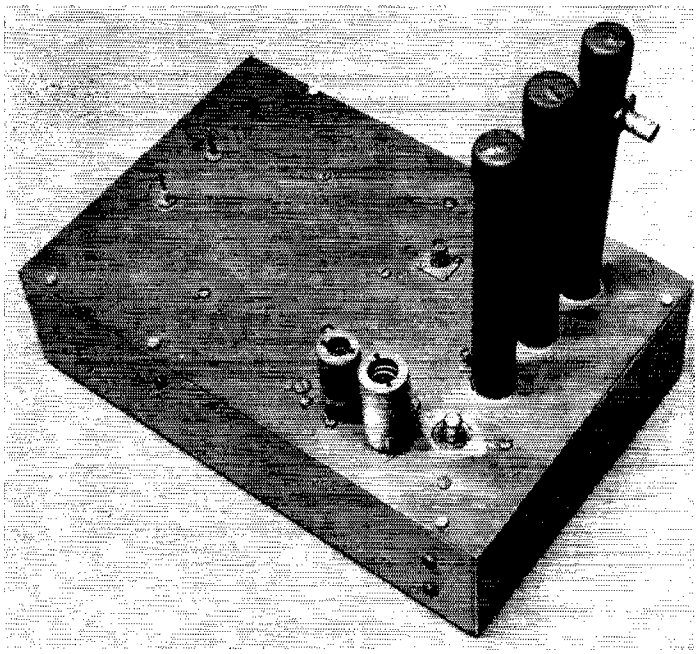
The v.h.f. amateur bands are both harmonically related and adjacent to frequencies widely used by other services, so exceptional care must be taken to prevent radiation of spurious signals. This problem can best be solved by complete shielding and filtering, and the installation of an external low-pass 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, ¾ 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 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 ¼-inch tapes with a razor blade jig.

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

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

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.

[2] Some 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.*

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.

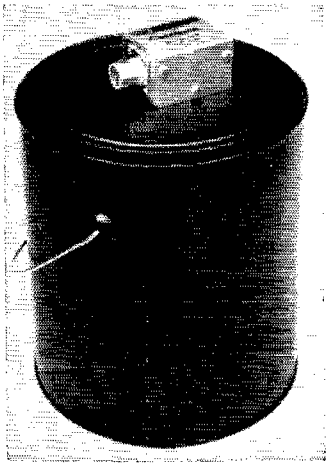
Valuable support for our project came from many sources. A few of the many contributors were WA6ATN, WA6FJF, K6QPV and W6NDW who also made the photographs. QST

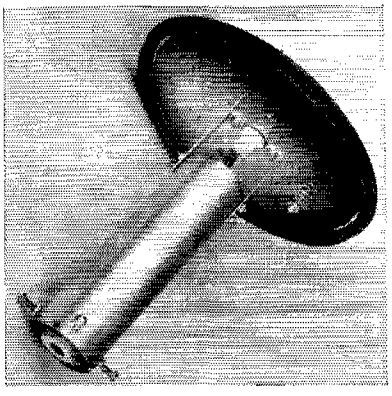
• *New Apparatus*

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





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 8⅞ 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, Bil 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

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, K1TBD 1, WA2JTU 4672, WA2JZM 3317, K2DNW 2616, W2NIY 1166, WA2HLH 850, WA2ODA 440, WA2JIS 420, WA2PZD 418, WA2CCF 34, K3DPA 10,857, K3GJQ 3180, K3JLW 1722, W3UIU 630, K3OJK 490, K3OWE 418, K3PCE 312, K3LSX 308, K4RIN 2400, K4LRX 2079, W4LYV 1596, K4FRM 1440, K4GMR 1344, W4EJP 950, K4WUY 903, WA4DSM 816, K4NVJ 490, WA4AWP 432, K4WUN 300, W5ARJ 3156, K5FQJ 2100, K5BQS 1632, K5FPU/5 672, K5BAJ 338, W6OEO 1170, WA6NML 160, WA6QKM 8, K7JRE 100, K7CWO 99, W8CXS 6063, K8TBR 3570, K8VAK 3552, K8BXT 3200, W8MSK 1541, K8UHJ 96, W9CLH 1340, K9QKY 1050, K9YEL 646, K9UCP 104, K9GDF 74, K9APK 47, K9HSK 28, KØZTU 6342, KØIJU 810, VE3BIR 1380, VE3LZ 756, VE3BYO 24.

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." — *WV2SVF.* . . . "My greatest thrill was working the ARRL station, W1AW, in the contest." — *KN1TKS.* . . . "Planned for this contest when I got my Novice ticket — then received my General opening day!" — *KØIJU.* . . . "I don't think I would have ever gotten my code speed up for the Conditional without the NR." — *WNØASJ/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." — *WV2WLM.* . . . "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." — *WV2YCI.* . . . "Enjoyed the NR very much. My best band to the South and East was 40 meters, while 15 was good to the West coast." — *KN9FPM.* . . . "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." — *WN8ADH.* . . . "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." — *KN7QPO.* . . . "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 band I went to there he would be with his *fb* fist." — *WV6WVM.* . . . "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.* . . .

"There were some good ops, but wish more Novices entered." – *K8UHJ*. . . . "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." — *WA2PZD*. . . . "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
KN3QCO....1608- 67-24-19
KN3OMB....1512- 56-27-14
KN3QMP....1298- 59-22-33
KN3QDA....1081- 37-23- 9
KN3QNC....774- 43-18-13
KN3QFF....544- 32-17- 6

Md.-Del.-D. C.

KN3PKI....8319-167-47-38
KN3QNH....3200-100-32-19

Southern New Jersey

WV2WCG..10,080-210-48-40
WV2TTA....4278-138-31-40
WV2WLM....1600- 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- –
WV2UKC....3051-103-27-30
WV2WGH....1992- 83-24-26
WV2RBJ....1752- 73-24-18
WV2YCI....1125- 45-25-16
WV2TLA....1080- 40-18- 5
WV2TUA....760- 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
KN3RGV....1020- 51-20- –
KN3PBN....168- 21- 8- 8
KN3PLX....20- 5- 4- 1

CENTRAL DIVISION

Illinois

KN9FRC...11,100-222-50-39
KN9IIQ....9408-196-48- –
KN9HWI....7755-131-55- –
KN9GMZ....5520-100-32-18
WN9AMV....3936-123-32-40
WN9AJD....3330- 90-37-13
KN9HYE....2820- 79-30-37
WN9AHD....1378- 53-26-23
KN9DVK....252- 13- 9- 8
WN 9BMG....234- 11- 9- 7
WN9BKW....98- 14- 7- 8
KN9ILJ....36- 9- 4- 2

Indiana

KN9EDW....2336-146-16-40
WN9AUM....756- 36-21-14
WN9ADK....740- 37-20- 8

Wisconsin

KN9IME....2650- 91-25-32
KN9HAN....1782- 81-22-23
KN9FPM....1708- 51-28-12
KN9FHB....1058- 36-23-11
KN9GAD....731- 28-17-14

DAKOTA DIVISION

North Dakota

WN0AAD....1776-96-16-19
WN0AQA....748-44-17-23

South Dakota

KN0GSY....6072-123-44-39
KN0IKC....1825- 73-25-31
KN0FVV....1200- 50-24-13
KN0HPS....273- 21-13- 6

Minnesota

KN0IUZ....5808-121-48-40
KN0JTA....1738- 79-22-28
KN0JOA....1710-114-15-23
KN0JFV....1035- 45-23-21
WN0ADX....931- 49-19-20
WN0ACI....667- 29-23-14
WN0ALE....518- 37-14-31

DELTA DIVISION

Mississippi

WN5ALL....3465- 84-35-19

Tennessee

WN4CBF...13,000-250-52-38
WN4CGI...11,988-222-54-31
WN4CGA....6480-144-45-35
WN4DCP....5368-122-44- –
WN4EAS....3960- 89-40-29
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....260- 20-13-12

Ohio

KN8DPB....7956-194-39-32
KN8BBH....7360-184-40-38
KN8ZJD....6752-196-32-39
KN8BXF....5456-124-44-10
KN8CXM....4653-141-33-35
WN8ADJ....3706- 99-34-36
KN8ZHA....3549- 76-39-20
KN8AIQ....3320- 83-40-28
KN8BAB....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
KN8BQX....1092- 42-21-17
WN8AGH....756- 42-18-19
WN8AGV....243- 17- 9-13
WN8CAI....230- 23-10-13
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....5256-136-38-39
WV2VJV....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
WV2VFV....3534-114-31-29
WV2RTR....3330-111-30-33
WV2SRV....1518- 66-23-25
WV2RUB....1428- 68-21-18
WV2URD....1364- 42-22-16
WV2VJE....1120- 41-20-13
WV2SJC....702- 39-18- 5
WV2WIO....200- 20-10- –
WV2WFW....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
WV2YTX....162- 18- 9-10
WV2VYN....42- 21- 2-21

MIDWEST DIVISION

Iowa

KN0GLQ....8517-167-51-36
WN0AJG....126- 21- 6- 3
KN0HSB....80- 10- 8- 5
WN0ABN....25- 5- 5- 6

Kansas

KN0JJL....1968-103-16-23

Missouri

KN0HMQ....2208- 69-32-16
WN0AJV....1980- 56-30-25

Nebraska

WN0AKK....286- 26-11-31
KN0GAY....187- 17-11-10

NEW ENGLAND DIVISION

Connecticut

KN1TKS....735- 49-15- 6
KN1TVF....648- 26-18-15
KN1SDF....390- 20-13-10

Maine

KN1TMM....220- 22-10- –
KN1SWG....216- 12- 8- 7

Eastern Massachusetts

KN1SMT...15,680-265-56-29
KN1SNW....5403-136-37-27
KN1TRK....4061-121-31-20
KN1RMR....705- 37-15- 7
KN1SHY....532- 23-14- 3
KN1RZL....396- 36-11-11
KN1VHS....40- 10- 4- 3

Western Massachusetts

KN1TTJ....6552-148-39-39
KN1SSH....5379-143-33-39

New Hampshire

WV2QZM/1..4550-120-35-33
KN1TMD....3068-108-26- –
KN1SFN....2071-109-19-20

Rhode Island

KN1SWK....7448-176-38-37

NORTHWESTERN DIVISION

Idaho

WN0ASJ/7...6672-139-48-38

Montana

KN7REJ....828- 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
KN7RIE....2268- 81-28-18
KN7QWC....1350- 54-25-17
KN7QMF....144- 18- 8- 9
KN7QWE....1- 1- 1- 1

PACIFIC DIVISION

Hawaii

WH6EFB....1232- 44-28-20

Nevada

KN7RBM....2015- 65-31-16

Santa Clara Valley

WV6TKC....4170-139-30-38
WV6TQK....2548- 88-26-15
WV6RRH....1071- 51-21-14
WV6TKE....319- 29-11-20

San Francisco

WV6UHN....736- 46-16-27

Sacramento Valley

WV6RKW....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....3162-102-31- 7
WN4APG....2910- 87-30-27
WN4DUW....1134- 44-21- 5
WN4CHJ....495- 33-15- 8

ROCKY MOUNTAIN DIVISION

Colorado

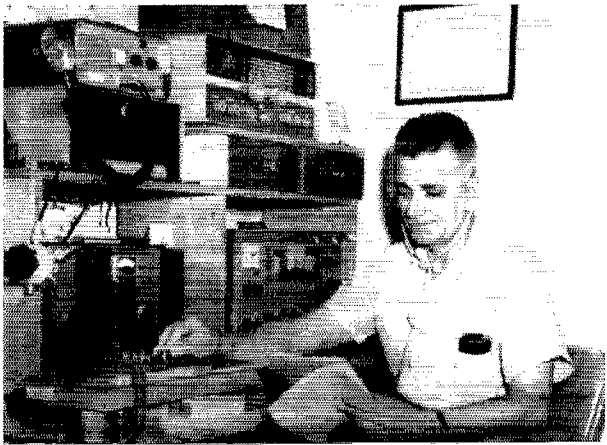
WN0BAZ....420- 30-14-17
KN0IRH....108- 12- 9- 9

SOUTHEASTERN DIVISION

Alabama

WN4AQV....3220- 72-35-23
WN4BQH....1988- 56-28-16
WN4AWX...1100- 50-22-22

(*Continued on page 152*)



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

Richcraft 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 ¾ 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*

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.

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 × 7 × 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 cascode 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 cascode 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.

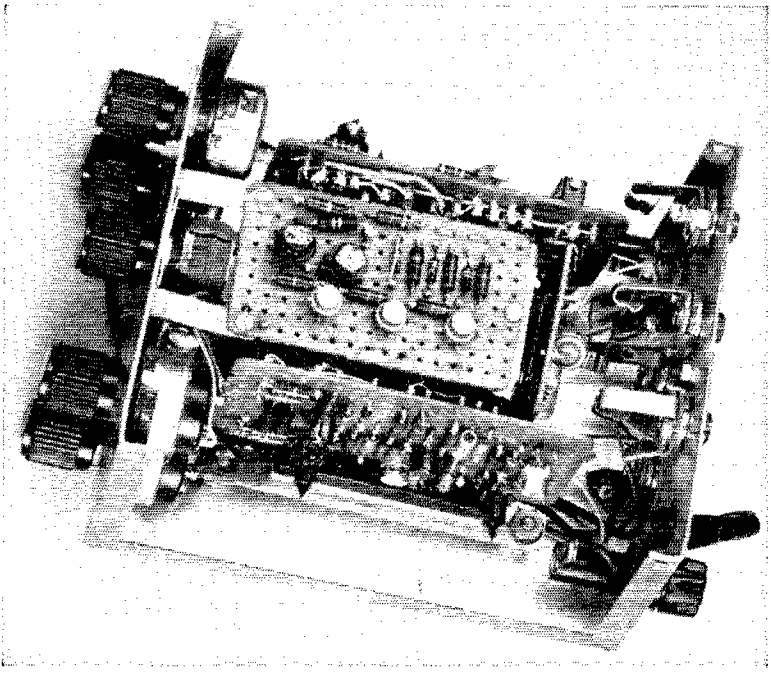
— *Al Horst, W9CUX*

(Continued on page 150)

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

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 foregound, 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,* K5UIJ

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.

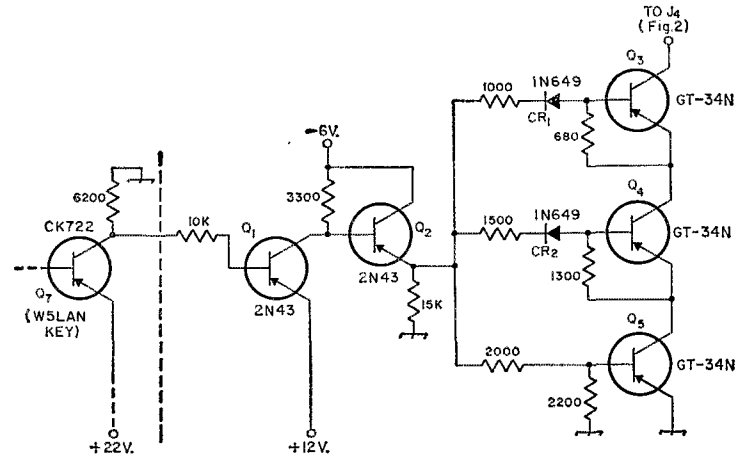


Fig. 1—Circuit of the electronic keyer. Unless indicated otherwise, resistances are in ohms and fixed resistors are ½ watt, Q_7, to the left of the dashed line, is in the W5LAN electronic key mentioned in the text. The keying relay of that circuit has been replaced by the 6200-ohm resistor. Q_1 and Q_2 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

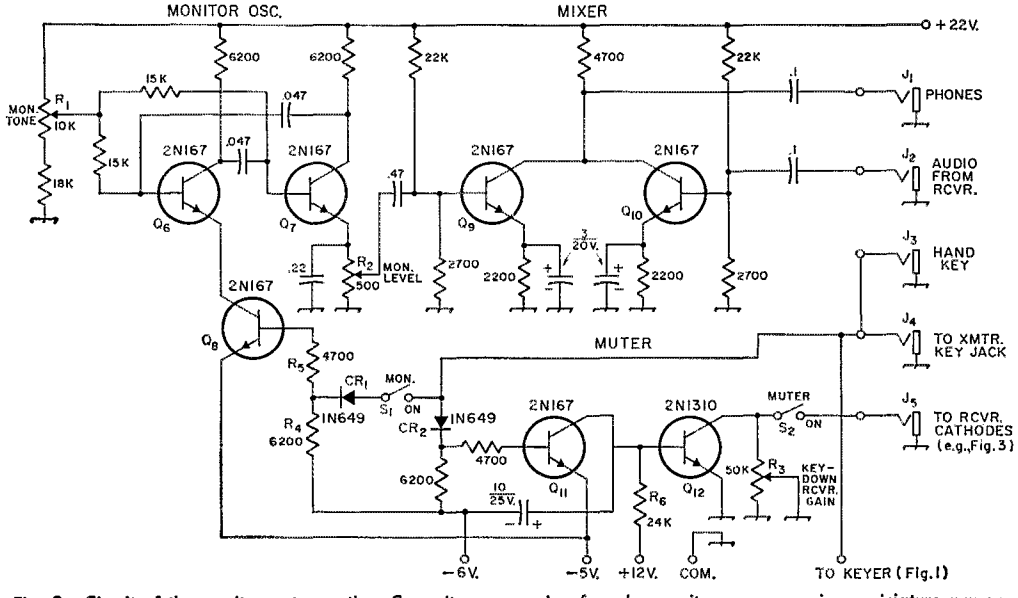


Fig. 2—Circuit of the monitor-muter section. Capacitances are in μf. and capacitors are ceramic or miniature paper, except for those marked with polarity which are subminiature electrolytic. Resistances are in ohms and fixed resistors are ½ watt.

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

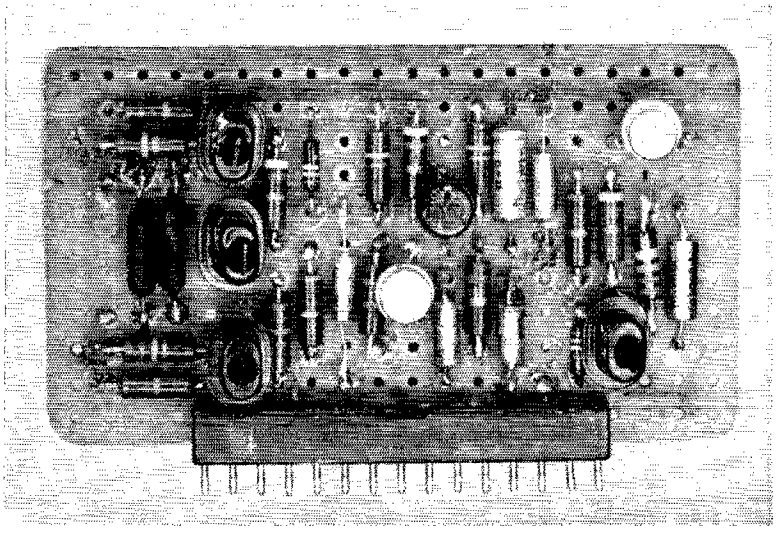
R_1, R_2 R_3—Linear-taper control.

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

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-μf. 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 × 5 × 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

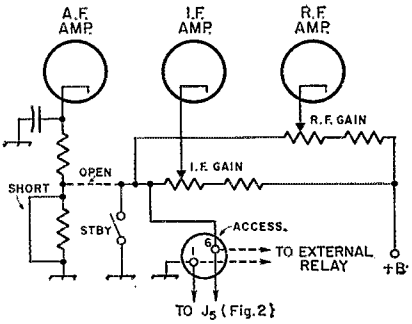


Fig. 3—Circuit showing modification of standby circuit in Heath RX-1 receiver for use with the muter. The same general principle will apply to other receivers.

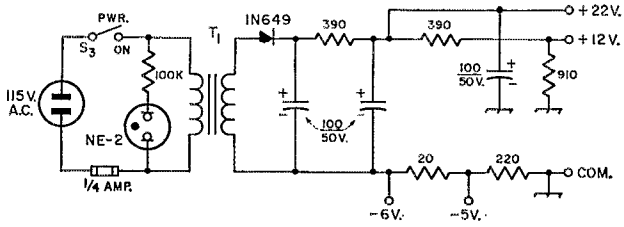


Fig. 4—Circuit of the power supply. Capacitances are in μf. and capacitors are miniature electrolytic. Resistances are in ohms and resistors are ½ watt. S_3 is a s.p.s.t. rotary snap switch. T_1 is a filament transformer with rewound secondary as described in the text.

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.

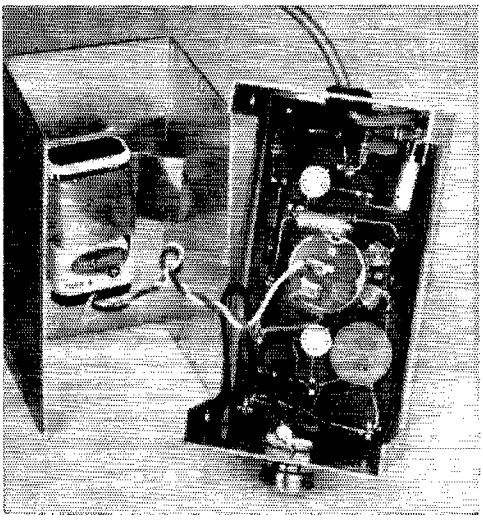
Q_6, Q_7, Q_8, Q_9, Q_{10}, Q_{11} — G.E. 2N1102.

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 2¼ by 2¼ 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-μf. 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_2 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 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.

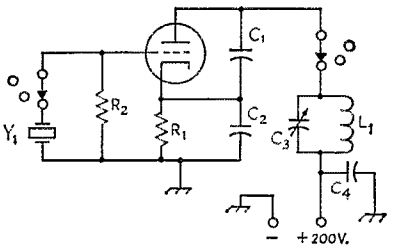


Fig. 1—Crystal-oscillator circuit.
C_1—27-$\mu\mu$f. silver mica.
C_2—180- to 500-$\mu\mu$f. silver mica.
C_4—0.005-μf. ceramic.
L_1, C_3—Tuned to desired frequency.
R_1—470 to 2200 ohms, ½ watt.
R_2—68,000 ohms, ½ watt.
Y_1—See text.

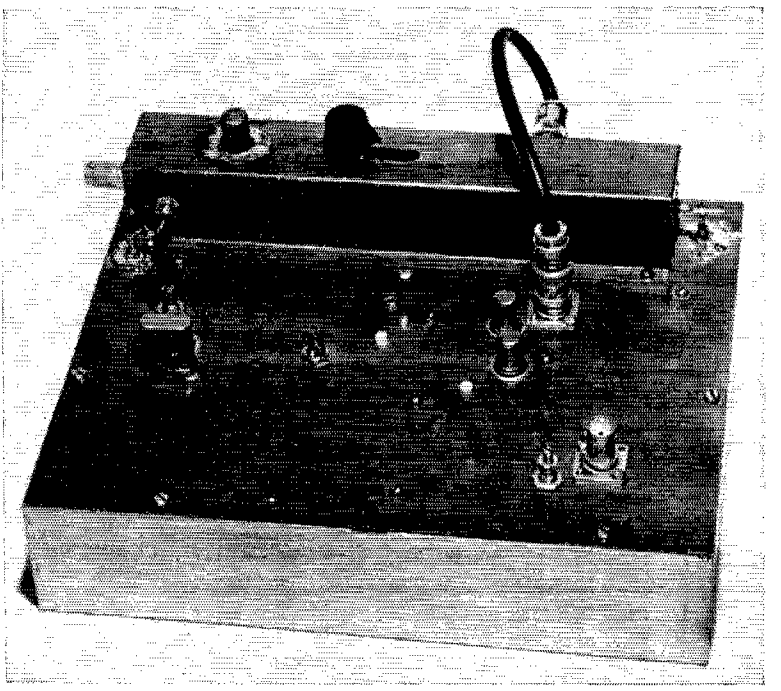
Values for C_2 between 180 μpf. and 500 μf. all seemed to work satisfactorily over the 2–26-Mc. range. Values of R_1 between 470 and 2200 ohms were tried. The higher resistance resulted in less power input and less output. A 1-mh. r.f. choke was substituted for R_1 and this also operated satisfactorily. 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-cascode 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-cascode. The mixer is the new 7587 Nuvistor tetrode. A 6CW4 crystal oscillator and a 7587 quadrupler furnish injection at 206 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.

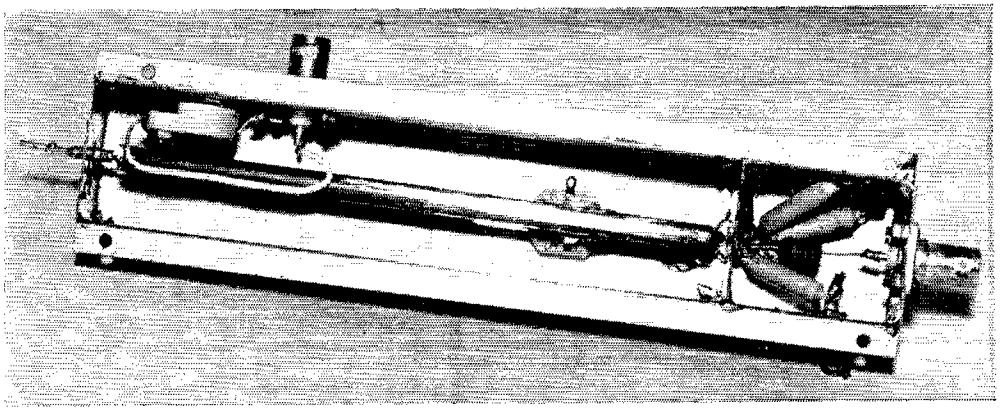
The tetrode Nuvistor mixer delivers more conversion gain than a triode, with lower oscillator injection and less pulling. The 7587 also gives lower mixer noise figure than conventional tube equivalents, so better over-all converter performance is more readily obtained. The series-tuned link, L_9-C_{10}, 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 ¼-inch tubing, cut as shown. The ½-inch end is bent down, for soldering to the plate pin of the socket, and the ¼-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 C_8 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

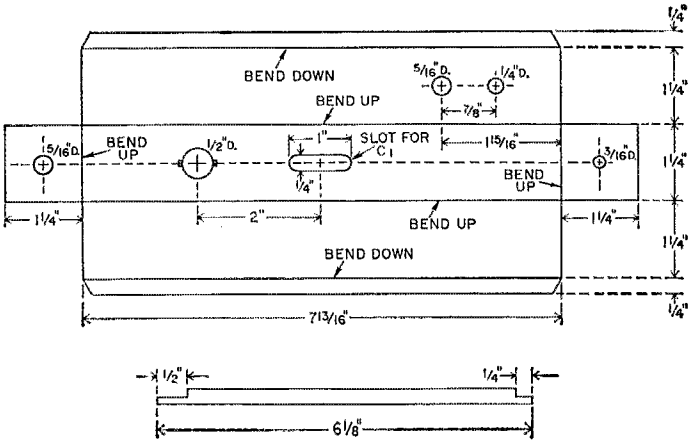
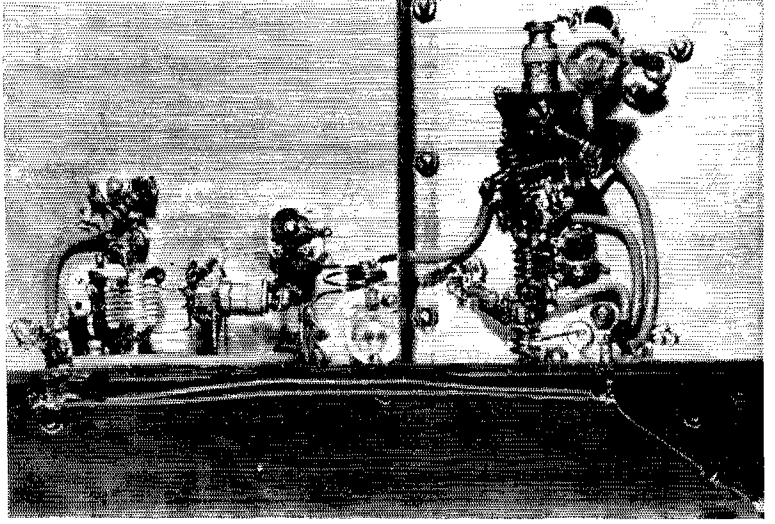


Fig. 1—Details of the trough-line metal work. The housing is cut from flashing copper and then bent to form a rectangular trough 1¼ inches square and 7 13/16 inches long. The elongated hole at the center of the top surface provides for adjustment of the position of the tuning capacitor. The inner conductor is made from ¼-inch copper tubing. The ½-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

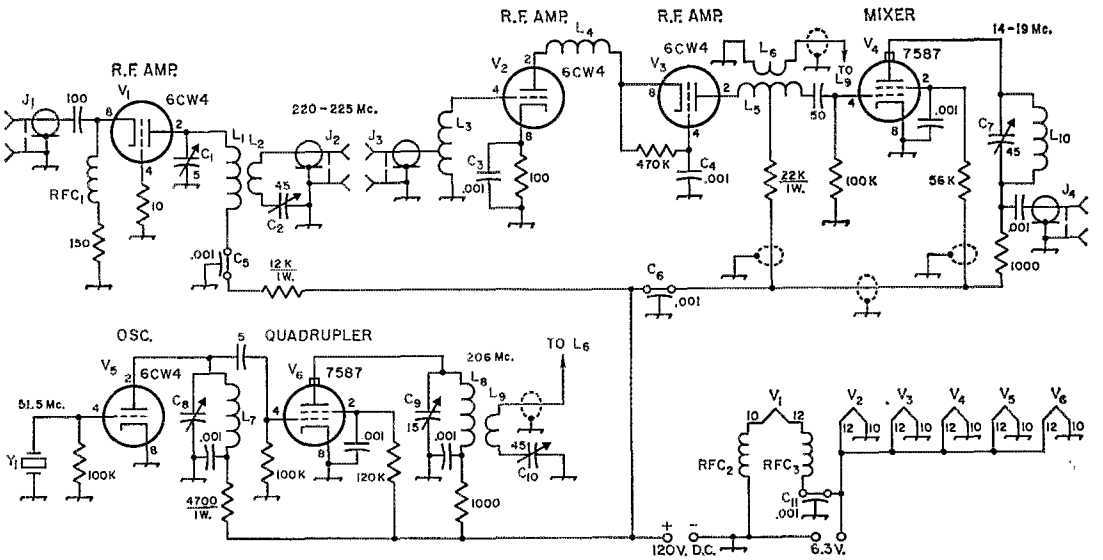


Fig. 2—Schematic diagram and parts information for the 220-Mc. Nuvistor converter. Decimal values of capacitance are in μf., others are in $\mu\mu$f. Capacitors are ceramic unless specified. Resistors are ½-watt composition unless specified.

C_1—5-$\mu\mu$f. miniature variable (Johnson 160-102 or 5M11).
C_2, C_7, C_{10}—7-45-$\mu\mu$f. ceramic trimmer.
C_3, C_4—0.001-μf. silver-mica button (Centralab ZA-102).
C_5, C_6, C_{11}—0.001-μf. ceramic feedthrough.
C_8—20-$\mu\mu$f. miniature variable (Johnson 160-110 or 20M11).
C_9—15-$\mu\mu$f. miniature variable (Johnson 160-107 or 15M11).
J_1, J_2, J_3, J_4—Coaxial fitting, BNC (UG290/U).
L_1—Inner conductor of trough line; see Fig. 1.
L_2—Approx. 2 inches insulated hookup wire in loop adjacent to L_1, as shown in photograph.
L_3—3 turns ¼ inch long, center tapped.
L_4—4 turns ⅜ inch long.
L_5—8 turns ⅝ inch long.
L_6—2 turns ⅜-inch diam., inserted between turns at center of L_5.
L_7—6 turns No. 20 tinned, ½-inch diam., 16 t.p.i. (B & W No. 3003).
L_8—2 turns ⅜-inch diam., ¼ inch long.
L_9—2 turns ⅜-inch diam., coupled to L_8. All coils No. 18 enamel, ¼-inch diam., unless specified.
L_{10}—20 turns No. 26 enamel, close-wound on ⅜-inch iron-slug form.
RFC1, RFC2, RFC3—0.84-μh. 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

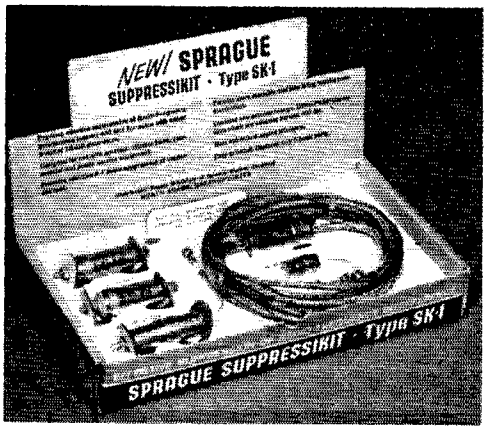
• *New Apparatus*

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 Supressikit 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 squelch level set just at the point where the Corvair's own noise



does not break it, the squelch 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.

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

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!

• *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. rig[1] 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.

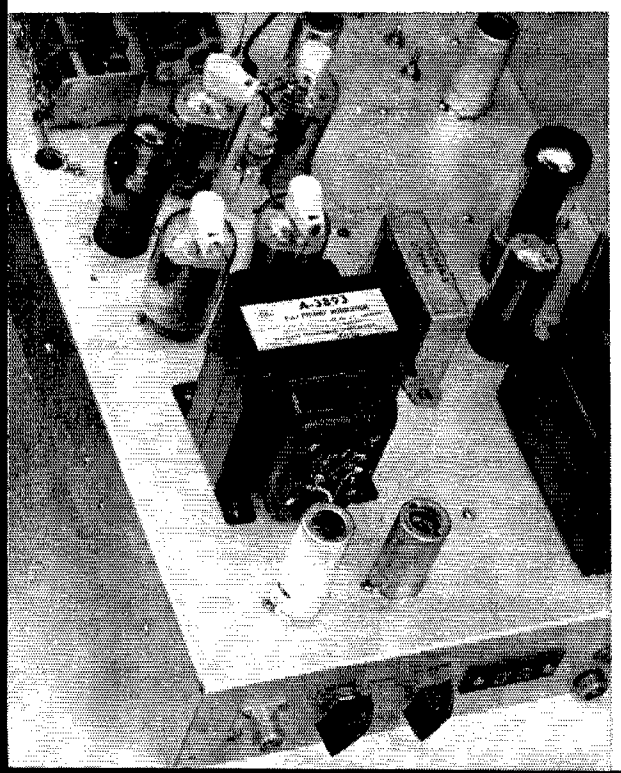
Power for the modulator is obtained from the same supply that runs the transmitter. Two voltages are needed, one of approximately 250 volts for the speech amplifier and driver and the other, high voltage for the modulator plates. The value of the high voltage will depend on your particular power transformer, 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.

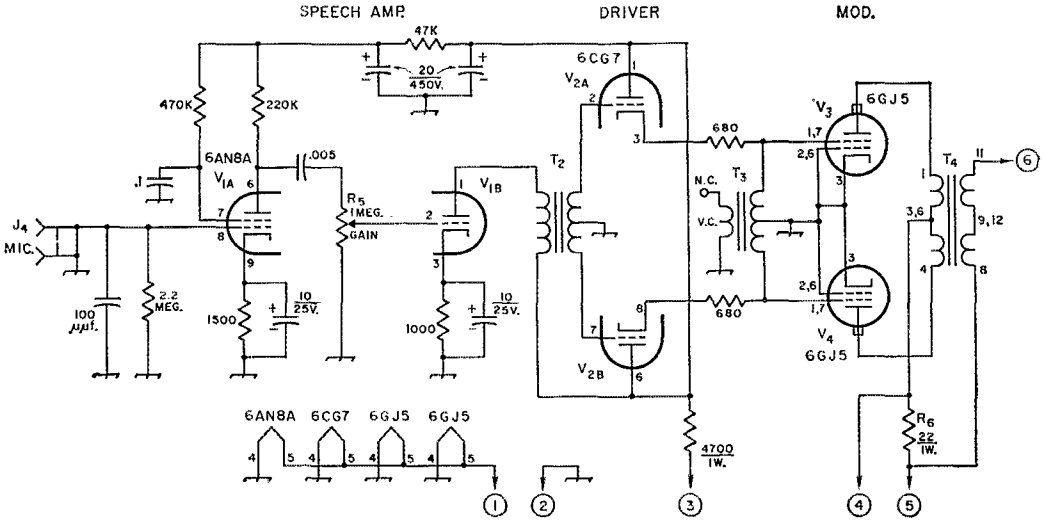


Fig. 1—Circuit diagram of the modulator. Resistances are in ohms, resistors are ½ watt unless specified otherwise. Capacitances are in μf. unless specified otherwise; capacitors with polarity indicated are electrolytic; others may be paper, mica or ceramic as available.

J_4—Microphone jack.
R_5—1-megohm control, audio taper.
R_6—22 ohms, 1 watt.
T_2—Interstage audio, 1:3 primary to total secondary; 10-ma. primary (Stancor A-73-C or equivalent).
T_3—Universal output, push-pull primary, voice coil winding not used (Stancor A-3496 or equivalent).
T_4—Multimatch modulation, 60 watts (Stancor A-3893 or equivalent). Adjust ratio for 5000-ohm plate-to-plate load.

150-volt line that connects to the terminal on S_6 (original circuit) is removed and connected to a terminal on S_8. The now-open terminal on S_6 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 T_4 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.

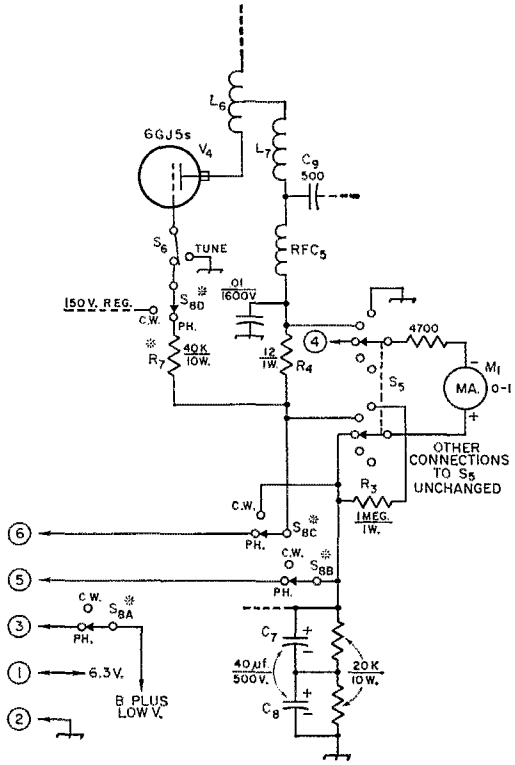
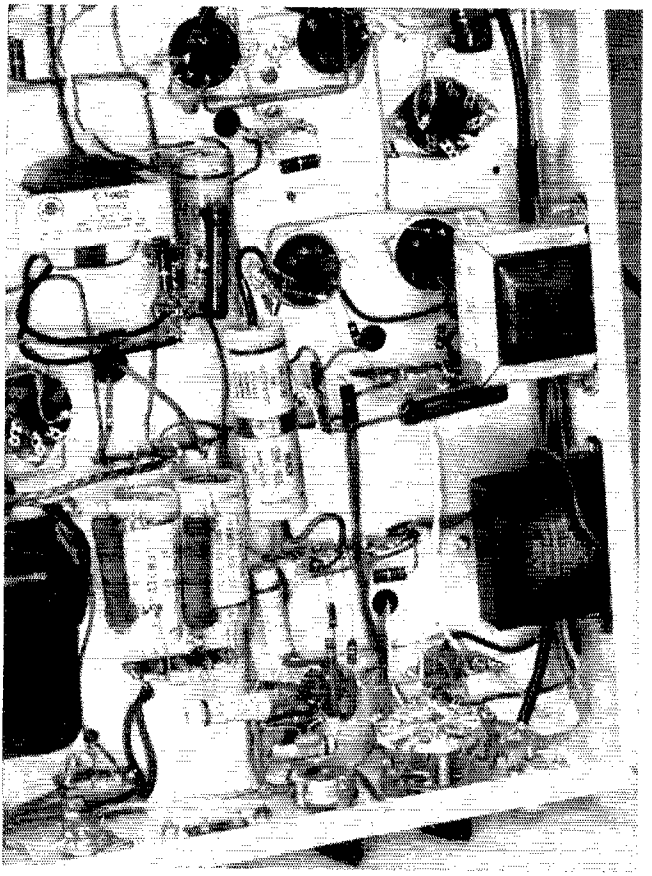


Fig. 2—Transmitter modifications for adding the modulator. Items marked with asterisks are added components; all others are original parts shown in Fig. 1, page 32, June QST.

R_7—40,000 ohms, 10 watts.
S_8—Four-pole, two-position switch (Centralab 2515, or P-270 index assembly with one ZD switch section; Mallory 177C).

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 mode!). 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

Love Them Dits

JOHN G. TROSTER,* W6ISQ

WILL ya listen to that kid burning up the band at 8 w.p.m.! Why do they let these guys clutter up the band? QRM isn't heavy enough — gotta let these novice kids mess around and use up good kilocycles. I oughta give that kid a blast — what would a guy like that talk about anyway? Bet he's so nervous he can hardly grab that old two-bit key. Sounds like he's sending with two pieces of wire!

"Give him a break. Push the weights out a little. But let's give him something to work on. Twenty is plenty slow for these guys. Make 'em build up their code speed. OK, pal, strap on the cans —"

"KN9KAZ de dit dah dah dah dididididididit dahdahditdah bk! Ahhhhh, love them dits — really rip out, don't they! Come on, kid, I'm waiting. Don't tell me ya can't copy a call at 20 — maybe not solid but at least the W6 part. Come on . . ."

"W6IVK de KN9KAZ —"

"Ya lid — can't ya read real code? You're probably in the second grade and don't know the alphabet yet. How come they give licenses to guys who can't read good clean bug c.w.? Go ahead, let's get it over with."

"— ur my third QSO — just learning this new-fangled code — was apprentice telegrapher on railroad in 1895 — trying to build up code speed again — retired prof. here — want to go on DXpedition — bongo drums in Bali hi — W6IVK de KN9KAZ."

"Should have known. No wonder he can't tell a dit from a dah. Turn up your hearing aid, dad. How can ya make 'IVK' out of 'ISQ'? Didn't they teach ya nothing in school — ha! One blast at 20 and I'm leaving! Hope ya get to Bali, but take fone!"

"Enough of these novices. How come the FCC lets kids like that get a license?

"See what's going at the low end. Ahhhh, there's a snappy little CQ. Little slow maybe, but tolerable. Back up to 40-plus w.p.m. OK, who is it? Ahhh, a two-letter call, a real oldtimer at last. Now for a good QSO with some guy who can at least read the code."

"W2TW de dit dah dah dahdididididididididit dahdahditdah BK. Boy! Love them smooth rippling dits. Wow!"

"W6IVK de W2TW . . ."

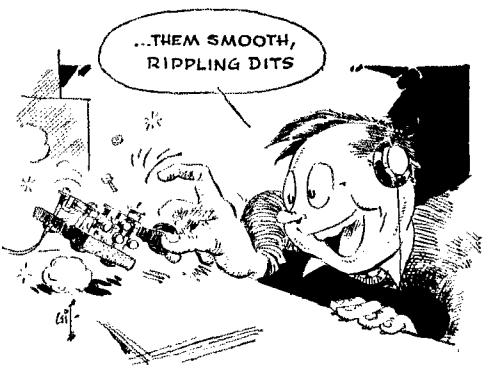
"This guy kiddin or sumpin? Probably hasn't been on c.w. for 25 years. Just bought a new electronic keyer. Bet that's it. Give him a bug and he wouldn't know what to do with it.

"W6IVK de W2TW New electronic keyer here . . ."

"See, what'd I say? Hasn't heard c.w. in 25 years . . ."

"Nice new gadget. Better than a straight key like I used for 30 years on ship-to-shore."

*45 Laurel Street, Atherton, California



"Well, no wonder. Been reading straight key — a lot different from good old solid bug . . ."

—...—

"That guy just couldn't read good, clean, old-fashioned bug c.w., I guess — even when I slowed way down to 35. Guess those ship ops never go over 20. That must be it. You'd think the maritime people or FCC or the ship's captain or somebody would make . . . oh well. Good snappy CQ, maybe raise a good op —"

"Throw away the weights and let fly. 'CQ CQCQ de dit dah dah dah dididididididididit dahdahditdah BK. Listen to them dits! Just lovely, lovely . . ."

"Here's some guy right on my frequency going about 50 w.p.m., but who could copy that stuff? Guys going that fast can't copy that fast, just trying to show off and louse up the band for guys who want a nice solid QSO. Might be someone calling me. Who's he after?"

"W6 something de W6W something — guess that's W6WX. Going so fast, trying to show off! No other station on this frequency. He's probably rock-bound calling a commercial at the other end of the band. Some of those old guys haven't heard of v.f.o. yet! How does he expect anybody to copy that stuff going like a machine? Show-off!

"Try another CQ. Maybe I can QRM that 'WX' off this freq — 'CQCQCQ de dit dah dah dah dididididididididididididitdahdahdidah BK. — Oh boy, them dits are really sumpin, aren't they! Just one long lovely brrrrrrddddddttttt. Wonderful. I'm glad the FCC gave me that call!"

"W6-something de W6WX."

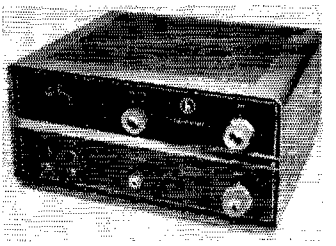
"Nuts. That 'WX' is blocking any calls for me. Why don't show-offs like that go on a special frequency? Probably doesn't have another rock."

"W6IVK de W6WX."

"You don't suppose. Nah, any lid can tell the difference between an 'IVK' and an 'ISQ'! Ya just gotta concentrate on the 'dits'! Any lid can tell 'dits' from 'dahs'! I just don't know why the FCC doesn't check the band for some of these lids, make 'em send so somebody can read the stuff. At least make 'em slow down and quit showing off!" 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-32 [1] 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.

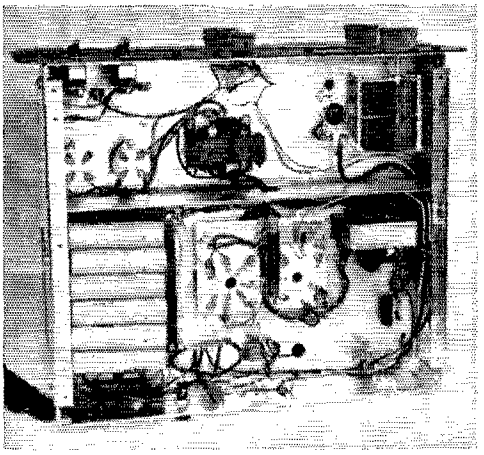
R.f. drive to the 7094s is applied to the cathodes, which are above ground for r.f., by way of an r.f. choke. The r.f. input circuit is untuned. Although the tube's control grids are at r.f. ground potential, during standby a cutoff bias of around 175 volts is applied to them. Fig. 1 shows the grid circuit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

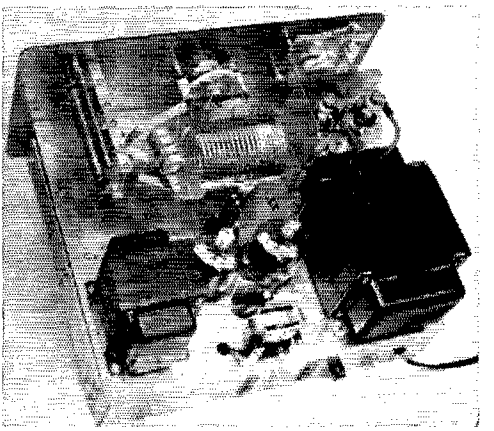
The plate circuit of the HT-41 is a conventional pi network with band switching. Additional capacitance is automatically switched in parallel with the variable loading capacitor on the lower frequencies so the tank can handle load impedances from 40 to 75 ohms on all bands.

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.

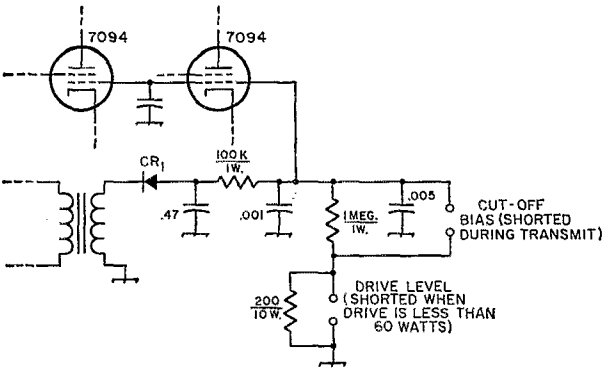


Fig. 1—Grid circuit and bias supply of the HT-41 linear amplifier. All capacitances are in μf., resistances are in ohms.

filter composed of a swinging choke and 17 μf. 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.

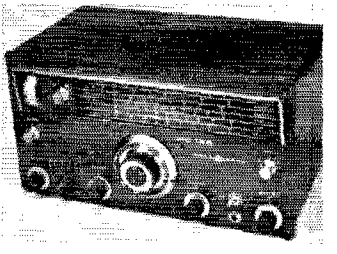
Operating controls on the front panel of the HT-41 include two toggle switches with lamp indicators for controlling the FILAMENT and HIGH VOLTAGE.

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: 12⅛ inches.
Width: 21½ 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.

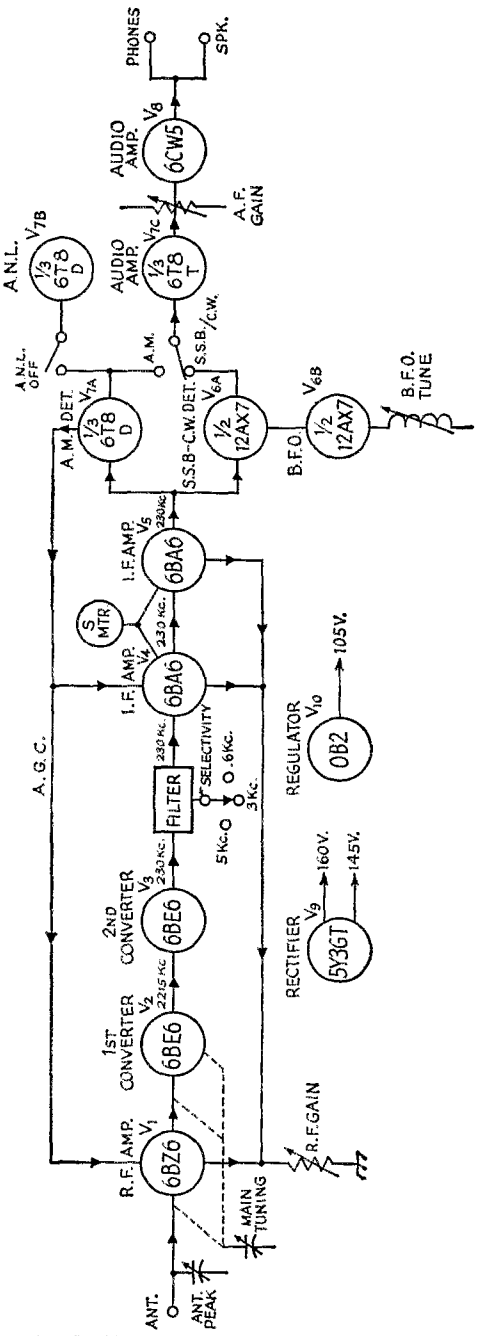


Fig. 1—Block diagram of the NC-155 receiver.

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

A ferrite filter [2] 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, V_3, and the 230-kc. i.f. amplifier, V_4.

After passing through the filter, the 230-kc. signal is amplified in V_4 and V_5. 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, V_4 and V_5, in a sort of bridge circuit. Since there is no a.g.c. applied to V_5, its gain remains more or less constant, but the gain of V_4 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, V_4, and to the grid of the r.f. amplifier, V_1. 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.

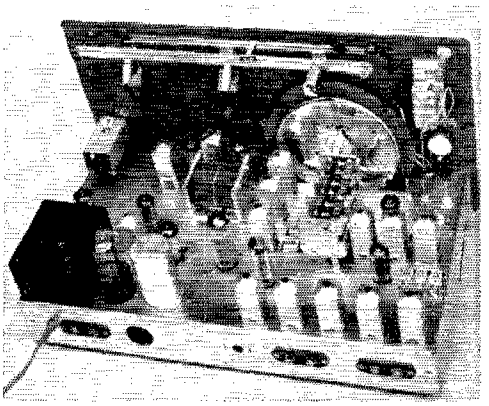
The FUNCTION switch also selects the desired reception mode, either straight a.m., a.m. with a.n.l., or c.w./s.s.b. All of these modes are marked in duplicate on the switch — one group for a.g.c. on, and the other for a.g.c. off.

When in the c.w./s.s.b. mode, output is taken from a triode product detector, V_{6A}. Extremely small coupling (5 $\mu\mu$f.) 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.

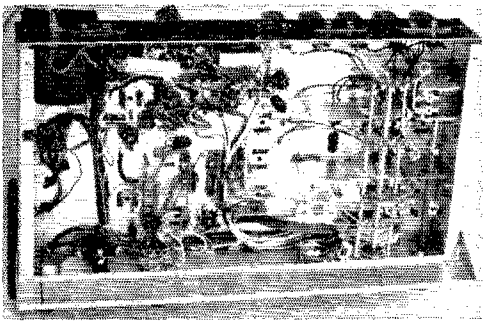
Following the detectors, the audio signal is fed into the triode section of the 6T8, V_{7C}, and then is further amplified in the 6CW5 power stage, V_8. About 3 watts of maximum output power is available from the amplifier, or about 1½ watts with 10 per cent distortion. Output from the transformer in 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.



Bottom view of the NC-155 receiver.

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.

W1HDQ's comments concerning the NC-270's performance on 6 meters [3] 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 condition 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.*

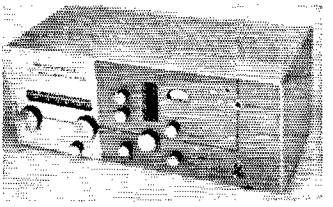
National NC-155 Receiver

Height: 8⅝ inches.
Width: 15⅝ 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 IV [1] 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."

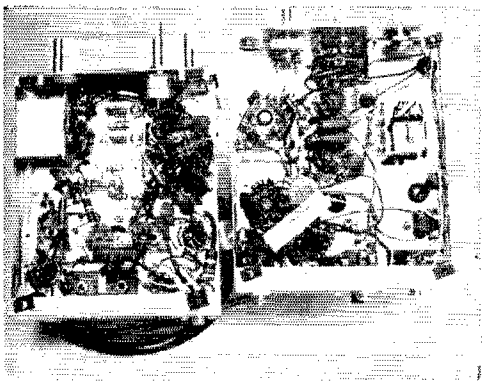
The GC-105 2-meter transmitter-receiver is the Communicator III,[2] in a new dress, with only minor electrical differences, and probably quite a few v.h.f. enthusiasts will welcome this reversion to the simplicity and moderate price



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 cascode 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.

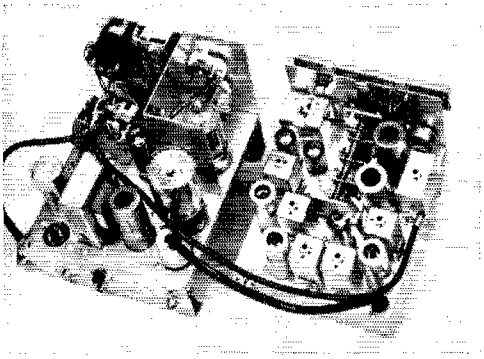


Bottom of the GC-105 units, with the receiver at the left. Since there are only minor differences, these detail pictures are almost identical to those made for the Communicator III. It's the outside that is different.

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 2E26 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-105. Either a carbon or high-impedance microphone can be used with the equipment.



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

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".

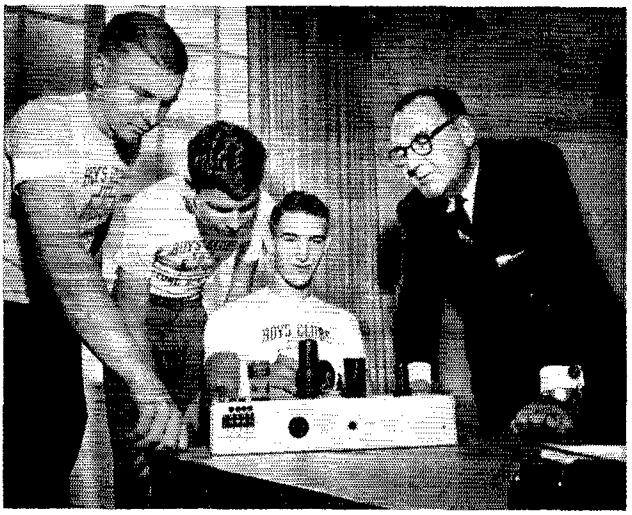
Now, forty-five years later, the mystery may be solved. Mr. E. L. Campbell, who now lives in Wichita Falls, Texas, comes forth with information that perhaps he was the originator of the signals. Quite active in the Kansas City area during that period, Mr. Campbell says he frequently signed the call "X".

Mr. Campbell is no longer active in amateur radio but, heredity being what it is, his son, W1CUT, 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 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

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

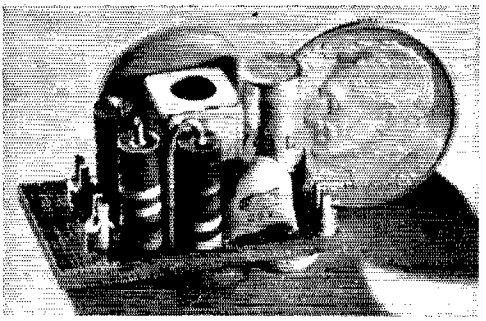
Strays

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 adjusting the screwdriver slot slug on the miniature transfomer, T_1. This transformer is a replacement part for a Zenith b.c. receiver and is available through any Zenith dealer or distributor.

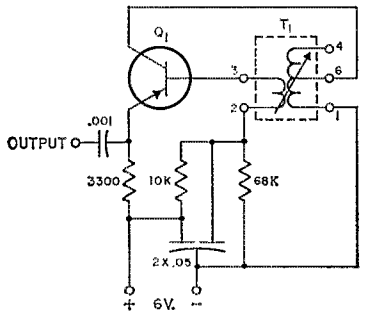


Fig. 1—WØCXN's miniature b.f.o.
Q_1—2N1525 transistor.
T_1—455-kc. i.f. transformer (Zenith No. 95-1879).

— *Vern V. Holmes, WØCXN*

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, W8QFH*

[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.

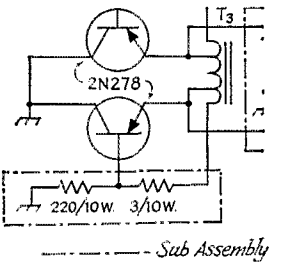


Fig. 2—Corrected circuit diagram of the triple transistorized power supply.

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 frequency[1]. 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

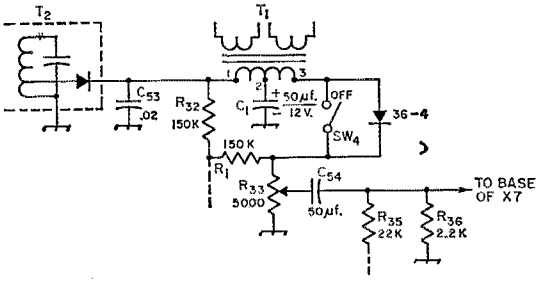


Fig. 3—Noise limiter for the Heathkit Mohican receiver.
C_1—50-µf, 12-volt electrolytic capacitor.
R_1—150,000-ohm, ½-watt resistor.
T_1—Miniature audio transformer (available from Arrow Electronics, Inc., 65 Cortlandt St., New York 7, N. Y. See ad on page 147 of June QST).

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. Buhrer, K2OHF

CURING BUZZY RELAYS

ALMOST any a.c. relay can be adjusted to give 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-µf. 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

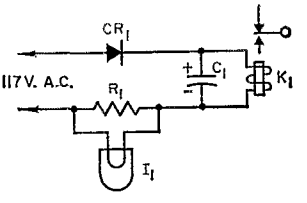


Fig. 4—Circuit for operating a.c. relay on d.c. See text for information on components.

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.

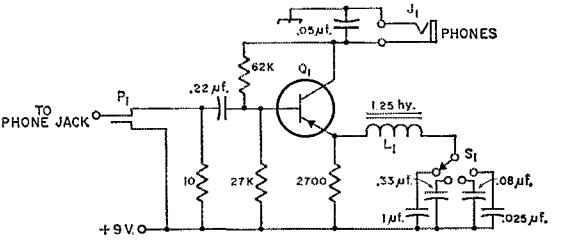


Fig. 5—Transistor c.w. filter.
Q_1—2N466, 2N43 or equivalent.
S_1—Single-pole, four-position rotary switch.

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 ..... kc.?" — 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 ..... kc. (*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 ..... kc." 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 ..... kc.)

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 ..... kc.

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.

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 Inspectors 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 requirements [1] 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.
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, Nebr.: 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., 356 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.

[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.

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

In the Matter of Establishment of fees for the Commission's licensing and regulatory activities	DOCKET NO. 14507

OPPOSITION OF THE AMERICAN RADIO RELAY LEAGUE

The American Radio Relay League, Incorporated, a nonprofit 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.

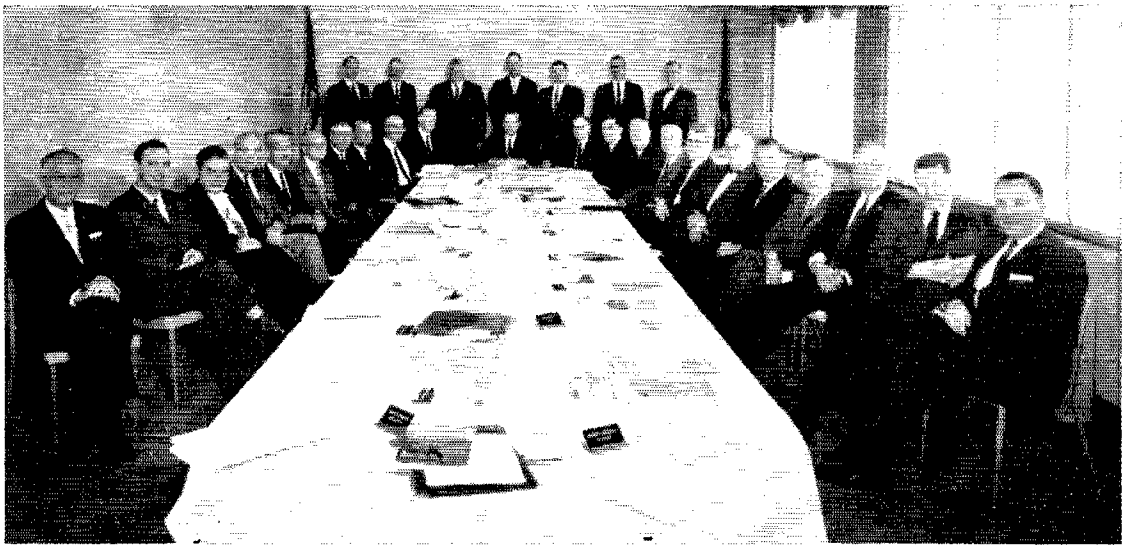
Amateur radio is a prime source of personnel for the electronics industry. A very high percentage of yesterday's and today's leaders in the field chose electronics as a career because of an early interest, usually in the teens, and self-training through amateur radio. The leadership of the United States 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 Dannals, 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 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 oustanding. 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 peacetime, 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. EDST, 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. Dannals, 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., W6ZH

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 SECs 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 1⅛ per cent of present compensation for each year of accredited past service and 1¼ 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 Huntoon.

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
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 $445.25, 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.

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.

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 Dannals, 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
Chiburban Radio Mobileers, Inc.....Chicago, Illinois
The Cleveland Amateuradio Convention, Inc.
Cleveland, Ohio
Copper Country Radio Amateur Association
Calumet, Michigan
Delta Radio Club.....Whitehaven, Tennesse
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 propagations 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 Love, 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.

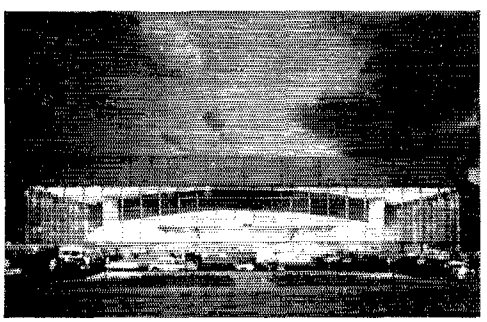
An electronics exhibit will include a working model of the "Oscar" satellite and an exact duplicate of Friendship Seven.

Special advance registrations before July 15 will cost only $4.75 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 DXpeditions

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

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 Suquoin 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 Marv 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 mobiliers 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.

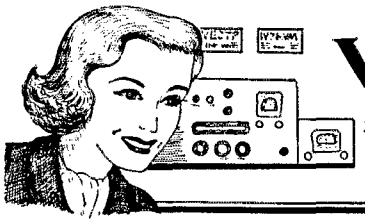
Wisconsin — The WNA picnic will be held on Sunday, July 8, at Hartford, Wis. No other info at hand.

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 Fron t-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 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.)*

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

An Exception!

Not all XYLs are understanding of ham radio and its involvements (most are, we're happy to note). K1MMC 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 OM 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 OM 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 AWTAR — 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. KØGIC, Secy. K7CHA, Treas. W1YPH, Certificate Custodian KØRGU. The chapter now has 37 members in 18 states and 7 countries. Nets will be scheduled and the chapter will issue a certificate shortly.

— • • • —

WA6RXH, 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!

RESULTS

Thirteenth Annual YL-OM Contest

OM comments regarding the 1962 YL-OM contest, sponsored by the Young Ladies Radio League and conducted Feb. 24–25 and March 10–11, were complimentary. Wrote one, "as an ex-commercial operator I found it a real pleasure to work those fine YL operators" — and another, "my congratulations and thanks to those who plan, sponsor, and judge this very interesting and worthwhile contest".

YLRL Vice President and chief log-checker Lillian Byrne, K2JYZ (nobly assisted by her OM K2JYM), reported approximately 350 logs were received. Lillian praised participants for submitting exceptionally readable logs.

Cups have been awarded to the YL and OM first-place c.w. and first-place phone winners. Certificates have been awarded to high place c.w. and phone winners in each district and country.

Here are the grand winners for 1962. Congratulations to all!

YL C.W.	*Contacts*	*Sections*	*Score*
KØIKL, Joyce Polley	411	65	33,394*
W4BLR, Kay Anderson	371	67	31,071*
W1RLQ, Grace Swenson	323	76	30,685*

OM C.W.	*Contacts*	*Sections*	*Score*
W4SVJ, Richard Brandt	80	47	4,700*
W5WZQ, D. R. Blaschke	80	41	4,100*
K2EIU/2, Kenneth Keeler	65	37	3,006*

YL Phone			
KØEPE, Martha Wessel	721	82	59,122
KP4CL, Alicia Rodriguez	543	106	57,558
W5DRI, Dena Morgan	518	81	52,448*

OM Phone			
K5MDX, David Thompson	99	45	5,569*
W4SVJ, Richard Brandt	78	46	4,495*
K4JIG, Bill Egbert	73	41	3,741*

YL C.W.

W1RLQ	30,685
K1LCI	13,353
K1BUF	3,798
K1QFD	2,210
K2ZQG	19,610
K2AGJ	14,355
WA2NFN	12,122
WA2CUZ	9,500
K2UKQ	8,413
K2JYZ	506
K2DKL	480
W3TSC	20,093
W3SLS	17,600
K3EHZ	15,604
K3HZY	3,443
W3CDQ	1,363
W4BLR	31,071
K4JYQ	27,913
K5LIU/4	24,413
K4ZNK	16,872
W4KZT	13,843
W4NGE	13,390
W4EJQ	11,194
W4UF	10,260
K4VDO	3,118
W4UPT	780
W4UTO	500
K4LMB	260
K5TXQ	24,632
K6OWQ	9,024
W6PCA	7,901
WA6PWV	1,316
K7HSB	22,051
K7EQM	14,755
W7PUV	8,096
W7GGV	7,950
K7CZQ	4,560
K7ADI	1,785
W7HPT	1,128
W7EHX	1
K8MKG	21,098
W8KLZ	7,020
W8WUT	4,607
W8HWX	3,806
K8ONV	3,204
K8HKU	563
W9MLE	18,778
W9USR	8,107
K9TLZ	2,553
KØIKL	33,394
KØGIC	21,600
KØZSQ	10,535
KL7ALZ	25,004
KL7DQS	12,740
KH6BTX	18,678
VE3EZI	16,129
VE7BBB	8,108
DL4IQ	130
G3OHU	734
JA1TL	1,120
OH5RZ	150
VK3KS	1,518
W3YVJ	2,280
K3KKF	2,240
W3VTT	1,283
K3GIQ	866
W3AYS	715
W3QLW	713
K3GJQ	709
W3CDG	683

OM C.W.

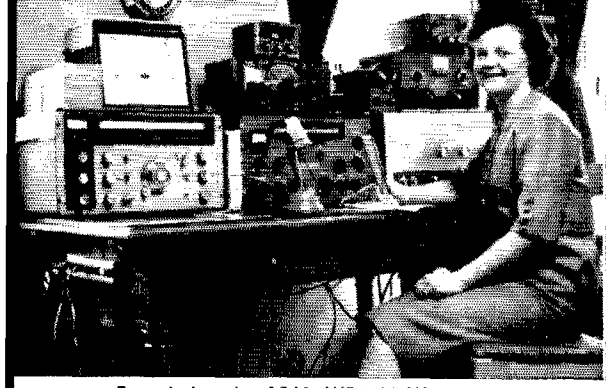
W1JYH	2,000
W1HOZ	1,209
W1EQV	1,204
W1PYM	1,140
W1NEP	1,140
W1FPS	1,053
W1NJL	990
W1GKJ	840
W1VBR	585
W1TQS	285
W1EXD	192
K2EIU/2	3,006
K2PXX	1,595
W2CVW	1,421
W2UAP	1,200
K2YXC	1,118
W2NCG	1,064
W2KAT	889
W2NIY	560
W2EIC	437
WA2LKW	380
W2IP	374
W2UNS	325
W2WL	265
W2CUE	221
WA2ODA	206
K2MJM	179
W2DUN	158
WA2HJF	135
W2EWZ	88
K2DEM	49
K3OCU	560
K3NEZ	368
W3MSR	309
W3VK	240
W3UIU	206
K3MNT	182
K3LUX	132
W3MGP	14
K3LVO	20
W4SVJ	4,700
W4JUJ	2,200
K4MPE	1,203
WA4FJM	949
W4HQS/4	840
K4RQE	91
K4TZP/4	53
K4UVT	25
K4ZRA	11
WA4BXZ	4
W5WZQ	4,100
K5OCX	2,210
W5DQK	1,950
W5KLQ	1,842
W5DWO	1,550
W5AWT	759
K5IGW	680
W5ARJ	323
W5GFT	196
K6CFJ	2,040
WA6FKN	1,451
WA6KNE	1,344
W6YC	1,053
K6ROU	870
W6AJP	720
WA6MWG	696
W6WLV	550
K6MPX	404
WA6DWH	319
W6OJW	272
KØQLY/6	262
WA6LGE	227
W7HKT	1,064
W7ULC	950
K7KHA/7	780
W7IEU	759
K7IWD	709
K7NFU	683
K7OFW	588
K7GFH	499
W7VIU	468
W7POU	451
K7NHV	300
W7ZRF	31
K8KFP	2,268
W8CXS	1,875
K8IPS	1,645
W8BQV	1,435
W8NAN	1,100
K8VTO	863
K8VIX	840
W8PYX	726
W8AJW	489
K8BXT	350
W8CAR	240
W8SS	224
K8CIP	175
K8BFZ	137
K8HTM	99
W8FWG	25
W8NC	4
K9KVK	2,320
W9LNQ	2,160
W9LKI	1,938
W9BZW	1,838
W9QQG	1,782
W9YAE	1,413
W9YDQ	1,202
W9RKP	1,053
W9UTQ	910
W9QWM	880
K9ASF	682
K9QKY	660
K9JSV	641
W9CHD	540
W9SFM	520
K9HRC	99
K9TZK	1
WØBTD	2,080
KØVTG	1,523
WØVBG	1,519
KØKCD	1,451
WØKCG	1,064
WØEMG	960
WØBYV	534
WØAUH	151
KØBQI	135
KØRTI	80
KH6DKA	165
VE1AE	112
VE2IL	1,575
VE2AQO	480
VE3EMA	863
VE3BPS	683
VE3EVK	63
DL4FT	100
DM2ATL	70
G3WP	1
IT1AQA	195
KA2JW	44
JA3AA	1
OH3TH	36
OH5RU	1
SM3ATG	1
SP5FZ	156
TF3AB	11
VP7BF	31
ZL2GS	162

YL PHONE

K1LCI	25,929
W1YPH	11,270
K1ADY	10,863
K1GSF	3,310
K1SLS	1,062
W1ZEN	744
K1RPI	237
W2OWL	1,236
K2JYZ	312
WA2CUZ	270
K3EHZ	11,326
W4WYR	14,599
WA4FEY	12,985
K4BNG	3,298
K4ZNK	1,311
W4KZT	595
W5DRI	52,448
K5BNQ	37,350
K5MJW	36,656
K5SBN	15,322
W5JCY	7,124
K5TXQ	1,696
WA6OET	16,470
WA6HKE	12,642
WA6LIZ	10,455
K6EXV	6,568
K7MRX	37,350
K7KSF	4,294
K7ADI	2,816
K8ONV	5,952
K8MZT	5,300
W8WUT	3,053
W8WRH	1,200
W8KLZ	630
K8VBO	320
W8LGY	150
K9QGR	18,400
K9AXS	6,175
K9TRP	5,632
K9LTQ	2,744
J9GME	1,275
W9ANO	825
K9TLZ	9
KØEPE	59,122
KØIKL	15,730
KØHEU	13,563
KØITP	12,420
W6WLD/Ø	10,155
KØGIC	10,350
KØHTQ	3,360
JA1YL	308
KP4CL	57,558
VE4PE	1,250
VE6RP	7,110
VE7BBB	531

OM PHONE

W1FDW	2,756
W1NEP	2,465
K1POA	2,000
W1GKJ	1,725
W4COW/1	1,610
W1BAB	761
W1FJJ	546
W1HOZ	425
W1VBR	228
K1TXK	147
W2COB	1,093
K2JTU	641
W2ASV	368
W2UNS	332
W3BVL	1,914
W3ETB	665
W3QLW	609
K3KKF	510
W3CDG	319
K3NEB	193
K3LVO	1
W4SVJ	4,485
K4JIG	3,741
K4STY	2,465
WØFHW/4	1,295
W4JUJ	750
K9VRV/4	558
W4DPN	176
K4UVT	90
K4RQE	1
K5MDX	5,569
W5NXF	1,568
W5DWO	1,189
K5OCX	1,188
K5UYF	468
W5PJW	437
W5GFT	196
W5AWT	64
K1SKH/5	44
W6FGJ	2,100
K6CJF	1,268
W6ANB	608
W6BWG	400
WA6MWG	345
W6AJP	132
W7SFK	2,553
W7KOI	920
K7NFU	840
W7NPV	784
W7ULC	714
K7IWD	193
W8AJW	2,516
K8CIP	1,645
W8AEI	1,283
W8BQV	863
W8NC	182
K8VIX	8
W9LNQ	1,487
W9LKI	1,350
K9LVK	1,295
W9UTQ	532
W9QWM	488
W9CRN	400
K9LXG	211
K9TZK	100
K9DVK	1
KØSCM	1,667
KØYWG	1,235
KØRFX	960
KØGPI	337
KØPLH	319
WØGZD/Ø	224
KØWWD	224
WØCZL	162
WØKCG	80
WØEUG	72
VE1AFP	206
VE2IL	5
VE3CBY	948
VE3AZX	79
VE5LD	930
VE6SB	1,073
KH6BPF	238
G3NFV	11
HM1AOP	15
JA9PGA	2
KP4AVQ	42
VP7BP	800
ZP9AY	25



For winning the 1962 WRONE Week contest, March 19–23, Joyce Garlick, K1OLM, of Tewksbury, Mass., received 100 Miss WRONE QSLs. The XYL of K1OLN 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.

W1ZEN, K1IZT, and K1EKO peer out of their Goldfish Bowl at passers-by who, oddly enough, walk rather than swim!

W1GLA "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 × 4½ × 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, umpteen trips rinsing and filling the coffee pot, washing cups and spoons, and so forth!

After about two hours of operation, we discovered the salesmen 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 bands, 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 lock up the receiver, but those TV sets proved to be amateur radio's best salesmen 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 W1GLA 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 W1GLA at that moment was none other than the YLRL President, Onie, W1ZEN. 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 W1GLA". 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, W1ZEN (President of the YLRL)
Blanche Randles, K1IZT (Secretary of the YLRLP)
Edie 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 hostessed 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 KØFPC advised us that KØONK made BPL every month in 1961. Attaining BPL honors is an achievement for any amateur, but KØONK, 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 WØZMR, 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, WØZSL, as my teacher. When my call KNØONK 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 Novice 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."

WA2GPT found a new world one-half an inch long!

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 "protege" 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.

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! — *K5HIU, 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 Contoocook 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. — *K9ZWV, 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. — *WØUGR, 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. — *WA2PYT, 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. — *KØLWN/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.

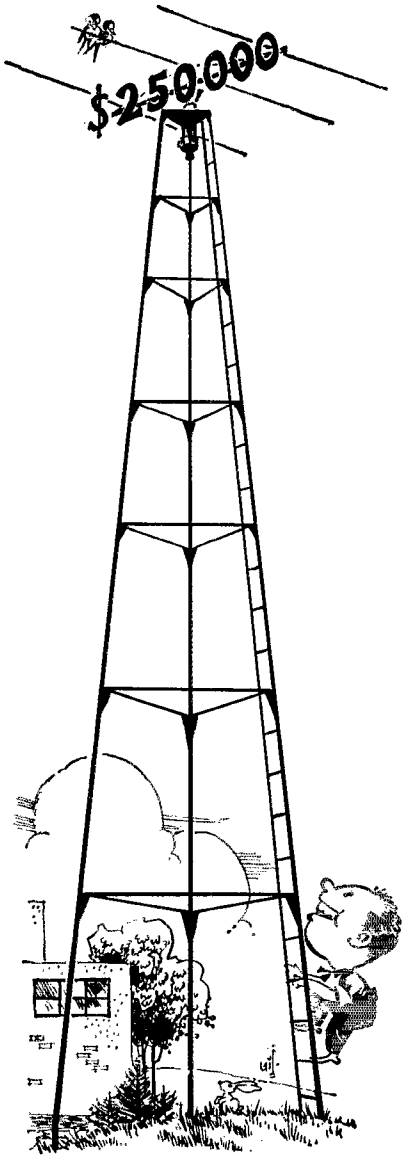
—···—

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 W1AW 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 praiseworthy 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 MaConomy, K7KUR/W6BUK, 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, K7LET, 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, Bronxville, 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 (Hi) 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. 94, 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, W8CCK, 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 WA2QPX, 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 transmissions 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.*

Strays

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 parental 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.

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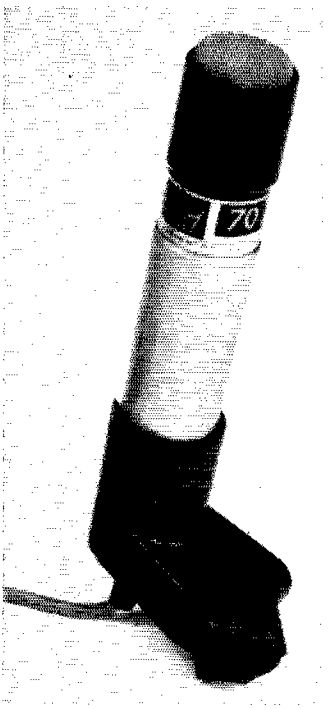
Interested in seismology? Contact Richard Byrd, K9IDS, 2651 W. Morse Ave., Chicago 45, Ill.

• New Apparatus

University Model 70 Microphone



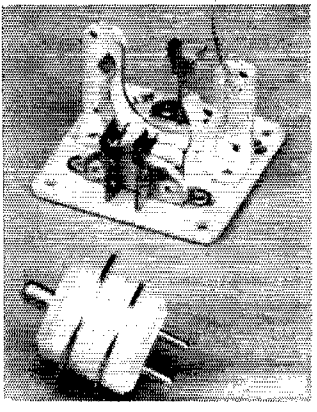
THE University Model 70 is an omnidirectional ceramic microphone finished in satin chrome and flat black. Following the modern trend in microphone design, the Model 70 is long and tubular in shape measuring about 1 5/32 inches in maximum diameter and about 6 inches in length. It weighs only 10¾ ounces. 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 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.

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 ⅛-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:

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.

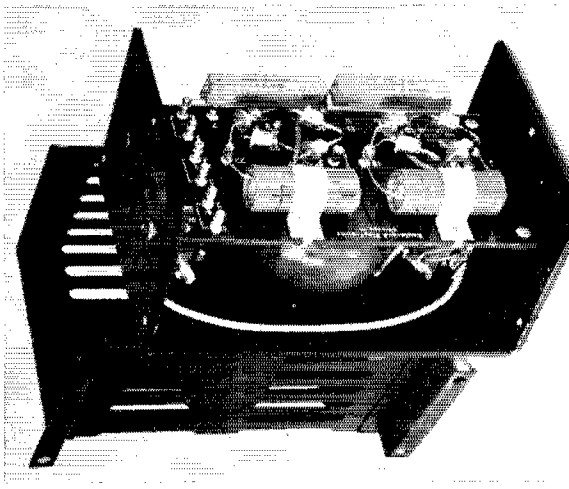
— *E. P. T.*

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.*

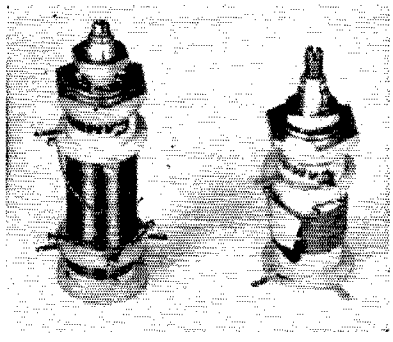
New Amateur-Band Coils

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, Guass'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 × 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. Safford, 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

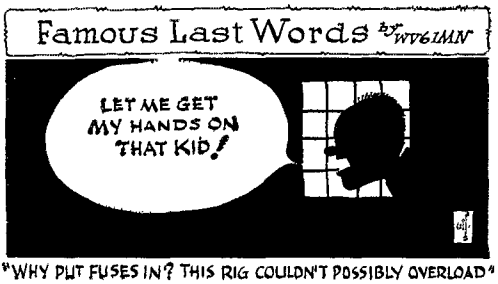
Amateur calls on neighbor to investigate problem. Discovers "oldie" TV set with rabbit ears, (ex 21 mc IF) vainly competing with auto idling in driveway. Amateur explains facts of TVI life to neighbor and extends invitation to ham shack.

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.



"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 hamdom 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.

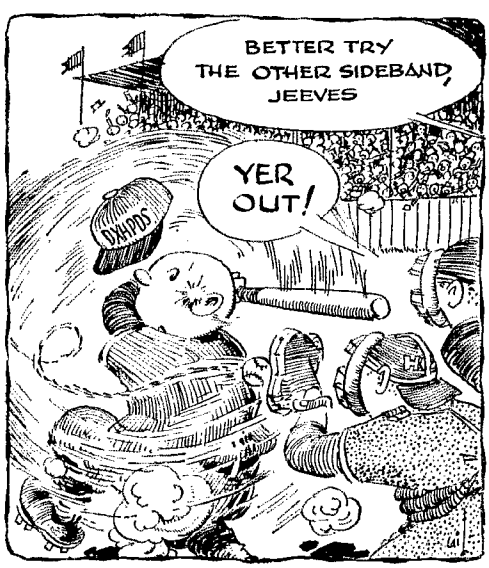
It wasn't long before a few exquisitely rare DX items found that they could escape mountainous 20-meter pile-ups by making 15 their chief hangout. Then many a 200-country DXCCer crept forth from his ancient 14-Mc. haunt for clean 21-Mc. shots at FU8AA, TA3AA and ZD9AA. Our new baby had really arrived!

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 ahead. Those memorable unexpected DX openings *will* come along, and sudden short-skip fun is a lively field in itself.

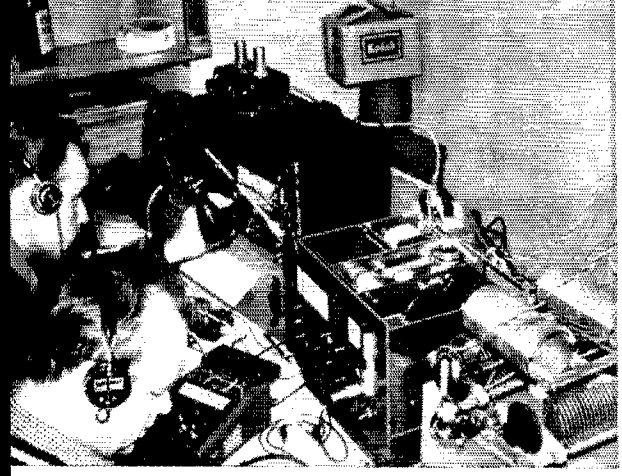
Much of this commentary applies to 10 meters as well. We suggest you keep a few 21/28-Mc. watts handy at all times henceforth, just for kicks. *Big* kicks!

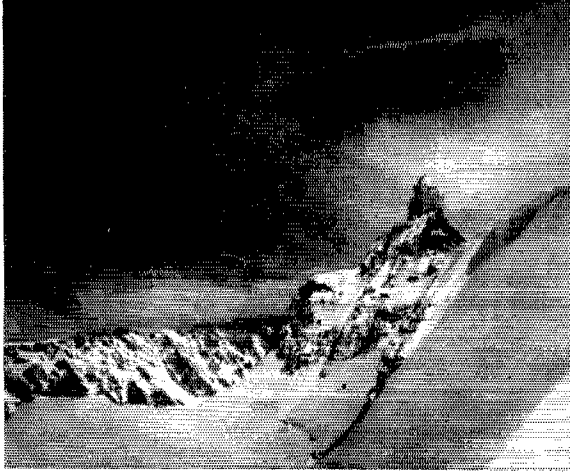
Due to the sudden illness of W9BRD's XYL we have to present a much-abbreviated version of *How's Dx?* this month. At deadline, Rod reports that his wife is now feeling fine, though she is still in the hospital, and he expects to have a full column for his fans next month.

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, 1fni's EA9DC, HC8MM, I5UF, M1B, MF2AA, MI3s DW RC RR, OE13SC, OQ5s CF VP WW, ST2GL, TA3AA, VSs 2BS 7FG, Ws 6HKH/KM6 ØEGY/KJ6, ZS2MI of Marion, and 4UAJ _ . . . _ On 20 c.w. we note C3MC, FD8AB, FKS8AB, FL8MY, FO7AW, HC8GI, HE9LAA, KT1OC, LBs 6XD 9Q, MI3s LK US ZX, OE13s IIP RN USA, OQ5s PE RA, TA2EFA, VK1RG, VRs 4AF 7AB, VSs 2CY 7GQ 7NG, W7LDY/KS6, YI3BZL, ZCs 2MAC 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 Zanzibar 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.



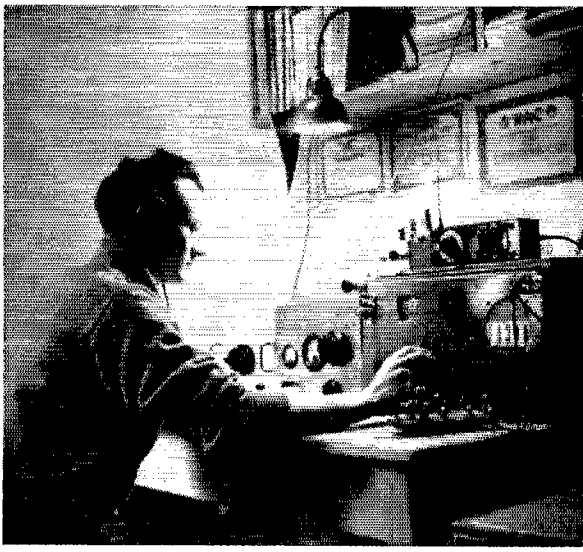
*7862-B West Lawrence Ave., Chicago 31, Ill.



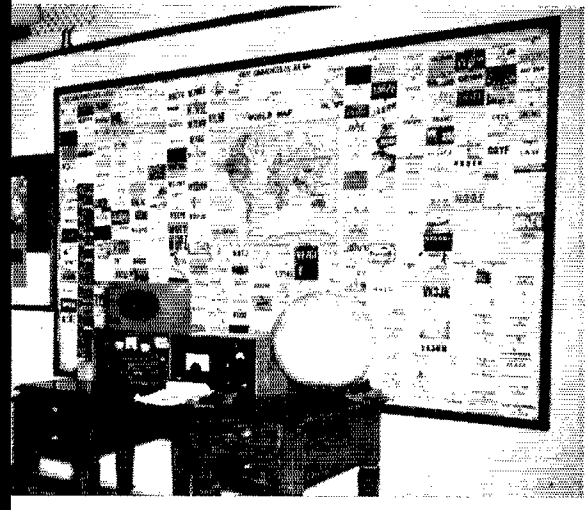


HB1ABU/vs, manned by HB9s ABU KC RC and a fearless s.w.l., spent the 1962 Helvetia-22 DX Contest in the Sphinx Observatory atop 12,000-foot Jungfrau-Joch with a 40-watt homebuilt rig, BC-348 and 70-foot wire. Zero temperatures, 80-m.p.h. winds, equipment difficulties and mediocre DX conditions held the 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)

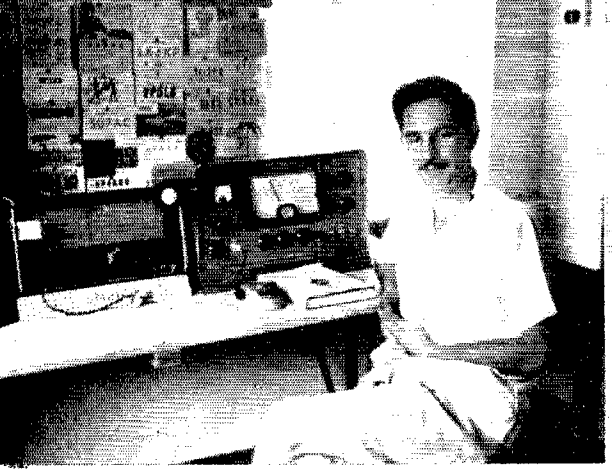
I1SVZ, aided by I1PGM, toted his Miniphase single-sideband outfit to San Marino for a three-day springtime DX sortie good for 1500 M1/I1SVZ contacts. Glauco anticipates an encore next month to some other rarish Mediterranean DXpeditionary target.



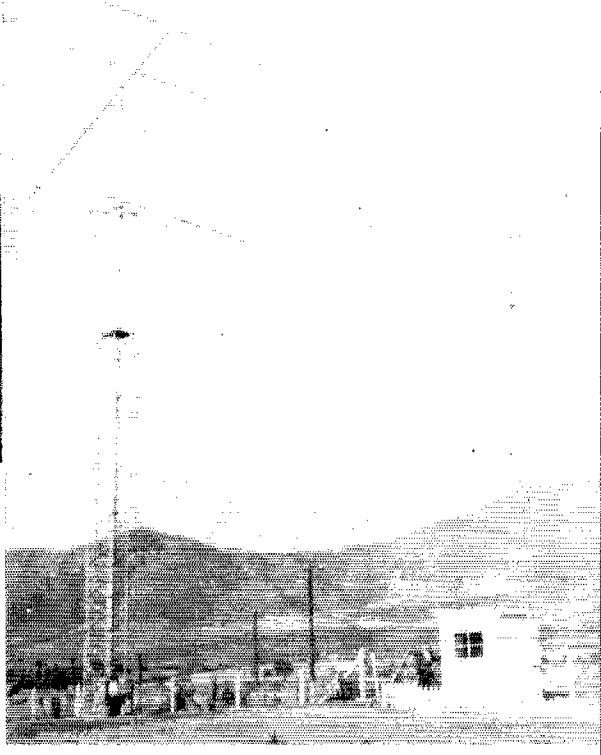
FA3OA (F2IC) manages frequent QSOs from troubled Algiers with his four-stage 807 transmitter, 12-tube double-con super and 150-foot long-wire, all homespun. Mike has amassed 146 countries and 3000 W/K friends, mostly via c.w. on 7 through 28 Mc.



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[1]....826,677-2963-93
W4KFC.....728,856-773-318
W3ECR[2].....665,873-743-299
W3GRF.....642,252-716-299
K2DGT.....571,896-676-282
W4DQS.....542,049-643-281
W8FGX.....475,323-589-269
K4TML.....455,400-575-264
W3ALB.....453,000-604-250
W0AIH/VE3..441,636-596-247
YV5AGD....435,150-1934-75
W4RQR.....434,134-553-262
W1B1H.....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.....266,104-1434-62
W5CKY.....265,200-400-221
G4CP.....264,300-1506-60
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....228,222-409-186
W3MFJ.....227,151-423-179
TI2CAH.....223,768-1097-68
W6KG.....223,440-392-190
W6LDD.....220,500-375-196
W2ESO.....219,770-358-205
WA2IZS.....217,704-383-188
K4LPW.....215,340-388-185
W9RQM.....214,032-364-196
K1RTB.....210,541-442-173
W7PGS.....206,853-363-191
GI3OQR....206,550-1230-56
W0BMM....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
W3KFQ.....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.....200,070-390-171

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
W4BVV.....242,688-422-192
HC1AGI[1]....231,264-1056-73
HI8DGC.....230,434-1334-58
KP4AWH....220,728-1083-68
VP5BP.....201,756-990-68
K2IEG.....194,706-373-174
W9DUB.....186,394-347-174
FS7RT.....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
CT1YE.....119,350-801-50
W2WZ.....117,249-323-121
W3TLN.....112,395-295-127
K1RTB.....108,480-316-120
W3WJD.....106,714-280-126
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
W8NGO.....159,852-346-154
CO8RA.....141,236-693-68
W3KFQ.....132,678-351-126

[1] HC1DC/W3EIS, opr; [2] W3MFW, opr.

The World Above 50 Mc.

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.

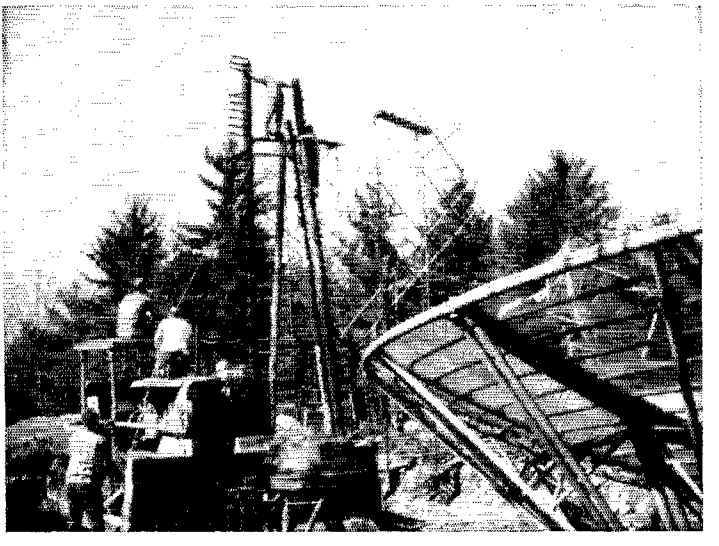
The simplest explanation of our failure to make it "two-way" is the cloud cover experienced by KH6UK. As W2AZL expresses it: "There is a new kind of QRM on v.h.f. Clouds!" One of the disadvantages of an el-az mount is the difficulty of tracking the moon. With a polar mount, you can set your declination with a protractor and drive your hour angle with a clock. An el-az mount must be driven both in elevation and 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-

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



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 XE1OE was getting into Texas with 5/9 signals and that a couple of KP4s were heard, plus Mississippi and Louisiana. Also the news was passed along that XE1OE 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 KH6 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 XE1OE, 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, W3BWU, who worked CO3NR and CO2XG on April 28. Also heard and worked in Pittsburgh were Louisiana, Florida, Kansas, Missouri, plus other ø 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 K5PPM in Arkansas kept plowing through even when the others dropped way down in signal strength. Between 2240 and 2250, K5PPM, K5IPQ W4YMM and WA4BNL 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
W1RFU	24	7	1120				
W1AJR	23	7	1130	W6WSQ	15	5	1390
W1MMN	22	8	1200	W6NLZ	12	5	2540
W1HDQ	22	6	1020	W6DNG	6	5	1040
W1IZY	20	7	1180	W6AJF	6	3	800
K1CRQ	19	6	800	W6ZL	5	3	1400
W1AFO	18	6	920	K6HMS	4	3	850
K1AFR	17	5	450	K6GTG	4	2	800
				W6MMU	3	2	950
W2NLY	37	8	1300				
W2CXY	37	8	1360	K7HKD	13	5	1130
W2ORL	37	8	1320	W7JRQ	12	4	1040
W2BLV	36	8	1020	W7LHL	5	3	1050
K2GQI	35	8	1365	W7CJM	5	2	670
W2AZL	29	8	1050	W7JIP	4	2	900
K2IEJ	27	8	1060	W7JU	4	2	235
K2CEH	25	8	1200				
K2LMG	25	8	1160	W8KAY	38	8	1245
W2AMJ	25	6	960	W8PT	38	9	1260
W2ALR	24	8	1100	W88DJ	37	8	1220
W2RXG	23	8	1200	W8IFX	35	8	980
W2SMX	23	7	1090	W88FG	34	8	1040
K2HOD	23	7	950	W8LOF	33	8	1060
W2DWWJ	23	6	860	W8RMH	32	6	910
W2PAU	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
W2WZR	19	7	1040	K8AXU	29	8	1050
W2RGV	19	8	720	W8LPD	29	8	850
W2RLG	17	6	980	W8WRN	28	8	680
K2JWT	16	6	550	W8DX	26	8	720
K2DDK	13	5	465	W8ILC	25	8	800
WA2JFA	10	4	340	W8JWV	25	8	940
WA2PGY	8	5	266	W8WNM	25	8	900
				W8GFN	23	8	540
W3RUE	33	8	1100	W8LCY	22	7	680
W3GKP	31	7	1180	W8BLN	21	7	610
W3SGA	31	8	1070	W8GTR	17	7	550
W3TDF	30	8	1125	W8NRM	17	7	550
W3KCA	28	8	1110				
W3BYF	28	8	1070	W9KLR	41	9	1160
W3EPH	32	8	1000	W9WOK	40	9	1170
W3LNA	21	7	720	W9GAB	34	9	1075
W3LST	21	7	800	W9AAG	33	8	1050
W3NKM	20	7	730	K9AAJ	31	8	1070
W3LZD	20	7	650	W9REM	31	8	850
K3HDW	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
W4LTU	34	8	1160	W9ZHL	25	8	700
W42XI	34	8	950	W9BPV	25	7	1030
W4MKJ	33	8	1149	K9AQF	24	7	900
W4AO	30	8	1120	W9LF	22	7	825
W4VLA	26	8	1000	W9KPS	22	7	690
K4EUS	26	7	1130	K9SGD	21	7	1100
W4EQM	25	8	1040	W9CUX	21	7	800
W4AIB	25	8	900	W9ALU	18	7	800
W4WNH	24	8	850				
W4JCJ	23	6	725	WØBFB	37	9	1350
W4VVE	23	6	724	WØIHD	31	8	1030
W4RMU	21	7	1080	WØSMJ	29	9	1075
W4TLV	20	7	1000	WØLFE	28	7	1050
W4IKZ	20	6	720	WØQDH	27	9	1300
W4OLK	20	6	720	WØRUF	23	7	900
W4LNG	19	7	1080	WØIC	22	7	1360
W4RFR	18	9	820	WØMQX	22	6	1150
K4YUX	18	8	830	WØINI	21	6	830
W4CPZ	18	6	650	WØTGC	21	7	870
K4VWH	18	6	590	WØRYG	20	8	925
W4MDA	17	6	757	WØENC	20	6	1100
				WØAZT	18	7	1100
W5RCI	37	9	1215	WØJAS	18	6	1130
W5AJG	32	9	1360	K9AQJ	16	6	1120
W5FYZ	30	9	1275	WØIFS	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	VE3AQG	18	8	1300
W5ML	16	5	700	VE3DER	17	8	1340
W5KFU	13	4	1300	VE3HW	17	7	1350
W5FSC	12	5	1390	VE3BPB	14	6	715
W5HEZ	12	5	1250	VE2ABF	10	4	580
W5SWV	12	4	745	VE7FJ	2	1	365
W5CVW	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.

KIDTR 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 WØFGL 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-oo-o. Down in Hermitage, Tennessee, WA4AJC 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.

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 K7HJO, 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 emergency. 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

That grin is probably the result of state No. 5 on 220 Mc. for Charlie, W4TLC.

220- and 420-Mc. STANDINGS

220 Mc.

W1AJR	11	4	480
W1AZK	9	3	412
W1HDQ	11	5	450
K1JIX	10	3	
W1OOP	12	4	400
W1RFU	15	5	480
W1UHE	11	4	385
W2AOC	13	5	450
K2AXQ	8	3	230
WA2BAH	4	2	167
K2CBA	13	6	650
K2DIG	4	3	140
W2DWJ	15	6	740
W2DZA	12	5	410
K2ITP	11	5	265
K2ITQ	11	5	265
K2JWT	6	3	244
K2KIB	12	4	300
W2LRJ	10	4	250
W2LWI	12	4	400
W2NTY	12	5	300
K2PPZ	11	4	190
K2QJQ	13	5	540
W2SEU	4	2	150
K2UUR	4	3	105
W3AHQ	4	3	180
W3FEY	10	5	350
W3JYL	8	4	295
W3JZI	4	3	250
W3KKN	10	4	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	1	315
W4UYB	7	5	320
W5AJG	3	2	1050
W5RCI	8	5	700
K6GTG	2	1	240
W6MMU	2	2	225
W6NLZ	3	2	2540
K7ICW	1	1	250
K8AXU	10	5	1050
W8IJG	9	5	475
W8LPD	6	4	480
W8NRM	8	4	390
V8PT	10	5	660
W8SVI	6	4	520
W9AAG	9	4	660
W9EQC	11	5	740
W9JCS	6	2	340
W9JEP	9	4	540
W9OVL	6	3	475
W9UED	4	4	605
W9ZIH	10	5	500
KØDGU	5	3	425
KØITE	6	3	515
KH6UK	1	1	2540
VE3AIB	7	4	450

420 Mc.

W1AJR	10	4	410
W1HDQ	8	3	210
W1MFT	8	3	170
W1OOP	11	3	390
W1RFU	7	4	410
W1UHE	6	4	430
W2AOD	6	4	290
W2BLV	12	5	360
K2CBA	5	3	225
WA2DTZ	6	3	200
W2DWJ	10	4	196
W2DZA	5	3	130
K2KIB	4	2	100
W2NTY	3	2	100
W2OTA	10	4	300
K2UUR	7	3	175
K3CLK	9	4	
K3EOF	6	3	250
W3FEY	7	3	296
W3LCC	2	2	
W3RUE	2	2	96
W3UVG	6	6	4
W4HHK	6	4	550
W4VVE	7	4	430
W5HTZ	5	3	440
W5RCI	10	3	600
W6GTG	1	1	180
W7LHL	2	1	180
W8HCC	3	2	355
W8HRC	3	2	250
W8JLG	4	2	275
W8NRM	3	2	390
W8PT	6	3	310
W8RQL	4	2	270
W8TYY	9	5	580
W8UST	3		255
W9AAG	5	3	375
K9AAJ	4	3	425
W9GAB	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 Fletch 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 hs 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 AB_2 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 nightly and will shortly be on the prowl for 144-Mc. DX again.

K9EIV 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, W1MEH, W1BDF, W1HDQ, W2UM, W2QZ, W2KR, W2ALK, W2KDX, W2LFL, WA2DIR, W2NCF, W2JJG, W2HEA, W2HNY, W2BXA, W2IMB, W2KEO, W2TMN, WA2GWN, 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, WA4GHK, 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, WA4GHK. 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 2200 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; W4UWH, Auburndale, K4QXX and W4UQD of Bradenton and K4QKR/4 at Orlando; all in Central Florida. Better watch out for Til 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

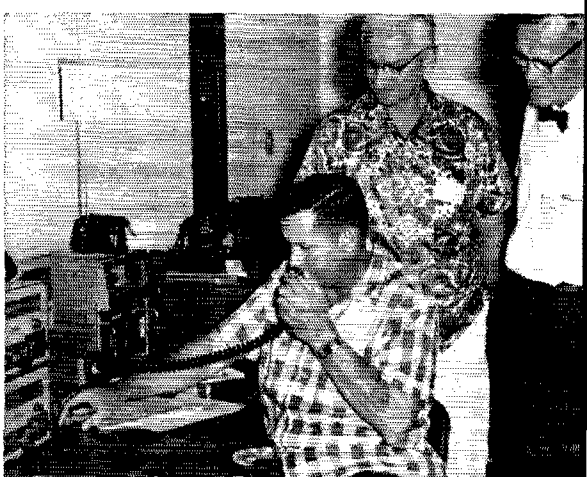
It is with deep regret that we record the passing of these amateurs:

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 Caggiano, South Burlington, Vt.
W3BCO, Donald L. Miller, Wormleysburg, Pa.
K3MIZ, John L. Williams, Clairton, Pa.
W3VEB, Anton C. Thom, Silver Spring, Md.
W3ZWJ, Harold S. Daniels, Everett, Pa.
W4EOE, William G. Tattersall, Jacksonville, Fla.
W4IK, Withers R. 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, Gaylerd E. Andrews, San Francisco, Calif.
WA6LHC, Jesse M. Jones, Riverside, Calif.
WV6NGX, Arthur M. Greenwell, San Diego, Calif.
WV6PNP, Marianna E. Wirth, Escondido, Calif.
K6SXM, Harry Blackstone, Inglewood, Calif.
W7FCU, Oscar O. Russell, St. Maries, Ida.
K7HMJ, 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. Peek, 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 innoculation, 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, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
JOHN F. LINDHOLM, W1DGL, Ass't. Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, 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*	K4IWI*	W8EMD*	W9GFF
W1AUQ	K4ZRA	W8IBX	W9RKP
W2BLP*	W5BKH*	K8EEB	K9GDF
W2TPJ	W6WLI*	K8LOS	KØAZJ*
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 14–16: 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.

Per cent 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.*

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for April Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	41	1156	989	146	2332
K6BPI	96	1085	970	115	2266
W0LGG	462	788	707	81	2338
W3CUL/4	23	898	872	10	1801
K4AKP	36	741	640	98	1515
W9IOZ	13	707	719	1	1440
W3LVS	1	577	744	19	1341
K0ONK	155	570	508	31	1262
K3IMP	100	563	538	19	1220
K4SJH	51	559	443	15	1068
K6EPT	20	520	300	220	1060
W3EML	14	519	484	41	1058
W5ICQ	11	514	509	5	1039
W8DAE	37	527	362	110	1036
W1PEN	26	478	449	15	968
K2UAT	172	491	378	7	958
W7BA	5	466	431	34	936
W6WPF	34	441	426	15	916
WA4BMC	151	343	336	20	850
W3WRE	30	399	371	25	825
W9DYG	50	396	311	47	804
W8UPH	6	394	320	74	794
WA2GPT	375	293	77	46	791
K2UBG	15	390	347	14	766
W3VR	14	377	349	6	746
W0SCA	15	354	351	1	721
W7DZX	11	380	285	32	708
K0LTJ	301	201	109	92	703
W1TXL	74	302	286	16	678
W4PL	15	320	282	21	638
W9IDA	17	308	306	2	633
K4KWQ	8	310	280	23	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
W2EW	119	221	111	106	557
K9UGY	26	261	254	10	551
K7NHV	53	244	238	14	549
W4DLA	18	257	252	8	535
W8CHT	46	240	223	18	527
W3YYC	18	255	193	53	519
W6GYH	106	207	190	14	517
WA8AJN	0	252	248	3	503
Late Reports:					
W3IVS (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*
W6IAB	95	1137	1092	68	2392
W6YDK	1047	429	399	24	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*

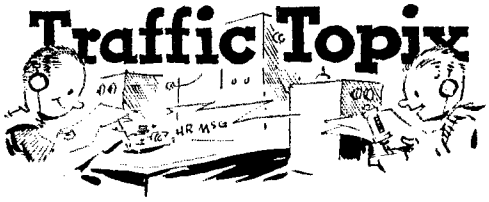
K3WBJ 209	K8ZZW 137	K9LXS 109
K4THG 206	W9NZZ 131	W2GKZ 107
K2UCY 173	K0RPH 124	K4HOE 107
W4NTR 165	K4FSS 119	WA2UZH 105
	K0HGI 117	
K6GZ 163	K3DCB 111	K2ASP 104
WA2JHQ 152	W9RTH 111	K3JYZ 104
K8KMQ 145	W3RV 110	K1GGG 103
WA2EDG 137	K9YIC 110	WA2CCF 101

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, K4PQL.

The BPL is open to all amateurs in the United States, Canada, and U. S. Possessions who report to their SCM a message total of 500 or more or 100 or more originations plus deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt, in standard ARRL form.



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 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 "nummer fi'hunnert niney t'ree," say "number fiyev niyen 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 receipting 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. — *W1NJM.*

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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

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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	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
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
ECN	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.); RISPN (R.I.); MDD & MDDS (Md.-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.

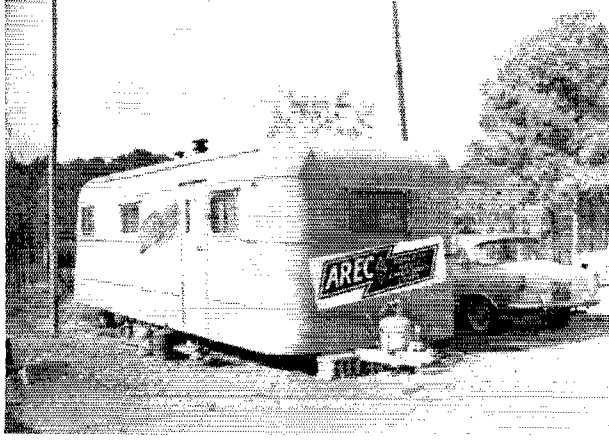
W8SCW, after over a decade at the helm of EAN, has announced his intention to resign as soon as a qualified replacement can be found. This won't be easy. QRN is beginning to wreak havoc on CAN; W9DYG says the CAN gang is the best bunch of ops, most reliable, most helpful and patient to be found anywhere. PAN is remaining on GMT, as are most of NTS nets in Pacific Area. W1BVR QNCs 1RN net statistics on the net early each month. W2EZB 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 WØFEO's time, but TWN continues to get better every month.

Transcontinental Corps. Failures were "up" in the Eastern Area this month; W1SMU 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*	*% Successful*	*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 (W1SMU, Dir.) — *W1s* EMG NJM OBR SMU, W2MTA, K2UAT, *WA2s* APY OPG, *W3s* EML FAF WRE, K3RXQ, *W4s* DLA FOR *W8s* CHT ELW UPH. Central Area (K4AKP, Acting Dir.) — K4AKP, K9UGY, *W9s* JOZ DYG CXY ZYK, *KØs* RCF OVQ, *WØs* DUA SCA. Pacific Area (W7DZX, Dir.) — W5ZHN, *K6s* ZYZ GID, *W6s* EOT FNE HC, WA6ROF, *K7s* NHV NWP, *W7s* DZX GMC ZB, *KØs* EDK DTK EDH, *WØs* WHE/7 WME 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 RTTY 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.

W3TMZ	239,040-747-64
K4PUZ	230,480-684-67
K4BAI	214,825-654-65
W4MLE	208,325-633-65
K2EIU/2	201,545-637-63
KØYRQ	172,980-552-62
K4TEA	172,575-527-65
VE7AAF	169,975-517-65
K8MTI	167,265-526-63
KØIVQ	154,635-501-61
K5OCX	146,560-452-46
W8AEB	138,300-456-60
K6BHM	136,500-448-60
W9YT[1]	134,230-427-62
W4BZE	131,570-441-59
K1LPL	128,030-427-59
W1SWX/1	127,575-400-63
W2GKZ	124,200-407-60
K6LKD	121,800-401-60
WA4FJM	120,170-387-61
W9QQG	117,450-400-58
W7BAJ	117,120-377-61
WØETT	114,560-354-64
W4LK	107,970-366-59
W7IEU	107,665-349-61
K4ZYI	107,260-342-62
W1MX[2]	107,010-362-58
W6WX	106,950-338-62
KØQCQ	106,500-350-60
W2MTA/2	106,445-344-61
W6YK	103,200-337-60
W2CVW	103,040-361-56
W4KFC	103,040-361-56
K1MZB	102,579-368-55
KØQWY	102,300-330-62
W8VPC	101,990-322-62
K3KMO	101,185-336-59
K3JIQ	101,075-311-65
K4JLD	100,800-336-60
K3ANU	100,340-341-58
KØAZJ	100,320-348-57
W3YA[3]	180,810-567-63
K3JCT[4]	143,650-438-65
WA6GFY[5]	137,100-457-60
W5YU[6]	120,655-402-59
W8IXJ[7]	117,705-399-59

PHONE

K4YZT	9520- 65-28
K4BAI	8880- 67-24
W1PYM	8050- 65-23
K8RMK	7155- 48-27
K1MEM	6705- 56-21
W1MX[2]	5980- 45-23
K2QDT	5400- 54-20
K2SSX	5280- 43-22
K5MDX	5040- 42-24

[1] K9ELT, opr.; [2] K2KIR, opr.; [3] K3AHT, W3GYP oprs.; [4] Multioperator; [5] WA6BSO, W6CUF, WA6HRS oprs.; [6] K4DRO, K5HSJ, oprs.; [7] W8IXJ, 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.

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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. — *W1NJM*.

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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.*

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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 EVE EVI QOK, *W3s* HYY BOM TAL TRU USW NAE. Another fine example of amateur service rendered as a result of preparedness.

KØMMS, EC for Sioux City, Iowa, reports to Red Cross that evacuation of his part of the flooded area is complete.

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 CZQ DON DPH EFK ERV FKC GBL JFZ JUK KGS LSU MFY MMQ MMS QII QKX SIC SLY SZJ TFT THE UAF UAH VEJ VND WIZ WLX WVS YFF YHN YZP ZEO ZFU LAC LYO OCK RIS, *WØs* AXE BXD CDK CRF CXN DAM DJU DOF EMI EPQ EQN EYR FBY FKZ FNF FZO GQE ILW JAQ MHC NRG OSO POD SDV DUL, WAØMCW, W4MYV, W7ZLY, K9LEY.

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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, Waretown, 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 Waretown and Forked River, thence to e.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, *WA2s* QOL QOW QPD AWE.

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 GQY EDJ JPJ DKM, *WØs* EFG GYC TBR DIT YOZ OBQ NWX TJA MHC BJW JDV FDM KMU MEL VQX GQE SCT AYC ZDT EIY, K9KZB. — *KØVBM, EC Northwest Iowa.*

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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.*

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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 EFV JFF DCV OTV RLS AVM JJW WOW CVV EHK RDN GVT YBU YXS KVM FDZ JQI MTG, *KNØs* KYR TZQ, *WØs* EFM ANZ JPJ PGJ KVJ RFC PTL, *WAØs* ASL ANT, *WNØs* ATR ATT BSM. — *WØPTL, EC Black Hawk Co., Iowa.*

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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 K4QOJ, 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 K4WIV/4, 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.*

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Thirty-one SECs submitted reports for March activities, representing 14,460 AREC members. Last March we had 34 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?), 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 irk 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!

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.

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 2200 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 *WØEFL/Ø*. Mobile units were *KØs* EAA UTC OTV TFW and WØDGY. Other amateurs taking part were *KØs* BSZ HTK GBD JRM, *WØs* EFL LGG GJT BDZ UJC FIP KXT, *WNØs* AIO AJG. Said the Mayor of Marshalltown: "I cannot find enough words to express the city's appreciation." — *KØEAA, EC Marshalltown, Iowa.*

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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. KØHEA, 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: *KØs* HEA ZCS RIH QXT JRV CLO VYT ALD RVS SAF LCE LUP ALZ LUN YPR FGR SWE BCA HPQ LUG SVR TXL HRO, *WØs* REM LRY QHB PKW PKH BBE NXD IVI DEJ SVD. — *WØMJH, RO/EC Polk County, Iowa.*

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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* GLM KEC NSN, *W1s* WNP LMZ 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, *WJs* GHM APS ZUT NBO YSK OPZ HQZ. — *WØYSK*.

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
W4DQH....307/319	W9RBI....305/318	LU6DJX....302/314	W1CLX....301/312	W7GBW....300/312
W6CUQ....307/320	W3KT....305/317	CE3AG....302/314	W8KIA....301/313	CX2CO....300/312
W2AGW....307/319	W8DMD....304/315	W2HMJ....302/313	W5MMK....301/312	W1BIH....300/312
W3GHD....307/319	W8BF....304/315	W6AM....302/315	W9HUZ....301/312	W2LPE....299/311
W8BRA....306/318	W5ADZ....304/315	WØQVZ....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	VQ4ERR....301/313	CX2CO....299/311	W8KML....297/308
W8GZ....305/316	W7PHO....301/310	W4DQH....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....166	CX6CB....111	W6OMR....104	W4JDM....102	W3AIZ....101	W2TOC....100
VQ4DW....133	VE1CD....108	HB9PP....104	K4YXJ....102	K3HQJ....101	K4LPR....100
W8WBT....128	OK1FV....108	WA6GFE....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	W4SVJ....106	YU3IE....103	W1TIW....101	W2FOO....100	VE3DEB....100
PY7MP....113	UR2KAE....105	K1PNN....102			

Radiotelephone

CR6DB....123	KØOYQ....112	W8FAW....106	W9EXY....103	K9AZB....101	W7DQM....100
W2WMG....120	VQ4DW....111	VE3CBY....106	W1QCO....101	W5CME....100	W9ZKB....100
W6PHN....120	WA2EOQ....110	K9ZEQ....105	W6RLC....101	K6SSX....100	KØWKE....100
G3KLL....117					

Endorsements

W6BZE....300	W1QJR....239	W2ZVS....200	VE3TB....169	WA6TGY....143	K9RZV....130
W9AMU....300	W3MWC....239	W4HUE....200	K1DMG....162	K9MGF....143	F8DF....130
W9YSX....300	W2AYU....238	W8KMD....200	W2MES....162	I1IF....143	PAØVER....129
VK2ACX....300	VE5RU....233	W4IUO....199	K1MOD....160	W8NAN....142	W5EJV....125
ON4DM....292	OE1FF....232	K5ESW....197	WA2CBB....160	W9MQZ....142	CR6DB....123
W7WVE....290	W1FQA....231	W6PHF....193	W4AVY....160	K2OUS....141	W9YTQ....121
W4KCL....281	W9LTR....231	W3MSR....192	HB9HZ....160	W1JVZ....140	W1DDO....120
WØMLY....280	W1RAN....230	W9EXY....188	ZS5KU....160	K2FQ....140	W2ASY....120
VE3BWY....272	W6KG....230	K6IBG....184	WA2AEI....152	K4GXK....140	W2CUE....120
K4AIM....271	W8IBX....230	W2BXA....180	W4EEU....152	K4SCT....140	WA2FQG....120
W2IRV....270	DJ3JZ....230	W2QDY....180	HB9TU....151	W7AIB....140	W2NCG....120
W5BRR....270	K9PPX....225	W5LEF....180	K2BG....150	K9JLR....140	K3CUI....120
W8SA....262	W4HYW....222	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	W6CHL....175	W7JWE....150	K1MEM....134	5U7AC....120
VE3ES....257	W5NUT....210	4X4CJ....173	K8PUU....150	W8QNW....134	VO2NA....115
W8SZS....255	W7ATV....210	K2MMS....171	W9FKH....150	HB9BJ....134	W2ELW....112
W1ACB....251	IIFO....210	VE7QL....171	WØRZU....150	W1IP....133	OH2EW....112
W3WU....250	W3JZY....208	DL9TJ....171	VE2AFC....150	W4NJF....132	W7DQM....110
W1UOP....242	WØEWH....203	W3YZI....170	OA4HK....150	W5RU....132	W1SIK....110
W3MAC....240	W8JXY....201	W4LZW....170	W7BPS....146	W4QMJ....130	WA6MWG....110
W7ZAS....240	W9QFC....201	W8JAQ....169	WA2EGK....143	W4QVJ....130	W9HGP....110
K8LSG....240					

Radiotelephone

PY4TK....300	VE5RU....217	VE3ES....179	W4DLG....151	W1PNR....140	W4CWO....130
W9YSX....292	W8SZS....201	K9PPX....175	NZ2SY....151	HB9RB....137	W2FGD....121
K4AIM....265	YV5AIP....200	DJ3CP....177	K1IDW....150	KP4CL....136	W4NJF....121
W1PST....255	W7ZAS....195	YV5ANQ....172	K8LSG....150	W4HUE....135	W2OWL....119
W2LV....247	W9ILW....192	W3JZY....166	K8PUU....150	W4EEU....134	W4IKL....118
YV5AB....244	K2JFV....190	ZS5PG....165	KØTJW....150	W4IUO....134	WA6MAZ....118
W1UOP....242	W9LTR....190	W8JXY....163	W2PTM....142	W7BPS....134	K1INO....110
W1CLX....240	W1LSZ....182	K2TAP....160	VE2WY....142	K2JMY....130	W2ELW....110
ON4DH....240	DL6FC....182	KG4AO....154	VE3BTI....142	K2OEA....130	K9VRV/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 fist, 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 Wavemeters 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 Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request. The station will be closed 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.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3DUI. RM: W3EML. PAM: K3BHU. V.H.F. PAM: W3SAO. 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. W3UIU received the Frankford RC Award. W3RV is now 65 years young. With the time change a lot of operators, including K3MQE, 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 for the Professional Freeloaders Convention announcement which should have more appropriately *Three Feathers*. New club officers: Oxford Circle Radio Assn.—K3ALU, pres.; K3BFW, vice-pres.; K3ALD, secy.; K3HYT, treas.; K3JSJ, act. mgr. Lancaster Radio Transmitting Society—W3JPS, pres.; W3MIZI, vice-pres.; W3OY, secy.; KN3-RZE, treas. Lehighton High School ARC—K3JLW, pres.; K3JHT, 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. KN3SME had his first QSO with KN3RVZ as a starter. K3ETS worked Florida with a "Sixer." W3GRS added HKØAB 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, K3IMP 1220, W3EML 1058, W3VR 746, W3HNK 564, K3GSU 424, W3LNW 387, W3RXQ 241, W3UIU 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, K3LKQ 39, K3JLW 34, K3NBU 31, K3CAH 30, W3LC 27, W3AXA 26, K3KJI 22, W3ADE 16, K3ANU 14, W3EEN 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. F. 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 8 and 2 Club, K3EEB; First State, K3JXR; Kent ARC, K3LGC. New officers of the Kent Country ARC are K3LGC, pres.; K3OCI, vice-pres.; K3OPF, 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 engineering assignment in Teheran, Iran. K3DCP had visitors from Kansas, KØZZF and his XYL KØZZE. 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 on 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. K3NMK 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 Taunytown, 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. K3MDL used a motor scooter and walkie-talkie in the transmitter hunt. W3OHI put up a two-element 15-meter beam in the attic. KN3SFT 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 FMT. Three BPL certificates were issued for April traffic. Traffic: W3YYC 519, K3JYZ 272, K3WBJ 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, K3MDL 2.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs.: W2-HDW, WA2VAT, WA2OVR, Trenton, is the new Mercer County EC. K2RXB, Margate, has gone s.s.b. WA2VAT, 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, W2QWC, K2RXB and W2TLO. W2ZI, Trenton, was guest speaker at the Gloucester Co. RC. WA2BLV, 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, WA2EIY 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) *News*. Recent training classes produced 55 new operators, bringing the school total to 126. W2ADA, Palmyra, 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, K2RXB 107, WA2VAT 92, W2JQU 72, W2ZI 36, WA2BLV 23, K2SOX 13, K2CPR 12, WA2-WNC 8, W2IU 7, W2BZJ 4, WA2KWB 2, WA2MEQ 2, WA2HJD 1. (Mar.) WA2HJD 14.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE. RMs: W2RUF, W2EZB, W2FEB. PAM: W2PVI. 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 1960. 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 WA2LVW, 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?

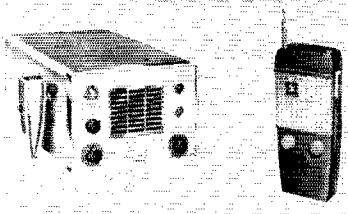
— R. W. "BUD" DROBISH, W9QVA

Lewis Marshall K9EBE W. J. Halligan 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!



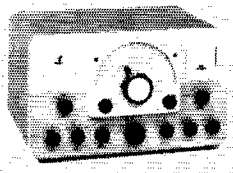
10 METER "MESSENGER"—For base station or mobile use! Instant selection of five crystal frequencies in range of 29.4 to 29.7 mcs., within a 300 kc segment of 10-meter band. 10 watts AM input—10 tubes (including rectifier). Super-heterodyne receiver—excellent sensitivity and selectivity! ANL, AVC, and "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**

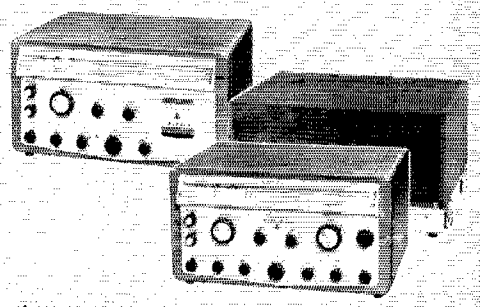
Cat. No. 242-104 1 watt (less penlight cells) Amateur Net **$129.50**



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!

NEW STYLING ...NEW FEATURES!

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.

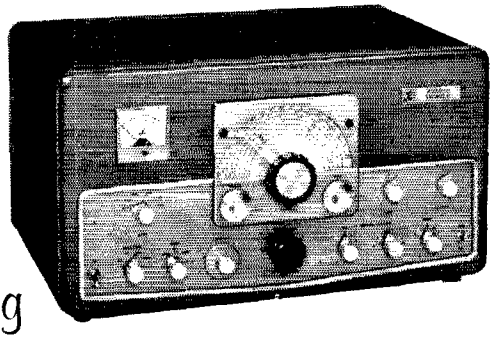
AS AN EXCITER—The "Valiant II" will drive any of the popular kilowatt level tubes, and will provide a high quality speech driver system for high powered modulators. The 9-pin receptacle on the rear of the transmitter brings out TVI filtered control and audio leads for exciter operation . . . Also permits 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.

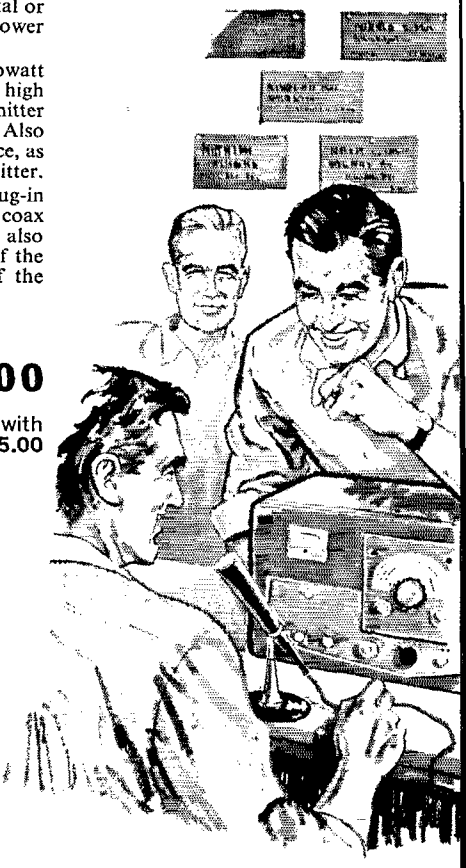
SSB OPERATION—New in the "Valiant II" are provisions for plug-in SSB operation with no internal modifications necessary. Rear panel coax fittings are provided for VFO output and SSB input, and a 5-pin plug, also located on the rear panel, provides connections for remote control of the final amplifier 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 $375.00**

Cat. No. 240-105-2 Viking "Valiant II" wired and tested with tubes, less crystals..... **Amateur Net $495.00**





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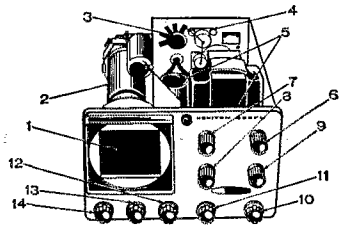


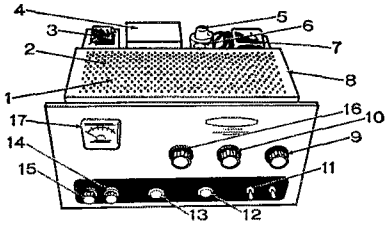
HEATHKIT AMATEUR MONITOR 'SCOPE...just $59.95

1. 3" CRT **2.** Neckshield minimizes external field effects **3.** RF attenuator accommodates 5w to 1 kw power levels **4.** Rear panel RF feedthrough 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:

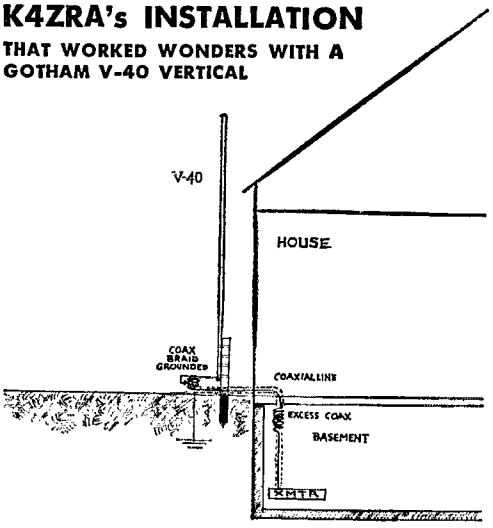
During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military ARR-7 (Hallicrafters 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



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- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
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- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
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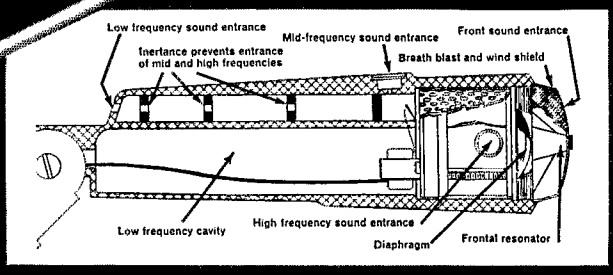
Flat response penetrates QRM more effectively because it permits an actual increase in RF power output! More effective cardioid pattern, essential for SSB, cuts accidental tripping of VOX circuit!

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:

CX2CO "My new 664 resulted in better and more consistent QSO's."

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."

PY2CK "My 664 microphone vastly improved my SSB transmission."

Average Peak-Power and Intelligibility!

CHOOSE AN Electro-Voice® MICROPHONE

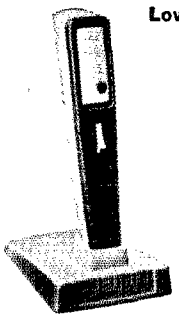
Model 664 for Highest Front-to-Back Discrimination Manufactured, Plus Peak-Free Wide-Range Response!

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.

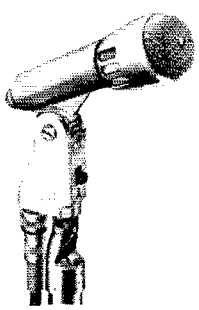
MORE 664 FEATURES: Output—55 db. On-off switch (can be wired for relay control). 150 ohms or Hi-Z output selected at cable connector. Satin chromium finish. High-pressure die-cast case. Pop-proof filter plus magnetic shield. 90° swivel mounting. 18 ft. cable. 7 3/16 in. long (less stand coupler) by 1 7/8 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.



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, 8½ ft. cable. 7¾ in. long by 1½ 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

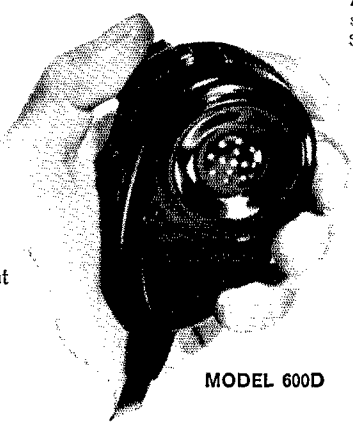
First True Crystal Cardioid With Variable-D Design. Combines High Output With Excellent Noise Rejection At Modest Cost!

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. 5¾ in. long (less stand coupler) by 1¾ in. diameter. Net weight 1¼ lbs. Model 951 Amateur net, $32.70. Matching desk stand with DPDT switch. Model 418S, $9.00. Less switch. Model 418, $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.



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(*Continued from page 94*)

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. W2OMV gave a talk to Clyde Lions Club, showed an ARRL c.d. film and gave a live 2-meter demonstration. WA2WVV/VO2 has been assinged 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. W2OPZ 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 562, W2EZB 387, W2MTA/2 346, W2RUF 275, W2FEB 190, WA2HSB 166, K2RTQ 166, W2RKU 142, WA2KZQ 61, K2QDT 39, WA2IXY 35, K2OFV 33, WA2LKW 27, W2PVI 26, W2RQF 21, WA2GLA 14, WA2-TDE 13, K1BVI/2, 12, K2HOH 12, WA2WEE 12, K2AFE 11, K2SSX 10, K2PNA 8, WA2SHE 7, K2PBU 6, W2RUT 6, K2TDG 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; W3UUH 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 Pittsburg 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. Up 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 Hauvention at Quincy May 19. K9YVT, W9VOX, K9VLV, K9UCG, W9QKE, W9GFF, W9IMN. K9JTD, W9KCR, W9NPC, W9UA, K9KZW, W9IPT, W9FLQ, W9ALS and W9TZN 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 observance 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. W9YIX, 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.; K9RKV, secy.; K9JLA, treas. K9ODG 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, K9UOV 241, W9EET 187, W9AKV 151, W9QQG 124, K9OCU 97, K9KZB 96, W9JXV 79, K9JSV 75, K9DRS 64, K9OAD 38, K9ZQT 31, K9IVG 28, K9QYW 28, K9LXG 27, K9RAS 26, K9VQC 24, K9UCG 22, K9VJS 18, K9CRT 15, W9MAK 12, W9PRN 10, K9SQG 9, K9PYD 8, K9TVA 2, K9ZPZ 2, K9DWR 1. (Mar.) W9-IDA 582, K9YNW 52, K9DRS 29, K9QYW 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 skeds: IFN, 0800 daily and 1800 M-F on 3910 kc.; ISN (s.s.b.), 1930 daily on 3920 kc.; QIN (training), 1800 M-W-F on 3745 kc.; QIN, daily at 1900 and RFN, 0700 Sun. at 3656 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 licensees in Winslow are K9DHJ, K9GHN and K9SXE. QIN Honor Roll: K9SGZ, W9TT, W9QLW, W9VAY, K9WWJ, K9VEJ, K9WET. New officers of the Bloomington ARC are K9-KKE, pres.; W9AOC, vice-pres.; K9QDD, secy-treas. Board members are K9YYX, W9YAN, K9KTH and K9UFX. Those making BPL: W9JOZ, K9YIC, W9NZZ, W9RTH and K9IXS. April net reports: IFN 339, ISB 411, QIN 277, QIN (training) 37, RFN 75, Hoosier V.H.F. 246. Traffic: (Apr.) W9JOZ 1440, K9YIC 424, W9MM 261, W9VAY 227, W9NZZ 215, K9SGZ 195, W9TT 172, K9OET 169, W9RTH 117, K9IXS 111, W9FJR 106, K9WET 103, W9ZYK 99, K9GLL 94, W9BUQ 92, K9ZLA 78, W9QLW 69, W9RE 67, W9FWH 66, W9PMT 66, K9KTL 63, K9RWQ 63, K9CIF 45, K9JSI 44, W9GJS 41, W9SNQ 37, W9CC 36, W9QYQ 33, K9YJW 33, K9ZUP 33, W9AWH 27, K9ILK 25, K9CRS 24, W9EJW 24, W9OG 22, K9FFV 20, W9BRW 17, K9ZLB 17, W9EGV 16, K9YXK 16, W9IMU 15, K9DZW 14, W9DGA 13, W9DOK 13, K9WWJ 13, W9CKW 11, K9RGS 10, W9BDP 9, W9DZC 9, K9VEF 8, W9HUF 6, 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. Ebneter, 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, W9LFK 82.5, W9ONI 140.1 and K9GDF 150.3 p.p.m. Endorsements: W9ONI and W9DYB as ECs, W9VIK as RM and ORS. K9YLK is experimenting with the 6DS4 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 HKØAB.

(*Continued on page 106*)

EXTREME STABILITY ON ALL FREQUENCIES INCLUDING VHF...

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self-powered, heterodyne-type VFO

FEATURES

- Variable oscillator 5.0 to 5.5 MC may be set directly against WWV.
- 30 to 1 tuning ratio.
- Illuminated dial calibrated for all amateur bands, 80-2 meters. (Crystals for 80-10 meters included.)
- Heterodyne system assures excellent keying accomplished in the mixer tube cathode.

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Output frequency range:
3.5 MC to 4.0 MC, 7.0 MC to 7.5 MC, 7.8 MC to 8.3 MC, and 8.333 MC to 8.833 MC

Power source:
105V AC to 125V AC, 60 cycles

Tube complement:
VFO and crystal oscillators, 1-6U8; mixer, 1-6BA7; output, 1-6AQ5; voltage regulator, 1-0A2

Dimensions:
7″ wide by 5″ high by 8½″ deep

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(Continued from page 104)

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. WN9BDX has an Eico 723 transmitter. K9GDF has received his Zone 4 award and Great Lakes Award. W9DYG made the BPL in April. Traffic: W9DYG 804, W9KQB 375, W9SAA 153, W9VHP 95, K9UUT 80, K9GSC 64, K9GDF 52, W9VIK 52, K9WGN 51, W9CBE 42, K9LGU 30, W9IQW 28, K9WVM 28, W9DWH 24, W9OTL 23, W9IRZ 19, W9YT 17, K9IMR 16, W9HPC 11, K9REC 11, W9WJH 11, K9ZMU 10, WA9DHL 7, W9MWQ 7, K9RTB 7, K9QKG 6, W9ONI 4, K9WIE 3.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: WØCAQ. RM: KØQWY. PAM: KØTYY. The North Dakota 75-Meter Phone Net report for Apr.: 25 sessions, 579 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. KØIVQ has a new RME-4350A receiver. KØRSA has a home-brew mobile rig. KØYWD 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 KØHDA, pres.; WØBHT, vice-pres.; KØIKD, secy.; WØQWG, treas.; KØJNB, act. mgr.; WØIKW, trustee. Traffic: (Apr.) KØIVQ 451, KØITP 42, KØRSA 20, KØTPK 18, KØQWY 14, WØYCL 9, KØJNB 6, KØTYY 6, WØIRN 4, KØYWD 4. (Mar.) WØIRN 28.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—SEC: WØSCT. Our February report should have read KØWEN as OPS instead of KØWEM. April appointment: WØCUC as OO. KØCVF received his General Class ticket. KØGSY is on phone with a Viking II. KØLKH operated portable from high school as a physics project. The Sioux Falls ARC conducted another successful quarterly auction. WØRRN "graduated" a class of six Novices. WØDSK has moved from Milbank to Sioux Falls. KØFKJ, Dell Rapids, worked 4 new states—Tennessee, Arkansas, Mississippi and New Mexico—on 50 Mc. during the week of April 23. Traffic: WØSCT 350, WØZWL 227, KØBMQ 142, WØDVB 126, KØCXL 31, KØAIE 26, WØOFP 18, KØZBJ 18, KØBSW 13, KØJGM 13, WØNNX 12, KØWEN 12, WØFJZ 10, KØTKN 8, KØVYY 8, KØYJF 6, KØYNS 6, WØYVF 6, KØBRC 5, WAØAOY 4, WØDIY 4, KØHQD 4, KØWEM 4, WØSWH 2, KØLKH 1.

MINNESOTA—SCM, Mrs. Lydia S. Johnson, WØKJZ —Asst. SCM: Charles Marsh, WØALW. RMs: WØKLG, KØAKM. PAMs: WØGCR, KØEPT. We deeply regret to report that WØVOY, of Tracy, is a Silent Key. The SPRC of St. Paul elected WØTHY, pres.; WØQKJ, vice-pres.; KØWML, secy.; WØKKO, treas. WØRQJ, 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.: WØs ISJ, KLG, DQL, KJZ, KØs IDV and OTH. WØDOB, licensed since the "ole spark days" in '21, can be heard on the air with a DX-40 and a SX-25 receiver. WØMDL, 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. KØEUH has a Ranger transmitter and a 129X receiver. The U. of M. Club station is operated by KØUXQ, KØTDB, KØHKZ. WØISJ and WØQDZ. KØJXE, of Rochester, won the McPherson scholarship; he plans to attend Dartmouth College in the fall. Director WØBUO spoke at the RARC. KØHGO recently was added to the staff of E. F. Johnson Co. as test engineer. New Novices in Rochester are KNØJEX and WNØCBZ. KNØJFV passed the Tech. Class exam. WØJBT has a Valiant transmitter, an NC-173 and a TA-33 beam. KØCIE can be heard with a Globe Scout and an NC-183. KØRCF recently was made EAN-TCC liaison on CAN. KØPIZ is a member of Bloomington RACES and has a GSB, a 100-Hy-Gain vertical and an RME 4350A-4301 receiver. WAØs CAH and CAI are a father-and-son team in Wheaton. They use a Viking II and an HQ-129X receiver. KØFSU, of Biwabik, is using an Eico 720 and an HQ-100 receiver. KØIJU 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.) KØOTH 405, WØKJZ 272, WØYC 109, WØKLG 86, WØHEN 54, KØWPK 40, KØZKK 40, KØQBI 36, WAØADX 34, KØJFJ 34, WØMXC 33, WØATO 32, KØSBB 30, WØUMX 30, WØOPY 29, WØLST 27, WØALW 26, WØTHY 21, WØRIQ 20, KØJYJ

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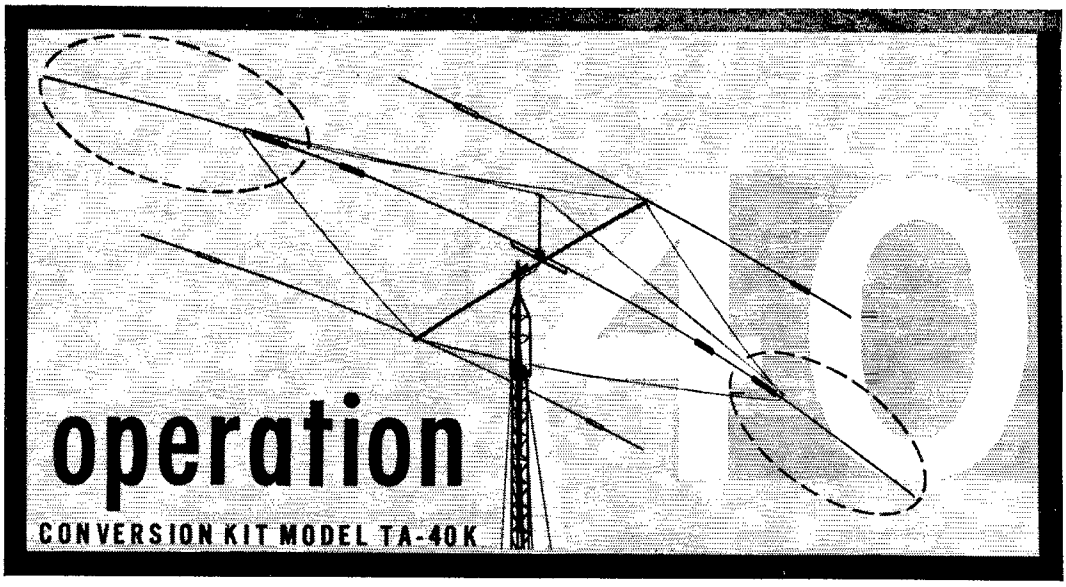

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In only a few minutes time you can now convert your Mosley Model TA-33, TA-32 or TA-31 for operation on 40 meters as a single rotatable dipole. Beam operation on 10, 15 and 20 meters is totally unaffected, The Model TA-40 K (enclosed in above ovals), when installed on the driven element of the models mentioned above, will exhibit a typical figure-eight pattern obtained from a half-wave antenna.

This new, easily assembled 40 meter conversion kit incorporates the same precision engineering and high quality 6061-T6 aluminum construction you expect in a Mosley beam.

This conversion kit, which incorporates the famous Mosley trap assembly design with features that maintain stability of resonance under all weather conditions assures you of continued top performance with your "Trapmaster" beam on 40 meters.

Because of the difference in mechanical strength of some antennas as well as possible differences in electrical design, use of the model TA-40 K conversion kit is not recommended on any antennas other than Mosley Models TA-33, TA-32 and TA-31.

For more information write Mosley Electronics Inc., 4610 N. Lindbergh Blvd., Bridgeton, Missouri.

Amateur Net..... $39.95

SPECIFICATIONS AND PERFORMANCE DATA ON MODEL TA-40 K

SWR 1.5/1 or better at resonant frequencies.
Maximum element length 38 ft. 7 in.
Turning radius 19 ft. 6 in.
Assembled weight 10 lbs.
Hardware, mast and line for guying is supplied.
Shipping weight 13 lbs.

Mosley Electronics Inc.

Prices subject to change without notice.

19, KØPIZ 19, WØWMA 17, KØDEF 16, KØCNI 10, WAØABU 9, KØZOH 9, KØUBA 7, KØVPJ 6, WØFGP 5, KØIJU 1. (Mar.) KØPIZ 11.

DELTA DIVISION

ARKANSAS—SCM, Odia 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 3885 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 W5KRO 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, exciters, 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 WIAW 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, K5YPV 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 OO 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, K4TTA, W4TYV, W4TZG, W4TZJ, W4WBK, W4ZBQ; OES K4KYL;

(*Continued on page 110*)

to each his own

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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 Loudon County (Oakridge) MARA (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, K4DJO, K4AKP and W4OGG attended *the Birmingham Hamfest along with 3000 others.* Traffic: K4AKP 1515, W4PL 638, W4OGG 289, W4OQG 127, W4PQP 116, K4OUK 69, K4WUG 45, W4UIQ 36, W4LLJ 30, K4WWQ 27, W4PFP 23, W4TYV 23, K4TAX 18, K4CPC 15, W4TZJ 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. RM: 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 3960-kc. 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, A1, 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, K4ZQR 12, W4BEW 11, K4LDA 9, K4TQZ 9, W4JUI 3.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8LOX. RMs: W8EGI, W8QQO, W8FWQ, K8KMQ. PAMs: W8CQU, K8LQA, V.H.F. PAM: W8PT. Appointments: W8PDF, W8QQO as ECs; W8HKT, K8HLR, K8KQV as ORSs; K8LQA, K8LZF as OPSs; WA8CNT, W8FWG as OBSs, K8RQO as OES; 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 WSSB/BR/MEN Picnic in July (get 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, act mgr. W8IXJ 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. K8JGF, 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 KWM-2. K8TFE liaisons the Michigan P.O. Net with QMN. K8RDE (OO) has a BC-221 for better OOing. 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, K8HNN, K8NOC, K8PKU, W8USZ, K8UZJ, K8WEN, 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.) W8IXJ 365, VE3CYG/W8 305, K8TDJ 282, K8JJG 258, K8KMQ 229, K8ZZW 192, K8HLR 104, K8RQO 89, W8OCC 82, W8ELW 78, W8JTQ 77, W8IBB 70, W8HKT 62, K8PKU 60, W8ZHB 55, W8FWQ 52, K8JGF 52, K8PYW 44, K8QLL 41, W8DSW 39, W8FX 38, W8EGI 37, W8MAT 34, W8BEZ 32, W8USZ 30, W8MPD 29, W8EOI 28, K8QCJ 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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12, K8GJD 10, K8JED 10, K8KQV 9, W8RVZ 8, W8WVL 7, W8HK 6, K8TJH 6. (Mar.) W8ELW 71, W8IBB 55, W8MAI 34, W8MPD 30, K8PKU 30, W8DSW 25, W8USZ 24, K8IRC 23.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, W8VTP, K8ONQ. PAMs: W8VZ, K8KSN. W8IBX received WZ and WAXE 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. WA8ATU 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 W8UOC helping. Warren ARA's officers are K8QDQ, pres.; K8LSI, vice-pres.; Ionagene, secy.-treas.; K8XNB, corr. secy.; K8LDX, act. mgr.; K8GAS, K8LDX and K8BXT, trustees. Your SCM attended a special meeting, at which W1ICP from ARRL spoke on antennas, and the club was presented its certificate of affiliation with the ARRL. The club's hamfest has been changed to Sun., Aug. 26, at Trumbull County Fairgrounds. New appointees are W8s AZL, CUT, ONT and PEN as ECs; WA8AGV 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.; K8CHE, vice-pres.; K8NYM, secy.; K8LDU, treas. WN8CZR is a new Novice. The Seneca RC saw W8MVE's and K8KFY's color slides of their trip to Tennessee and Florida and heard W8IJL talk on antenna construction. The Boardman High School ARC had its SX-100 serial #100030112112 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. WA8AKC, K8VJR and K8ZFY received their General Class licenses. Canton ARC's *Feedline* has on its cover page a picture of K8VLU and K8YLK (father-and-son team) at their station 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; WA8DOA is a new ham; K8RXD received his General Class license. Great Lakes Director W8UPB and your SCM attended the Dayton Hamvention 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 WØMLY were presented with USA-500 awards. The banquet speaker was WØTSN, ARRL President, who spoke on Ham Radio and its Future. The Drake 2-A was won by K8KAR, the Viking Invader by a Mr. Smith and a Clegg Zeus by W8FGZ. We were told 4292 registered for their call letters on auto license plates in Ohio this year and the Dayton Hamvention will be held Apr. 26 and 27, 1963. Dayton ARA's *R-F Carrier* informs us W8AKW is a Silent Key; W8HB 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. W8CHT, W8DAE, W8UPH and WA8AJN made 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, K8LMF, K8MHK and K8ONA, board members. WA8ABF is the proud father of a baby boy. Parma RC's *P.R.C. Bulletin* informs us that WN8ACY is editor of *Ham Shack*, 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. WN8COB and WN8CNP are new Novices. Traffic: (Apr.) W8DAE 1036, W8UPH 794, W8CHT 527, WA8AJN 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, K8KLA 17, W8IBX 14, K8PBZ 13, K8WBL 12, W8APS 11, W8CYS 7, W8YGR 7, W8WYS 6, K8KXS 4, W8QCU 4, K8BAP 3, K8BNL 3, K8CKY 3, K8CYJ 3, K8WDC 2. (Mar.) WA8AJN 240, K8AAG 169, K8JSQ 3, K8WLP 2.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy,

(*Continued on page 114*)

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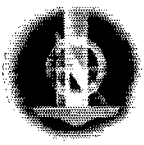

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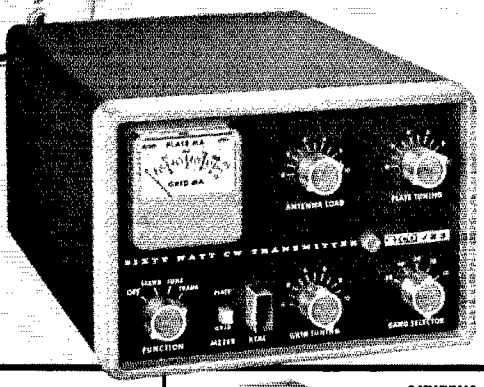

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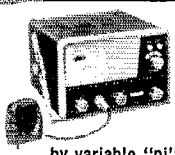

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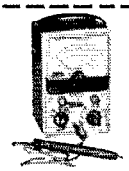

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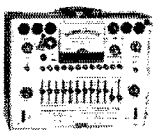

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W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 MGT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-club on 28.690 kc. Mon. at 1030 GMT. Appointments: K2SJN as OPS and WA2PNR as EC. Endorsements: W2URP as OO; W2SZ and K2EIU as OPS and ORS; W2HZZ as OBS; K2CXO as EC; W2SZ as OES. 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 W2GTI. 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, K2SJN 38, WA2LOJ 36, W2URP 24, WV2YHA 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: W2WFL. 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, secy.; W2EEO, treas. K2OPT has a new GPR-90 and a GSB-1. W2WFL's son is now WV2WYP. WA2NCE has received his hard-earned WAS certificate. W2PF is using a new 75-S3 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 eleven-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. W2LGK, 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. WA2UBU 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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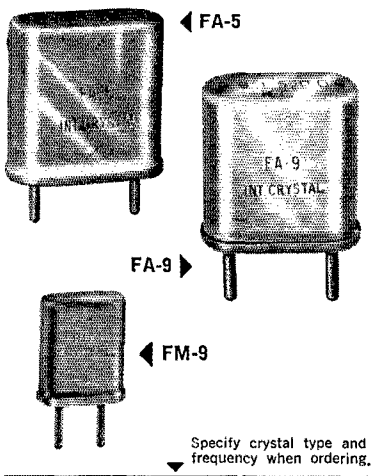

Specify crystal type and frequency when ordering.

	FA-5 and FA-9	FM-9
Fundamental	* 1000 - 1499 kc * 1500 - 1799 kc * 1800 - 1999 kc 2000 - 9999 kc 10000 - 14999 kc 15000 - 20000 kc	Not available Not available Not available 8000 - 9999.999 kc 10000 - 15000 kc 15001 - 19999.999 kc
Overtone (3rd)	10 - 14.99 mc 15 - 29.99 mc 30 - 59.99 mc	Not available 20 - 39.99 mc 40 - 59.99 mc
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Overtone (7th)	100 - 137 mc	110 - 137 mc

* Allow three to four day processing.

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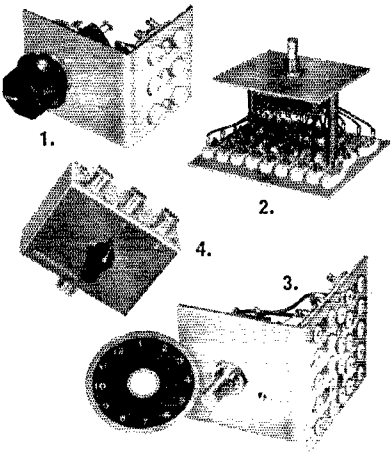

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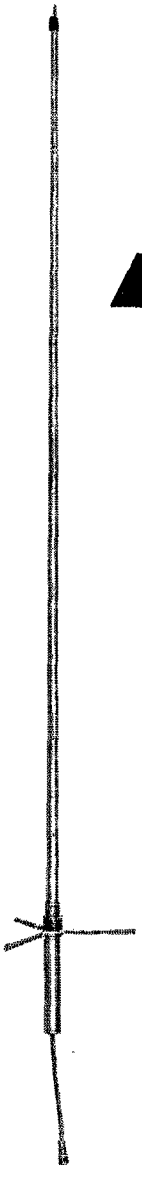
958, WA2GPT 791, K2UBG 766, W2EW 557, WA2RMP 340, W2GKZ 249, WA2TQT 243, K2ASP 164, WV2VKK 155, K2FO 147, WA2NCE 141, W2WFL 132, K2KYS 125, WA2QAT 125, WV2RVU 108, WA2LJS 32, K2UFT 27, WA2FUL 25, K2AAS 22, K2SPG 22. WA2EFN 16, W2JGY 13, WA2GFP 10, W2LGK 6, WA2PUE 6, W2PF 4, WA2UVK 4, WA2ODA 3, WA2IMH 2, K2THY 2, WA2PAM 1, WA2QJU 1.

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 2200Z 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: ORSs—W2LQP, WA2OQP. EC—W2LEP. OOs—K2ONE, W2CVW, K2DQT. 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. W2CWK 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. W2NIY 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 WA2WXP, had a message service for the Easter vacations. It went over big, says K2SBS. Looks like WA2EDG didn't get on 160 meters fast enough; 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, WA2UZH, 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, WA2APY 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, WA2ZQH 10, W2NKD 9, WA2LUD 8, W2BVE 6, W2NIY 3, W2OXL 3, WA2KKH 1. (Mar.) WA2KKH 27, W2BVE 6.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—SEC: KØEXN. PAM: WØPZO. RM: WØDUA. OOs: WØQVZ, KØAZJ. 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. WØNWX and WØQVZ attended the WØDXCC 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: 160 meters—QNI 868, QTC 54, sessions 30; 75-Meter Phone—QNI 1315, QTC 142, sessions 25; 75-Meter EEB—QNI 794, QTC 24, sessions 25; Wright County Em. Net—Total QNI 445. Traffic: WØLGG 2038, WØSCA 721, WØDUA 203, KØMMS 130, WØBDR 98, WØPZO 64, KØUAA 30, WØBLH 29, KØHBD 27, KØYLN 27, WØLJW 26, WØPTL 18, WØBTX 14, WØFMZ 14, WØGQ 14, KØKAQ 14, KØGOT 9, KØJYF 9, KØYDV 8, KØEXN 7, WØJPJ 6, WØQVZ 6, KØWVK 6, KØAFG 5, KØAFI 5, KØJMA 5, WØNGS 5, KØQKD 5, WØNWX 4, WØNTB 3.

KANSAS—SCM, Raymond E. Baker, WØFNS—
(Continued on page 118)



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BASE STATION STATIONMASTER ADVANCED DESIGN ANTENNA (4X-Omnidirectional Gain)
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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.

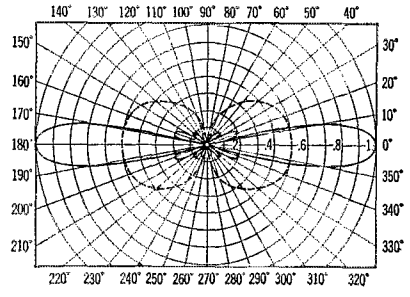
*Exact frequency must be specified

Electrical Specifications:

Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	±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 (½ power points)	18°
Lightning protection	*Direct ground*

Mechanical Specifications:

Radiating element material	Copper
Element housing material	*Fiberglass*
Element housing tip diameter	⅝"
Element housing butt diameter	1⅞"
Element housing length	19'
Ground plane element length	18"
Support pipe	2⅜" 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.



Vertical field strength pattern of Cat. No. 200-509 Stationmaster Antenna. A dipole pattern is shown for reference.

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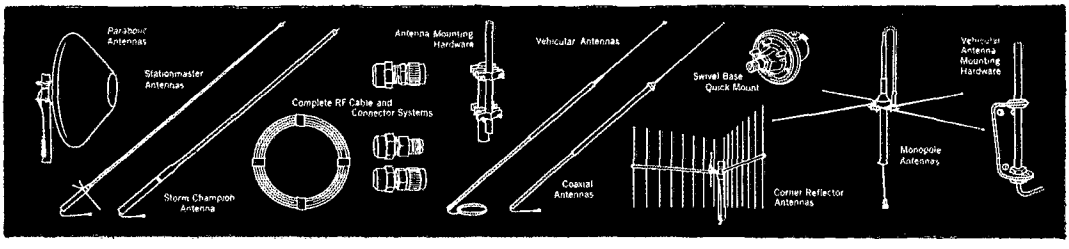

SEC: KØBXF. Asst. SEC. KØEMB. RM: WØQGG. PAM: KØEFL. V.H.F. PAM: WØHAJ. Nets. KPN. 3920 kc. Mon.-Wed.-Fri. at 1245Z. Sun. at 1400Z. 18 sessions: QTC. high 17. low 0. total 84. average 4.66; QNI. high 55. low 12. total 455. average 25.26; NCSs KØQKS. GII. YTA. WØIFR. ORB. FHU. QKS. 3610 kc. daily 0030Z. 30 sessions; QTC 127. high 14. low 0. average 4.23; QNI 249. high 12. low 4. average 8.3; NCSs KØBXF. IRL. YRQ. YTA. WØQGG. TOL. SAF. FNS. 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*. KØLHF. 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 81. WØIFR 63. WØQGG 41. KØBXF 35. WØTWJ 29. KØYTA 29. KØEFL 24. KØHVG 22. KØGII 18. WØALA 17. KØQKS 15. WØTSR 13. KØTGR 10. KØJID 4. WØFDJ 3. WØWFD 2. KØZHO 2. (Mar.) KØTGR 15.

MISSOURI—SCM. C. O. Gosch. WØBUL—SEC: KØLTP. Asst. SEC: KØLTJ. RMs: WØOUD. KØONK. PAMs: WØBVL. KØWNZ. WØLFE (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 K9IVG 2. KØLTP 2. WØANT 1. WØTPY 3. KØWNZ 2. KØYWT 2. WØTWJ 3. KØLTJ 1. WØFJX 1. KØHGI 1. MSN (3715 kc. 2200 GMT. M-F; 3715 kc. 1400 GMT. S) 24 sessions: QNI 87; QTC 63; NCSs KØFPC 5. KØFZY 5. KØVPH 4. WAØABL 4. KØONK 6. MON (3580 kc. 0100 GMT. Tu-S) 25 sessions: QNI 187; QTC 165; NCSs WØOUD 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. MoSSB (3963 kc.. 2400 GMT. Tu-Th) 8 sessions: QNI 133; QTC 33; NCS WØPXF 4. WØOMM 4. MEN (3885 kc. 2400 GMT. MWF) 13 sessions: QNI 317; QTC 161; NCSs KØIHA 4. KØONK 4. KØVPH 4. WØTPK 1. PON (Mo) (3810 kc.. 2100 GMT. M-F) 21 sessions: QNI 238; QTC 101; NCSs KØPIQ 5. WØHVJ 13. KØBWE 3. WØHVW 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 OPS. Officers of the Missouri School of Mines and Metallurgy Radio Club. WØEEE. (Rolla) are KØCWB. pres.; K5YTZ. vice-pres.: WNØCAW. secy.: WAØASD. treas.; KØHXF. 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. WØOUD 85. WØOOM 78. WØMKJ 62. WØBUL 36. WØRTW 35. WØBVL 32. W5ZEY/Ø 28. WØZLN 26. WØAYB 22. KØGOB 13. KØFZY 12. WØKCG 12. KØWNZ 8. WØOVV 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. WØDVB. WØGGP. WØLOD and WØOCU. WØHXH 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.; WNØBBC. 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. WØBOQ 110. WØLOD 58. KØDGW 57. WØNYU 56. WØDDT 55. WØOKO 48. KØRRL 38. KØFBD 32. WØNIK 27. WØFNH 26. WØZJF 26. WØVZJ 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. WØEGQ 8. WØFBY 8. WAØAIJ 7. KØZBA 7. KØKJP 6. WØKLB

(*Continued on page 120*)

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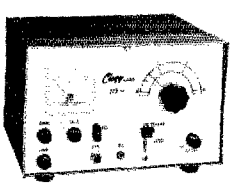

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6, WØLFJ 6, WØDPW 4, WØCIW 3, KØCGM 2, WØDLM 2, WØVEA 2.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Henry B. Sprague, jr., W1CHR—SEC: W1EOR, RM: W1KYQ, H.F. 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 W1s PHP, 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 OTC and added VU2US/AC5 and HKØAB 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, K1IFJ 100, K1OEH 87, W1NJM 68, W1LXV 60, W1YBH 55, W1BDI 51, K1MBA 49, K4MUT/1 49, W1LUH 38, K1HTV 35, W1CTI 34, K1DGK 27, K1AQE 25, W1FHP 24, K1EIR 20, K1MVQ 18, W1FXS 16, W1CUH 15, W1EJH 15, W1BNB 12, K1ONZ 11, W1LV 9, W1CHR 7, W1ADW 5, K1JVZ 3. (Feb.) K1PQS 247.

MAINE—SCM, Albert C. Hodson, W1BCB—The Portland Amateur Wireless Association held its fourth Hamfest and Supper at Highland Lake Grange and there was a good turnout. K1MBM has worked the HKØAB 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 W1NZW 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 OES. 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 28, K4BSS/1 16, W1EPN 16, K1MDM 10, K1GVQ 7.

EASTERN MASSACHUSETTS—SCM, Frank Baker, jr., W1ALP—SEC: W1AOG. PAM 75 meters: W1AWA. Silent Keys: W1s UBF and UHV, the wife of W1RSY. Ex-1FVD's wife passed away in Arizona. W1BNS and W1GOU are in the hospital. W1OOQ is on the air some. W1s PLJ, RHN, PXH, BB, WK, TZ and K1IZM took part in the Feb. FMT. EM2N held 21 sessions, 291 stations, 252 traffic. K1HSV has a net certificate. Heard on 2 meters: K1s VIO, KLB, NNK, OSJ and W1ZXZ. 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 films 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...

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10-15-20-40-75 METERS

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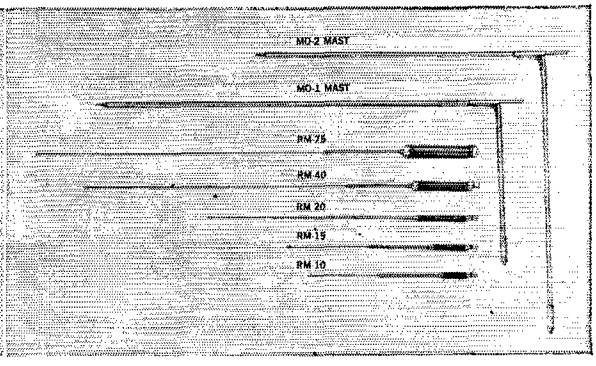

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ANTENNA ASSEMBLY CONSISTS OF 1 MAST and 1 RESONATOR

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
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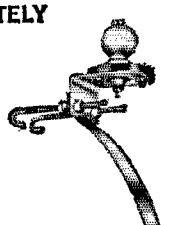

MODEL BM-1 Flat alloy steel strap fits tightly against any shape bumper yet is inconspicuous. Length of strap permits its attachment to both large and small bumpers.

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 ¼".

Whip receptacle assembly consists of a heavily chrome plated 1½" die cast Zamak ball with ⅜-24 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

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NEW-TRONICS CORP. 3455 VEGA AVENUE CLEVELAND 13, OHIO

worked K5SUG in Mississippi. W1MX still is being rebuilt. W1GHB spoke at a QRA meeting. W1BGW got HTH, RTTY, WAC and RGK from Russia. W1EFW, W1EAE and W1ALP attended a meeting of the Middlesex ARC, W1HEB, at which the club's ARRL charter was presented. K1OPQ is active on several bands and will be on 6 meters. The Framingham Club, W1GLA, had a station on during Amateur Radio Week at Shoppers World and the following were on duty: K1s IZT, EKO, DVJ, GUU, KMV, 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 80 meters and had a station at the local Spring Exposition. KN1UTG is new and K1MCE has a TA-33 beam. K1LAD is club secy. The Malden RA held an auction. W1s HKG and AKY are at it again. K1MAH has a closed circuit flying spot scanner TV camera and he and K1DRB are going to go on 420 Mc. and have a circuit between their QTHs. 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 c.d. gang. W1DYS is busy on his QTH. W8UDL 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 BKI, 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 Techs, and 6 Novices, and has 5 Communicator IIIs. Traffic: (Apr.) W1PEX 968, W1OFK 377, W1EMG 252, W1AWA 243, K1GYM 134, K1TSD 80, W1EAE 73, W1ZSS 65, K1DGI 48, W1DFS 47, K1QNZ 47, W1SIV 45, W1AOG 42, W1VYS 30, W1GEK 24, W1GKA 20, K1OLN 20, W1GLA 15, K1CMS 13, W1AUQ 10, K1LFA 6, W1JNV 2. (Mar.) W1FJJ 11.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. RM: K1IJV. 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. WMN 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 WMN, and he is getting to be a topnotch traffic handler. West. Mass. again maintained 100 percent attendance on the First Region Net. Our RM, K1IJV, 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. W1HRC 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 W1CTL) W1CVE, W1WCC, W1JFE and W1VVH. By Goodman, W1DX, and Ray Higgs, W6OGI/1, 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: K1IJV 181, W1BVR 116, K1LNC 101, K1PES 57, W1AMI 55, K1LBB 55, W1DVW 13, W1OSK 6.

NEW HAMPSHIRE—SCM, Ellis F. Miller, W1IIQ—SEC: K1GQK. PAM: K1JDN. RM: K1ITS. GSPN meets Mon. through Fri. at 2300 and Sun. at 1330 on 3842 kc. CNEN meets Mon. through Sat. at 1030 on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330 on 3685 kc. Appointments: W1TFS 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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Swan Engineering Company OCEANSIDE, CALIFORNIA

of the Midstate Amateur Radio Club at Laconia, with an initial membership of thirty hams from the Lakes Region Area. K1NYS and W1IIQ 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, W1IIQ 12, W1JNC 6, K1EEN 5, W1EVN 4.

RHODE ISLAND—SCM, John E. Johnson K1AAV—SEC: PAZ. RM: SMU. PAM: TXL. Report of RISPN: 30 sessions, 512 QNI, 98 traffic. The W1AQ Club of Rumford held its Annual Spring Cleaning Day with a committee of K1s LXQ, CZB, NSY and QIE. Three WRI certificates were issued to the following: No. 18 to W2NIY, 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. KN1UQI 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, K1DZX 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: W1KRV. 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 K1AEY 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 Macks 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: W7-BOZ. 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 128)

NEW Sonar—MONO-BANDER

SSB transceiver for any one Amateur Band 80 to 10

- 50 db unwanted sideband suppression; and 60 db carrier suppression
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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. PAM: W7NJS. RM: 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. K7DVK has been lending a helping hand on building a four-element 6-meter Yagi for a new ham. W7ZB 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 CHC 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. K7BHI, 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.) W7ZB 169, K7IWD 67, W7ZFH 64, W7RVN 36, W7AJN 24, W7DEM 19, W7BVH 13, W7MTW 11, W7MAO 6, K7DVK 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 jetting 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 936, W7DZX 708, W7PGY 348, K7JHA 320, W7GYF 177, W7APS 131, W7GIP 103, W7OEB 56, W7AMC 30, W7BTB 22, W7USO 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)

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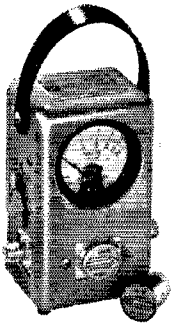
DIRECTIONAL RF WATTMETERS

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*	1⅝" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	.25, .5, 1, 2.5, 5KW
460 4610*	3⅛" EIA Flanged	2-30; 25-60; 50-125; 100-250; 200-500; 400-1000	1, 2.5, 5, 10, 25KW
4902	6⅛" 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.

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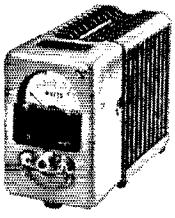
TERMALINE ...to absorb rf power

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

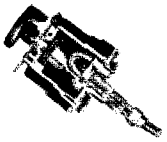


TERMALINE

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 ±5% of full scale . . VSWR 1.1 to 1 maximum over operating range.

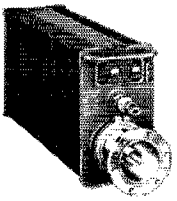


COAXWITCH

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.

Model	74	718	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.			



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 (★QC Type) available on many models.

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	1⅝ EIA Flanged
888	1200 w	0-2.0 KMC	1.25	3⅛ 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 ⅞" EIA flanged.

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, skillfull manufacture assure you of highest performance and reliability. New miniature filters, as light as five ozs., are available and can be produced in quantity.

Complete Specifications on request.

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Western Representative:

VAN GROOS COMPANY, Woodland Hills, Calif.

Asst. SCM. KH6DOX is EC for Western Honolulu. KH6BG is a new OPS and is active in the RICE Net. W1MV/KP6, K3GAD/KJ6 and W5HTM/VR3 are welcome visitors in the section. KH6HAA is a new OO. KH6EGL has completed a 100-kc. frequency standard with 10-kc. multivibrator. KH6DVD QNIed 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, KH6BZF 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. W7KOI 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—W7KOI, 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. PAMs: W6ZLO, WA6EIC. RM: K6KCB. W6ZLO has taken off for an extended trip across country and will visit his daughter in Philadelphia. W6AUC 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. K6BBF, 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 Mobileers, 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. WA6AFX won the second national prize, an HT-37, in the Hallicrafters 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 FMT. Traffic: (Apr.) K6KCB 307, K6GZ 196, W6AIT 166, WA6NAV 155, W6YBV 155, W6DEF 137, WA6EIC 98, W6AUC 70, W6YHM 50, K6YKG 47, K6DYX 41, W6OII 35, W6RFF 18, K6VQK 17, W6UVP 12, W6ZLO 10, WA6BZE 7, WA6OLQ 5, K6TEH 5, W6RSY 4, K6EQE 2, K6SMH 1. (Mar.) W6YHM 43.

EAST BAY—SCM, B. W. Southwell, W6OJW—SEC: WA6MIE. ECs: W6NOP Napa, W6WAH Vallejo, K6OSO E. Contra Costa, WA6MHJ W. Contra Costa, K6EDN N. Alameda, K6HJT S. Alameda, WA6RGD Metro-Oakland, W6LDV Acting Lake County. K6ZYZ reports QRN is heavy on 80-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.; WA6PUF 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 WV6YES (XYL) and WV6TET are new Novices in the same area. WA6QAZ 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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- MOTORCYCLE
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- GROUND STATIONS
- POINT-TO-POINT

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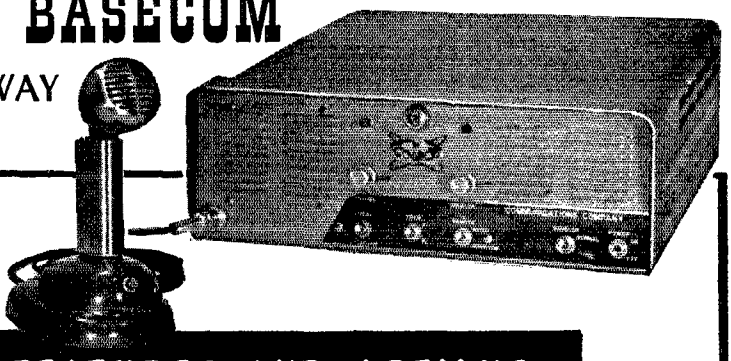

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★ **HIGH POWER** . . . 100 watts output 25 to 50 mc, 75 watts 144 to 174 mc, both base and mobile.

★ **TONE SQUELCH** . . . two way tone squelch compatible with other systems to EIA standards.

★ Meets all FCC and OCDM requirements.

★ **SIMULTANEOUS RECEPTION** . . . dual front end receiver for monitoring two frequencies anywhere in the band.

★ **TRANSMITTER FILAMENT SWITCH** . . . reduces battery drain when on "stand-by".

★ **MONITORS REMOTE CONTROL** . . . base station monitors remote transmissions. Intercom provided. All functions available at remote position.

"680 FLEETCOM"

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- **MOBILE CONTROL HEAD**
- **SPEAKER**
- **TRANSISTOR POWER SUPPLY**

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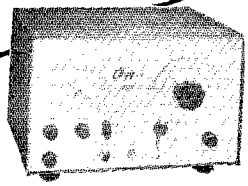
ator, born Mar. 2. WA6RBA won two 4CX300A tubes and her OM, WA6QYN, won the Morrow 5BR-2 converter at the BARLARKS Annual Fun-Fest. The MDARC held a mobile breakfast Apr. 29 in Walnut Creek. W6BSE and WV6WYA are new members of the HARC. K6KLY is s.s.b. on 50 Mc. WA6GRB, K6LYG, WA6DJD, K6OXK and K6SPP 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, W7QOH/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. W6KG 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, *BAYLARC*, 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 Fair. 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. WV6VLX 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 K6RJZ/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, secy. The NCN meets at 7 P.M. PDST on 3635 kc. W6DEF is temporary acting manager of NCN. W6DUD and W6BJI 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 compatable 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)

BULLSEYE BUYS at ARROW!



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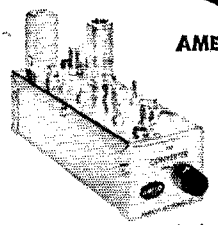
A true ham station, ideal for both fixed station and mobile operation.
Double conversion superhet gives you extreme selectivity and freedom from images and cross modulation.
Transmitter section has an ultra-stable crystal oscillator which also may be controlled by external VFO.
Efficient, fully modulated 8 watt final works into flexible Pi network tank circuit. Large S meter serves for transmitter tune-up procedure.

Amateur net price **$159.95**



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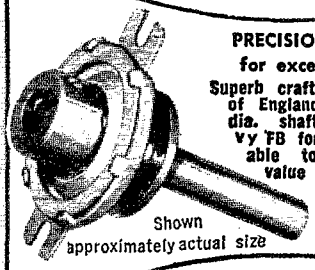
Choice of separate models for 50, 144 or 220 mc bands. Output frequency easily changed for present and future requirements. Three RCA 6CW4 Nuvistors used, two as RF amps, one as mixer with 6J6 oscillator. Noise figure: 2.5 db for 50 mc model, 3.0 db for 144 mc, and 4.0 db for 220 mc model. Image, spurious and IF rejection better than 70 db. Power required: 100-150 V @ 30 ma, 6.3 V @ 1 amp.

Specify desired IF output for converter model selected.

Kit: CN-50K, CN-144K, or CN-220K, each **$34.95**

Wired & Tested: CN-50W, CN-144W or CN-220W, each **$49.95**



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for exceptionally fine tuning

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" dia. shaft, 1⅛" long, 6:1 ratio, vy FB for fine tuning. Easily adaptable to any shaft. Comparable value — $5.95.

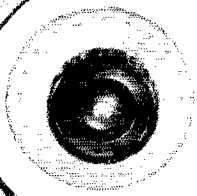
Amateur Net $1.50 ea.
10 for $13.50

HAMMARLUND "personal touch" ELECTRONIC KEYER HK-1B

The new Hammarlund 'Personal Touch' Keyer is a compact, fully transistorized code generator that combines all of the desirable features of electronic sending with distinctive dot/dash control to give messages your 'personal touch'. Usable with any of the key paddles available, the HK-1B generates smooth, effortless code transmission for the novice and expert alike.

Amateur Net (less battery) **$39.95**

PRECISION BALL DRIVE DIAL



Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard ¼" shaft. For that velvet touch...

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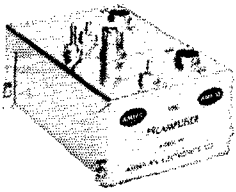

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FOR 50, 144 or 220 mc. Over 20 db gain plus a lower noise figure, 2 tuned ckts, 6CW4 Nuvistor completely neutralized. Noise figure is 2.5 db @ 50 mc, 3.0 db @ 144 mc and 4.0 db @ 220 mc. Power requirements: 100-150 v. @ 8 ma, and 6.3 v. at .13 amps. Specify frequency desired.

Also available for 27 mc Citizens band

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Same as used in W2EWL SSB Rig — March 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

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ROANOKE DIVISION

NORTH CAROLINA—SCM, N. J. Boruch, W4CH—SEC: W4YMI. 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 W4HEI, 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.h.f. clubs. Participants in recent ARRL Frequency Measuring Tests with nice results were W4FUI and K4SYN. WA4FJM 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 WA4BFG as assistants. K4PBG, Area 10 EC, also has two assistants, K4TSW and K4IOF. Traffic: (Apr.) K4CPX 227, WA4FJM 214, W4BAW 100, K4QFV 49, K4YCL 47, WA4ANH 39, K4TSM 15. (Mar.) W4BAW 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 progam 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. W4FFH 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 K4AIM is now WN4HFZ. Known candidates for the SCM post are W4FFH 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, W4SHJ. SEC: W4VMA. RMs: W4LK, K4MXF, W4SHJ, 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 sked, what with EC/OO/CD and traffic, and reports that his County Radio Club has a new station, WA4GOA. 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 clixs. 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, K4IKF 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, K4RNH 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, K4ITV 33, K4TSJ 29, W4BZE 23, K4PRQ 17, K4IAN 14, W4LRN 14, K4IKF 10, K4PIK 10, W4TE 10, K4QIX 8, K4IIP 6, W4KFC 6, W4KX 6, K4LTK 6, K4ORQ 6, W4JUJ 5, W4CVO 4,

(*Continued on page 134*)

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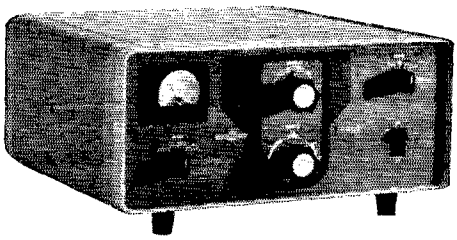

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WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. PAM: K8CFT. RM: K8HID. The West Virginia C.W. Net meets on 3570 kc. at 0000 GMT; the Phone Net on 3890 kc. at 2330 GMT. K8CFT reports 17 sessions of the Phone Net with 312 stations and 22 formal 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 Novices 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-Grafton link on 144 Mc. New WACWV members are K8MQB, K8MNG, W2QHH and K8KZF. Congratulations. New ECs are K8MRX for Taylor and K8PRC for Monogalia Counties. Traffic: K8LOU 32, W8JUE 26, K8CSG 25, W8HZA 19, K8CNB 15, K8TSB 4, W8JM 3.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald S. Middleton, WØNIT—SEC: WØSIN. PAMs: WØCXW, WØIJR, WØGNK. RMs: WØFEO, KØDTK. OBS: KØDCC, KØIQL and WØETT located at a Husky Dog Ranch in Elizabeth, Colo., for rare county operation. KØBCW reports the first 50-Mc. E opening of the summer was observed on Apr. 27, 28 and 29. During the same opening WØBAG and KØUYC 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 WØISL, KØMNQ, WØFPT and WØBAG. Two-meter schedules are now being set for a try for contact between KØMNQ in Denver and K7HKD in Cheyenne. KØOVQ has been appointed as the RO for Denver. Roy also is the Denver Area EC. WØEXR 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. KØWWD, at the Air Force Academy, has been Colorado's most consistent BPL award winner. Traffic: KØRTI 282, KØDCW 133, WØETT 95, KØQGO 66, WØBWJ 53, WØMYB 51, WØCWD 28, KØLCZ 27, KØZSQ 25, KØWGC 18, WØENA 14, WØTIV 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. W4VIW 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 BUN 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 BUN. 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, W5ZHN—SEC: K5QIN. RM: K5GOJ. PAM: W5ZU. K5CXN is Albuquerque's new EC. WØBWJ 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 NMBC 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. W5ZHN finally whipped his mobile antenna troubles and is now work-

(Continued on page 136)

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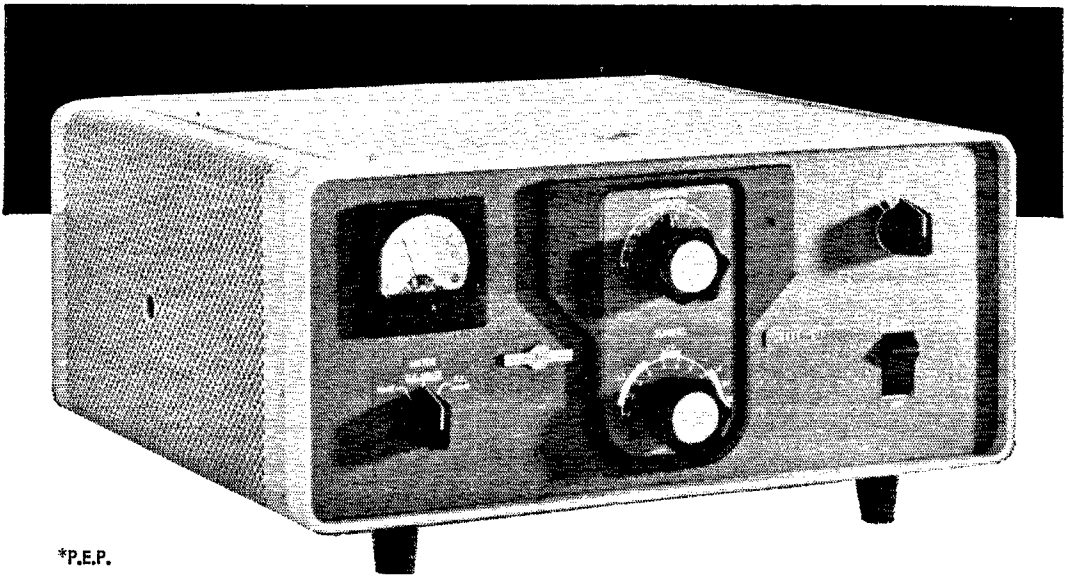

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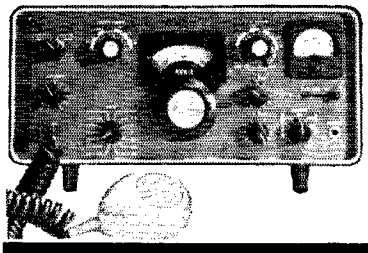

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ing 75 meters again. W5ABQ, AREC/RACES, ran a propagation test May 5 and 6. Traffic: W5ZHN 140, W5UBW 66, K5FMF 12, K5ONE 12, W5WZK 8.

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 AENH 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. K4ZYO 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 WA4EWA. WA6GOJ 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, K4ZYO 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: W4IYT. 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, W4EHW 148, W4WHK 132, W4VLH 117, W4MIN 112, K4AHU 105, K4LCF 104, W4LDM 95, WA4DMV 88, K4JZU 79, K4AX 77, W4CNZ 77, W4DFU 75, K4DAX 68, K4VNA 68, K4ENW 63, K4JLO 58, W4ZAK 57, K4NVD 55, W4IYT 48, K4AKQ 45, K4DBT 42, W4CWD 40, W4VCX 38, K4ILB 37, K4RDX 35, W4BKC 28, WA4BGL 27, W4HTH 25, K6SXX/4 24, WA4BGW 23, K4JWM 21, K4ZIF 21, WA4CJC 20, W4EAT 18, K4GUE 18, K4MTP 18, W4QVJ 18, K4PPX 18, W4WPD 18, WA4AZZ 17, W4LMT 17, K4QQE 17, W4SMK 16, W1AGM/4 15, W4TRU 15, WA4DCI 14, W4HFR 12, K4OZS 12, WA4COR 11, K4NXW 11, K4OSQ 10, K4RNG 10, K4JZK 9, K4MZR 9, WA4AII 8, W4LSA 8, W4BBZ 7, K4CMK 7, W4IMC 7, K4LML 7, K4LVE 7, W4ZUT 7, W4DTS 6, W4RHH 6, K4VGD 6, W4AYD 5, K4DAD/4 5, W4YOJ 5, K4ODS 3, W4BNE 2, K4KVJ/4 2, W4LVV 2, W8LDU/4 2. (Mar.) K4LLI 67, K4EHY 57, K4FMA 55, WA4DMV 47, WN4BSH 39, W4SVB 33, K6SXX/4 32, W8LDU/4 29, K4FQP

(Continued on page 138)

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18, K4LVE 17, W4SMK 16, K4OZS 8, W4UHB 3, K4UKF 2, K4MXH 1. (Feb.) K4OZS 4.

WESTERN FLORIDA—SCM, Frank M. Butler, jr., W4RKH—SEC: W4MLE. PAM: W4WEB. RM: K4UBR. A recent program of the PCARC was a tour of the telephone office and microwave equipment. WA4FIJ and WA4FJF 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 WA4AKT, in Blountstown, also made a 10-meter contact. Port St. Joe: K4RZF, K4LQQ, 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/Eglin AFB: WA4EVU 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 6- and 2-meter mobile. K4WTF keeps 10 and 75 meters hot. Val-P. c.d. purchased a 10-meter Communicator. W4VWI 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, WA4FIJ 10, WA4FJF 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 26 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 Kennehoochie 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 GYPL 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: K4MCL 295, W4DDY 173, W4PIM 164, K4WWY 114, K4ZYI 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*: KP4BAU, a new OPS, reports his station consists of B&W5100-B, Drake 2B, TA-33, t.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&W51SB s.s.b. generator, 2000 p.e.p. linear, all-band 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*: KP4BDO 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 99er. 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*: KP4AVB 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. KP4AOO received the WPR25 Award before going on sea duty with the USCG. KP4AXB installed a Heath Cheyenne, a Heath transistorized power supply, a Gonset 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*)

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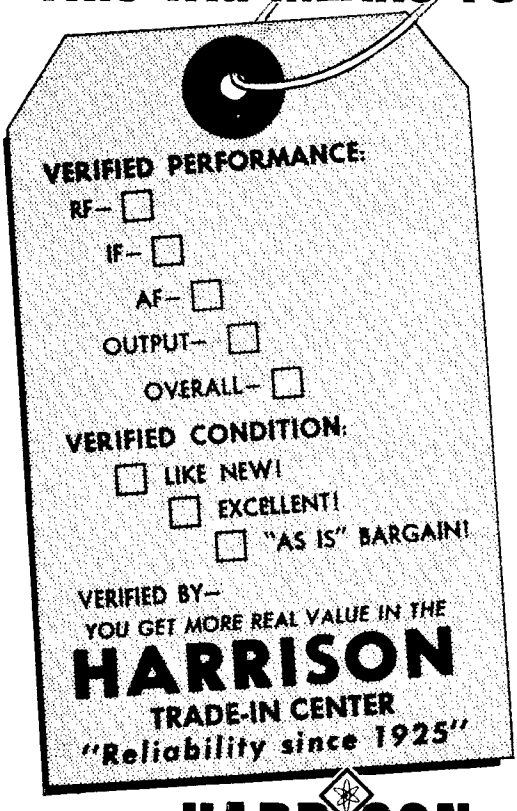

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a Drake speaker/Q-multiplier to a 2A receiver. KP4MO finds the WRL vertical works FB alongside his house. KP4BDS and KP4CH placed first and second in the ARRL C.W. Sweepstakes Contest. KP4AWH was in front in the phone portion of the Sweepstakes, followed 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 MQ, HR and KGN set up a DX-20 hi-fi amplifier modulator, an SX-43 with RME preselecter 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.

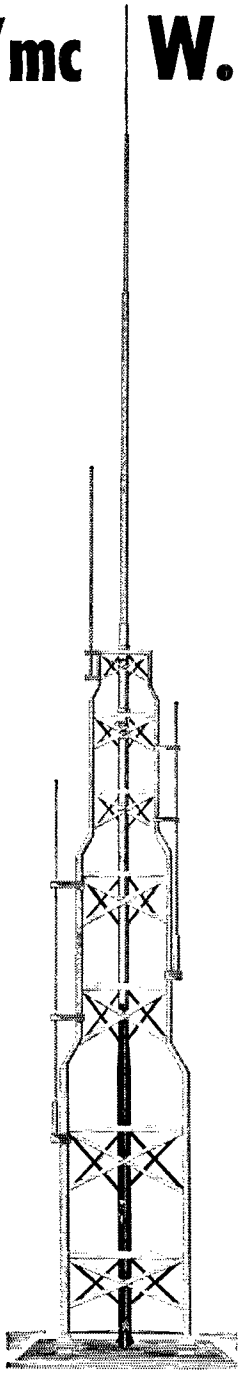
SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—Asst. SCM: W6KGC. SEC: K6YCX. RMs: W6BHG, WA6ROF. PAMs: W6ORS, K6PZM. 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. WA6GRG was busy on term papers. W6NAA made a trip to Ohio and worked on the 29 Palms Run. WA6DWP took a nice vacation in Las Vegas. WA6JDB traded his 2-meter rig for s.s.b. gear. WA6KVA 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. WA6ODF and W6FNE are new ORS appointees. Congrats, fellows! WA6SLF operated portable from a storage battery in Ladera Park, Inglewood. WA6CKR 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, WA6JDB 307, K6OZJ 276, WA6ODF 264, K6MDD 263, WA6ROF 236, W6QAE 201, K6YVN 160, W6BHG 109, WA6KAW 98, K6SIX 95, K6HOV 42, W6USY 36, WA6CKR 29, WA6GRG 29, WA6KVS 23, W6NAA 20, WA6QMC 19, WA6DWP 6, K6JNP 4, W6SRE 2, WA6SLF 1, W6VOZ 1. (Mar.) W6FNE 135, WA6OUK 53, WA6ODF 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



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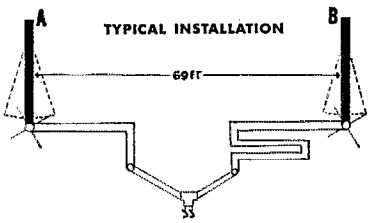
John Mayes, W6BYB Sebastopol, California

*EA 8 CG 0838 GMT	JA 3 CB 0927 GMT
LA 8 FG/P 0850 GMT	VK 2SA 0942 GMT
PY 5 OF 0910 GMT	VE 4 MZ 0949 GMT

PHASE TWO FOR 3DB GAIN



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 cardiod 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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W7IWJ, W7LHN, W7WUC, W7ZFC, K7EVE and K7GVP. Through their efforts over a period of 60 days the club has seven new Novices. Maricopa County is the first county of any in 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, FWA, IJP, KOY, KYE, LND, LXX, MAE, OUE, PMQ, QFL, QZH, RBA, WFY, YWF, K7s AWI, BAM, BGG, BGL, BXT, CEH, CIN, DSB, DVO, ENN, GAG, GHS, JNY, JTC, JTF, KAW, KCB, LBP, LBT, LFS, LSQ, MSD, OBB, OCT, ORE, OXS, PLR, QCT, SKT, WA2PCZ/7, K5ZDP/7 and KØDON/7. Civil Defense communications tests, planned by W7LAD, W7SXQ and K7CET, were carried out by Tucson amateurs on 75, 40 and 2 meters. W7NIY, Arizona SEC, was an observer. New calls: KN7s SBI, SBJ, RQL, RQE, RZN, SEC and SME. Traffic: WØWHE/7 351, W7AMM 26, K7CET 8, K7RUR 3.

SAN DIEGO—SCM, Don Stansifer, W6LRU—The May meeting of the Newport Amateur Radio Society featured a talk by WA6KPF on "Propagation of Radio Waves." Chief operator at W6IAB is now K9UNC, 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 Beaumont, Tex., during Hurricane Carla last year. W6WNN vacationed to the Midwest during April and May. K6BX 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 Radio 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. Congratulations 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 handle QSL chores for VR6AC. W6MGT is studying Spanish 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: W6IAB 2392, K6BPI 2266, W6YDK 1899, W6UUS 572, W6EOT 484, K6KGR 96, K6LKD 84.

SANTA BARBARA—SCM, Robert A. Hemke, K6CVR—Appointments renewed: W6OUL 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 RADIO Club has 2 pilot models of a 2-meter handie-talkie intended for AREC use. Also a part of the same program 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. Stero—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 resigned from the Ventura ARC. Reason—reassignment overseas. He certainly will be missed in this area. Traffic: 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 homebrew 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.

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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, W5GY 245, K5JTQ/5 216, W5LR 117, W5GNF 66, K5HTM 55, W5EUY 34, K5PXV 20.

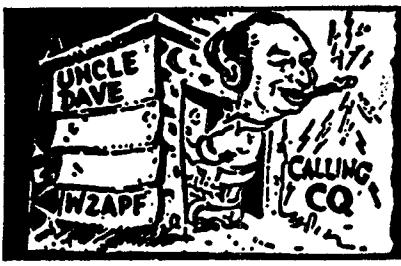
OKLAHOMA—SCM, Adrian V. Rea, W5DRZ—The North Fork Club did a very fine job at the Quartz Mountain Hamfest. The North Fork Club members are to be commended for their fine work from year to year. New ORSs are K5CWR and W5DNG; a new EC is W5VVQ; the new PAM for 2 meters is W5LOW. The SCM had an on-the-air 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-EZM'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 W5JJR, 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, W5FEC 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, VO1CZ. VE1AGT 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, VE1AGD, VE1PB and VE1PK. VE1FR 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 VE1MW/VO2, 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. NG was maritime mobile for Field Day. DZA was the other operator on board. WIIKE 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 W1-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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Ranger Xmtr.	195.00
Pacemaker SSB Xmtr.	250.00
Viking II Xmtr., CDC Model	175.00

"WRL"—GLOBE XMTRS.

DSB100 DSB Xmtr.	$ 74.50
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VOX10 Voice Relay	22.50

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Mosley VPA20-2 (New)	39.50
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BA6M (Baluns-for-above)	3.95
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Cushcraft ATGP3	24.95
Cushcraft A28A	21.95
Hy-Lite 3E10F	49.50
Gonset 3220	94.50
Hy-Gain 203G	49.95
Hy-Gain 113G	39.95

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per 600 ft.	17.84
Heavy Duty per 100 ft.	5.89
per 600 ft.	34.75

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6J7	4.55	1.25	13.75
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2A6 (Bulk pack)	3.65	1.10	12.10
6A8G	5.80	1.75	19.25
6AE6G	2.05	.65	7.15
6S8GT (Bulk pack)	2.75	.85	9.35
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has a new meeting place. Mr. Harry Savage, Public Relations Officer, and your SCM wish to thank the Skywide 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. VE3EMF 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. VE2AMA 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 JC. SO: Sera bientôt on s.s.b. BCZ: Est maintenant OA4-NZ 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. BJY: Est maintenant actif sur 80 m. 11 membres du CJO ont assistés a 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 acceuilli avec joie, les nouvelles en français dans cette colonne. 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 VE8CW 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, VE6AEN 9, VE6-BA 8, VE6SU 6, VE8JS 5, VE6PZ 4, VE6UH 4, VE6SF

(Continued on page 148)

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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 Albernies. 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 KØUS 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, VE5GC 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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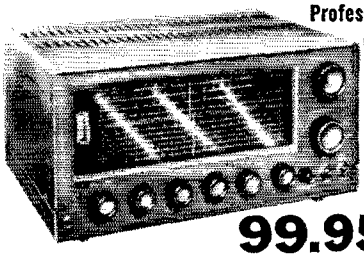

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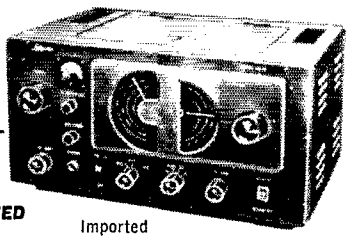

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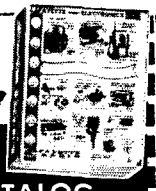

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Technical Correspondence

(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 Moonbeam 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 μv. 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)

r.f. circuits and changing l.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.....36- 6- 6-20

Western Florida

WN4CDN....3922-106-37-37
WN4BPO.....450- 25-18-13

Georgia

WN4ARV....4815-107-45-14
WN4ARE....3675-105-35- –

West Indies

WP4BBN....7585-170-41-40

SOUTHWESTERN DIVISION

Los Angeles

WV6TBB....8262-147-51-39
WV6QNN....8131-173-47-23
WV6PQI.....1971- 63-27-36
WV6STC.....1302- 62-21-35
WV6SNK.....1005- 42-15- 5
WV6VKY.....880- 40-22- 4
WV6TMY.....476- 28-17-17
WV6STJ.....120- 12-10-10

Arizona

KN7OWD..15,732-276-57-36
KN7QPO.....4620-105-44-31

San Diego

WV6SBO...20,345-313-65-29
WV6UCF...10,340-220-47- –
WV6SWV....8476-163-52-27
WV6WVM...4788-116-38-29
WV6QJX.....3584-108-28-33
WV6RUS.....3164-113-28-40
WV6QJF.....1216- 54-19-20
WV6UHY.....736- 46-16-17
WV6UQK.....168- 21- 8- 4

Santa Barbara

WV6TIF.....800- 50-16- 9
WV6UQI.....385- 35-11-12

WEST GULF DIVISION

Northern Texas

KN5KWG..13,560-226-60-30
WN5AZB....8480-160-53-37
WN5AKH....5004-139-36-32
KN5LZP.....3492- 97-36-28

Oklahoma

KN5JIL.....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

Check logs: W5LJT, WA6RWM, W8IBX, W9VSW.

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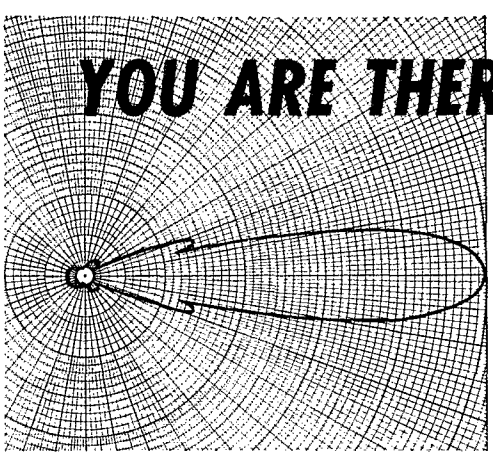

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Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

"BREAKFAST Club Hamfest," July 28-29 at Terry Park near Palmyra, Ill.

TRAVEL Abroad costs less, and is lots more fun when arranged by The International Ham-Hop Club. Non-profit, non-political. Members in 50 countries. W6THN/1, Gunther, 165 Lloyd, Providence 6, R.I.

WANTED: All types military aircraft ground radios, teletype and test equipment. GRC, PRC, etc. Have all types amateur gear for trading, purchases or cash. Phil Rickson, K2HJC, Morrisonville, N.Y.

QST Magazines: 1940 to 1962, $50. W8SWF, Dearborn, Michigan.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

RECEIVERS: Repaired and aligned by competent engineers using factory standard instruments. Factory service at reasonable prices on Collins, Hallicrafters, Hammarlund, Gonset, National, Harvey-Wells. Our 26th year. 90 day guarantee. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

TRIGGER. Cash paid for ham equipment. 7361 W. North Ave., River Forest, Ill. PR 1-8616. Chicago #TU 9-6429.

TOROIDS: Uncased 88 Mhy, like new. Dollar each. Five/$4.00 P.P. DaPaul, 309 So. Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. KEllog 8-0500.

WANTED: Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

ATTENTION Mobileers! Leece-Neville 6 volt 100 amp. system, $50; 12 volt 50 amp system, $50; 12 volt 60 amp system, $60; 12 volt 100 amp syst. $100. Guaranteed no ex-police car units. Herbert A. Zimmermann, Jr. K2PAT. 1907 Coney Island Ave., Brooklyn 30, N.Y. Tel. DEwey 6-7388.

CASH For your gear! We buy, trade and sell. We stock Hammarlund, Hallicrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & H Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

WANTED: For personal collection: QSTs January through August, 1916: ARRL Handbooks: Editions 1 and 5. W1CUT, Box 1, West Hartford 7, Conn.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 399, Mt. Kisco, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

$1.00 Frames 60 QSL cards in clear plastic! See picture on page 138 this issue. John Thomas, K4NMT, Box 198, Gallatin, Tennessee.

QSLS? WPE? America's finest and largest variety samples 20¢. Religious QSL samples 20¢. "Rus" Sakkers, W8DED, Box 218, Holland, Mich.

C. FRITZ QSLs guarantee greater returns! Samples, 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Ill.).

QSLS Three and four colors on lustre coat stock, 100 $3.85 or 200 for $6.90 combination mixture—five days service—satisfaction guaranteed or order our sample catalog showing over one hundred designs. $1.00 (refundable). Constantine Press, Bladensburg, Maryland.

QSL-SWL-WPE. Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

QSLS "Brownie." W3CJI, 3110 Lehigh, Allentown, Penna. Samples, 10¢; with catalog, 25¢.

QSLS-SWLS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo, 1, Ohio.

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢

QSL Cards. Call letter D-cals. Samples 10¢, or send 25¢ for extra large selection and free "Danger, High Voltage!" card. Dick, W8VXK, Rte. 4, Gladwin, Michigan.

QSLS-SWLS. 100 2-color glossy, $3.00; QSO file cards, $1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

QSLS: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLS, SWLS, WPE. Samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS, SWLs. XYL-OMs (sample assortment approximately 93¼¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, prototypal, snazzy, unparagoned cards (Wow!). Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

DON'T Buy QSLs-SWLs until you see my free samples. Bolles, W5OWC, Box 9445, Austin, Texas.

SUPERIOR QSLS, samples 10¢. Ham Specialties, Box 823 Bellaire, Texas

QSLS, 3-color glossy, 100—$4.50. Rutgers VariTyping Service, 7 Fairfield Rd., Somerset, N.J.

PICTURE QSLs. Cards of your shack, home, etc., Made from your photograph. 1000, $13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

QSLS, 300 for $4.35, Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill.

QSLS-SWLS. Samples free. W4BKT Press, 123 No. Main, McKenzie, Tenn.

QSLS. Samples free. Phillips, W7HRG, 1708 Bridge St., The Dalles, Oregon.

QSLS. Samples dime. Rubber stamps: name, call and address $1.35. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

QSLS. $2.50 and up. Samples 10¢. RBL Print M.R. 12, Phillipsburg, N.J.

QSLS. Free Samples. W7IIZ Press, Box 183, Springfield, Oregon.

QSLS, SWL's that are different, colored, embossed card stock, and "Kromekote". Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

RUBBER Stamps, $1.00. Call and Address. Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N. J.

CERTIFIED QSLS-SWLS, unique designs, speedy service. Catalog 25¢ (refundable) Certified Printing, Box 1023, Whittier, Calif

QSLS, Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 10¢. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

QSL Specialists. Distinctive, Samples 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago 39, Ill.

QUALITY QSLS. New designs monthly. Samples 10¢. Giant, 25¢. Savory, 172 Roosevelt Rd., Weymouth, Mass.

RUBBER Stamps for hams, sample impressions, Hamm, W9-UNY, 542 North 93, Milwaukee, Wis.

QSLS 2 color glossy, 100, $2.50 samples dime. Ramsbottom Print Shop, Box 237F, Kirksville, Mo.

QSLS. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

MAKE Your own QSLs with quality rubber stamps. Sample impressions (stamp appreciated). Vanguard Industries, Box 1386, St. Thomas, V.I.

QSLS. Real gassers. Dime, Filmcrafters, Box 304, Martins Ferry, Ohio.

QSL-SWL Samples 25¢. Spicer, 4615 Rosedale, Austin 5, Texas.

CANADIAN Used, surplus and new gear. Giant catalog, 25¢. Low prices, thousands of items. ETCO, Box 741, Montreal, P.Q., Canada.

QSLS. Samples, dime. Printer, Corwith, Iowa.

100 QSL cards, $1.00. Lewalski, 1367 Perkiomen Ave., Reading, Penna.

QSLS. 2-color glossy, 100 for $2.50. Samples dime. Frank Ramsbottom, WØYBI, Box 237F, Kirksville, Mo.

QSLS-SWLS. 3-colors 100 $2.00. Samples dime. Bob Garra, Lehighton, Penna.

ATTRACTIVE QSLS: Large variety of styles, cartoons, multicolored, same price. Personal ham stationery. Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

QSLS, $2.00 per 100 postpaid U.S. only. Glossy, red and green. All orders mailed within 10 days. Free sample. Hobby Print Shop, Umatilla, Fla.

QSLS. Low cost. High quality. (Samples 10¢). Rimer WA2WAO, 212-03 53rd Ave., Bayside, L.I., N.Y.

DON'T Buy QSLS until you see my free samples. Bolles, 7701 Tisdale, Austin, Texas.

CANADIANS: Sell DX60 and HA4 keyer with paddle, both like new. VE3EGG, 64 Barrie, Galt, Ont., Canada.

CANADIANS: 300 watt, 80-10M factory wired xmttr. AM-sideband c.w., WRL 755A, VFO, DSB-100, LA-1 linear, in exc. condx, $125.00. Also Mohawk receiver, works perfectly, used 500 hours, $250.00. All letters answered. VE3DPV, 212 Dublin, Guelph, Ont., Can.

CANADIANS! Hallicrafters HT-30 sideband exciter, in top condition, used under 10 hours. Price $325.00. F. T. Gaspard, 143 Smith St., Winnipeg 1, Canada.

HAM TV Equipment bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

KWS1, $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., uncased, 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-probe; CQ all issues 1945. W4ID, 461-3rd Ave., Sea Park, Eau Gallie, Fla.

SELLING new Hallicrafters S120 receiver, $62; Chuck Harmon, WA6NPP, Hq Co 501 Inf., 101 Airborne Div., Ft. Campbell, Ky.

CUP-CORE Inductances, excellent for sharp or band-pass 50 to 100 Kc. I.F. or R.F.O. Very high Q. Unused, cased, adjustable; 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, Delta 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 HRO6OT, 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 lot. Mrs. Miriam Knapp, W1ZIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel. 521-2055

COLLINS 75S-1, $380; 32S-1 with AC, $520; 399C-1, $120; 516E-1, $180. K8YEI.

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, W1AFN, Alltronics-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 condx. Latest modification by factory authorized service. If you want a real clean, new condition staion, write W8BPB, 5210 Three Mile Drive, Detroit 24, Michigan, for photo or demonstration. Detroit area parties, phone TU 4-3800 days for appointment.

HAMMARLUND HQ-100 reciever 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 dip oscillator with all coils, perf. condx in original box. Want C-E, 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.

HQ-140XA, spkr. Heath Q-mult., $170 and in exclnt 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. TUxedo 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 W4ZG 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, K6QQI, 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, K2SAQ, 77 Ridge Road, Rumson, N.J. Phone 842-1209.

Palo Alto Area: Collins 310C-2 PTO VFO xmttr, 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 TCS12 rcvr and xmttr 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 6-4591.

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 HQ-100, $129.00; HQ-110, $179.00; HQ-170, $289; HQ-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 Longstreth, 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. W1JLX, 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, xtals; converted surplus 160, 80, or 40 meter plate-modulated pi-net 807 mobile or fixed transmitter built-in antenna, PTT relays; used 4CX300A'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. KØTBO, 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.

GG 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.

HAMMARLUND HQ-145 rcvr, w/spkr. In exc. condx, $150.00. No shipping, sry. Aramburu, 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, KØQMO, Rte. 1, Baxter, Iowa.

TRADE! 3¼ x 4¼ Graphic, with case, flash, holders. Want: Hy-Gain vertical tower. Doxsee, 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 VTVM 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 Superceiver 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 PMR6A, Multi-Product M1050 power supply and Gonset Super-Six. Write for details. WØAML, 2900 7th Ave., Marion, Iowa.

SELL: 2A-2AQ-2AC-2OA, QT1, 458VFO, LA4OOB, 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 5Ward 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-LP, $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. W1SAQ.

WANTED: SSB xmtr. K3LIY.

SELL Or swap: RDO—$65.00; BC-348Q, $45.00; APR-5, $35.00. W7PVF, 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 Challenger, $95; Hammarlund HQ-145, $175; Hallicrafters T.O. keyer 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. WV2SQR, 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 dynamotors. Write. F.o.b. W3NCX, 1005 Wyoming, Allentown, Penna.

COLLINS 32V-1, gud condx, $195.00. M. W. Chambless, W5PAR, 7115 Richwood, Houston, Texas.

WANTED B&W L1000A. State condx and price. E. C. Drake, KØZWB, 819 Millcrest 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. Pietropaolo, 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. WØMKF, 4412 C. Ave., N.E., Cedar Rapids, Iowa.

WANTED: Hallicrafters 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; VeeDx rotator $15; Lakeshore SSB audio generator, $7, other items. List, W4API, 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. KØRID, Brueschoff, 610 West 64th St., Minneapolis 23, Minn.

SELL: Central Electronics 100-V, factory modified. Original shipping case, $495. W9JWW.

HEATH HD20 crystal calibrator, $13.50; Heath PM-2 R.F. power meter, $11.50. 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; Mobile xmttr, 15 watts, $10; PMR6A rec. with supplies, $70; mint HQ-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, Wauconda, 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. WØIOC, 12301 E. 47th Terr., Independence, Mo.

FOR Sale: Hy-Gain 18HT vertical tower antenna, $80. Local sale only. Bob, W2QPP, 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 xmtter, 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-Xmttr, $12. F.o.b. W1KVG, Mirror Lake, N.H.

JOHNSON Challenger and Harvey-Wells R9A rcvr. Both in excellent condx, $125.00. You pick up in Levittown, N.J. Tel. TR 7-6494.

HUNDRED QSLS: 80¢. Samples, dime. Meininger, Jesup, Iowa.

DEMAMBRO Says. Sell our guaranteed used equipment: B&W 370 SSB adapter, $119; Central Electronic 20A-OT1, $175; Collins 75S1, $375; Eico 723 trans., $54.95; filter king VHF144, $32.50; Geloso G209 rcvr, $209.95; Geloso 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; Hallicrafters HT32, $349.00; Hallicrafters 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. CQ. Unmodified, 100-156 Mc. W/PS. $30.00. KØDHH.

WANTED: DX-100, HQ-129X. State price, condition. Sell: S-40B. Jonathan Pederson, Arlington, S.D.

FOR Sale: Collins 51-S-1 receiver (same coverage as 51J4) to the highest bidder. Will accept other commercial gear as part pay on this brand new item. M. E. Smith, K8GIDR, 5760 N. High St., Worthington, Ohio. Tel. TU 5-6886 after 0200 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. W2VQR, 709 Seventh Ave., Asbury Park, N.J.

SELL: Gonset Twins with power supply and mounting brackets, $210. G66B with Universal P/S and spkr. 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, K2POO 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, CQ, diving equipment, geiger, 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 eqiupment: mobile FM gear. Send for complete list. Dave Hale, W9RBX, 635 S. 21st Ave., Maywood, Ill.

WANTED: 75A2 or 75A3, tower, rotator, 3-el. 3 band beam. H. F. Cushing, W1EUS/6, 2348 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? WØRO, Larrabee, Iowa.

HQ180C, $335. CE20A with VFO, $145; Globe 680, $40; Hy-Gain 14AVS with 14RMK, $20. W8ZBD, 1605 Iowa, Midland, Mich.

TWO New Eimac 4-250A tubes, $65/pair. Singularly as last resort $35 each. Also McElroy bug—best offer. WA2SEU, David Burmaster, 3823 Macklem, 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 exclnt condx: $700.00. Bill Kulhanek, K2ASN, 28 Longfellow Dr., Huntington Sta., N.Y.

MUST Sell; Gonset II Communicator 6-meter, with xtals, 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, WØRRJ, Hallock, Minn.

SELL: 17 months old SX-110 with spkr, $90. APW, 206 Wilson, Mt. Horeb, Mt. Horeb, Wisc. EX KN9APW.

SELL: Eico 720, used 3 months, $90. WA2ZVJ, 2115 East 27th St., Brooklyn, N.Y.

SELL Hallicrafters 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, W2OEA, 82 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 Vermut, 83 Blackheath Road, Long Beach, L.I., N.Y. Tel. GE 2-0707.

FOR Sale: DX-100B, excellent condition. First $140 gets it. Shipment made from Nevada. Robert Ball, W7GBF, 125 Edgemore Lane, Ithaca, N.Y.

1 KW phone-c.w. VFO xmttr, 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. W4-CRL, 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-SIJ, 4058 Herman Ave. S.W., Grand Rapids 8, Mich.

SALE: Apache, 2 yrs. old, $175; SX-111, speaker, 1 yr. old, $225; Hallicrafters BC-610 KW xmtr; Lysco 600S exciter, all coils, excint 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.

BEST Offer above $299 takes almost new, perfect, Hallicrafters receiver SX-101, Mark III. Best SSB receiver. F.o.b. W1ZJ, Breezy Green, Leicester, Mass.

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, excint 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.

KWM-2, power supply and speaker, excellent, $895. L. Wecker, 225, Farhan Lane, North Babylon, L.I., N.Y.

SALE: Viking Valiant, factory wired, $300; Hallicrafters SX-111, $195. Both perfect. H. W. Barton, K4MYY, Box J-1, Greensboro, N.C.

SELL: SX-99 with xtal calibrator, $100; Heath QF-1, $8.00; Knight T50 xmttr, $30; VFO, $20.00. Perfect condx. Take all for $150.00. What's your offer? WA2KHV. 408 Bradford St., Brooklyn, N.Y.

FOR Sale: Apache (TX–1) $200; Hammarlund (HQ110), $180, TA33-Rotor, TWRT, $90; Johnson lo-pass, $8; Turner mike Dyn. $10; Vibroplex bug, $8; 14 ay vertical, $15. Complete ham station, $500. Murray Kallen, 4923 N. 11th St., Phila. 41, Penna.

SELL: AF-67, $110; PS-2V, $30; both $130. Instruction books, original cartons. W8PJH.

2 Meter FM 30 watt output 12 VDC Bendix, real clean, $30; Army walkie-talkie 388SKC, $12; 2.5 KVA plate trans., $10 each. Bendix 30 to 50 Mc. FM rcvr, $15. 813's, $2 each. W5BLZ.

SELL: SB10, $70; DX100B, $150. Combination $210. Both in excint condx. Jack Carnes, K2IOE, 3 Niagara St., Pulaski, N.Y.

TRADE My radio parts for your stamps, World War One flying books or cash. Mocabee, 2065 Eileen Dr., Anaheim, Calif.

DUE To illness sell two KW transmitters in 6 ft. cabinets: 4-400A with HT-32 exciter: two 250-A's with Central Electronics 20A and 458 VFO. Also separate complete KW power supply and SX-101 like new. Will sell separately. Sorry, can't ship! W1AVK, 1431 Plumtree Road, Springfield, Mass.

FOR Sale: 100v new 25 hours, best offer brand new Intercom Master and five station, 2 slaves. W2CYW.

QST Back issues, 1930-1952, 25¢ each. Fair to good condx. You pay postage. Send for free list. K2ZCC, 113 Iroquois Lane, Liverpool, N.Y.

VIKING Adventurer in original carton, w/manual, cath. modulator, $39.00. Johnson VFO-122, $25; Hallicrafters S-77A w/nary a scratch, manual, $43.00. Wally Wentworth, 1784 Germaine Ct., Hayward, Calif.

SELLING Out! RME 6900 $245.00; Johnson Invader, $495, both for $720; Viking mobile with coaxial relay, $48; Gonset Super 12, $45; Heath transistor power supply, $45, all three for $125.00. All these units are on the air and operating FB. First certified check takes all or any part by express collect. Also 23 acre antenna farm 19 mi. northeast of Colorado Springs, Colo., with long-wire V antenna four 132 ft. legs, improvements. Chuck Camp, KØIFT, RFD Peyton, Colorado.

FOR Sale: 75A1, immaculate condx. Best offer. W9PIO, Columbia, Ill.

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.

MUST Sell: SX-111, perfect, 20 hours use: $200; CE-20-A w/QT-1 excint condx, $180; all instruction books. You ship. Delivered in Tennessee. All offers considered. Randy Johnson, 818 W. Clark, Murfreesboro, Tenn.

1.7 KW power transformer, 230/115, 4700/2350, GE, weight 98 lbs., 500 mil swinging choke GE; two 810's, 866's, fil. transformers, sockets, $50 or best offer. Will not ship, sry. W1AUQ, 29 Rhinecliff St., Arlington, Mass.

QSTS. Wanted 1915 to 1921. Also second and four Handbook editions. Will sell QSTs 1926 up. Collins 75S-1 with 500 cycle filter, perf., $400. W2DYU, 36 New Lawn Ave., Kearny, N.J.

SAVE $44.95 on Communicator IV (2M). An identical unit traded in earlier is now listed at $294.95 by dealer. Also for sale: Valiant, $250; XCU-109 crystal calibrator, $10. Dick Long, Pulaski, Iowa.

JOHNSON KW amplifier with desk. Excellent. $695. F.o.b. HQ-145 mint with spkr, $215.00. Eldico 75 transmitter. Excellent. Make offer. Communicator III 6M with Gonset VFO and microphone, $195. Johnson Challenger, $85. DX-40. $55. Megaw, 5727 Antilles, Sarasota, Fla.

SELL: RAK-7 receiver with PS, $30 F.o.b.; Gonset noise clipper, $5.00; Gonset Monitone, $17.00; Gonset Converter, 3-30, $13; 20 meter beam, $30. F.o.b. K4MEP, 3517 W. Stillwood, Mobile, Ala.

SELL Model 955 digital inst. co. electronic counter and timer, 5 digit unit needs crystal, oven and 19 tubes, $190; Lampkin 103B, $185; Precision E-310 sine and sq. wave gen. $110.00; RCA WV-84A 6 range UA. meter, $45.00. Amperex 6083/9909 tube, $6.00. Robert Ireland, Pleasant Valley, N.Y.

BARGAIN: Hy-Gain 10000 in/lb. Rotobrake, only $33.00; CDR, TR-4 antenna rotator and indicator, $15.00, perfect condition. F.o.b. Dave Manning, Box 563, Riverside, Mich.

75A-4, excellent, $449; KWS-1, 4X250Bs, antenna relay, perfect, $869.00; 75A-1, $215.00; 75A-2, $265.00; 75S-1 with noise blanker, perfect, $439.00. W8WGA.

NEW Collins 30L-1 amplifier in unopened carton. $470. Class W5OTE. Box 387, Port Neches, Texas.

NEW Gonset G-63 receiver, $150; new factory wired 20-A with VFO, $150.00. BC-221 frequency meter, $45.00. New 4-1000 with filament transformer, $65.00. Harland Hirst, 113 Folkstone, Greenville, S.C.

75S1, 32S1, 516F-2, 312B-4—all or none: $995.00. Tecraft 220 Mc. transmitter, $40.00. K4GAX, Cash, no letters.

QST Magazines, 1939 thru 1959 $50; Radio-CQ together 1939 thru 1959, $50. Both for $75. W4JAG, Princeton, Ky.

WILL Sell complete station in new condx. Hallicrafters SX-140K rcvr and HT-40K transmitter commercially aligned. Dow-Key relay, Astatic mike and R-47 spkr. Best offer over $225.00 puts you on the air. Bill Stansbeary, Section 6-287, Sioux City Air Base, Iowa.

SELL: HQ-145, $215.00. WA2ZVJ, 2115 East 27th St., Brooklyn, N.Y.

POLY-COMM "62b", $290. W3CAV, 29 Wine St., Uniontown, Penna.

FABULOUS Swan SW-175 transceiver SSB-AM-CW, $255. Topaz SW-12A, mobile PS. $80.00. Package $325. Perfect condx. W3OKW.

SELL: Gonset G76 with transistor power supply, $390. KWS-1, spotless, $790. W2AEV, R. Jones, 111 Hillside Road, Farmingdale, N.Y.

FOR Sale: NC-300, serial AX481-0895 with spkr, calibrator, 6 & 2 meter converters in cabinet. Best offer. K1ABE, 130 Bishop Ave., Rumford 16, R.I.

FOR Sale: Hi-Pass filter (1 KW), $5.00; Collins KWS-1 TX, $900; Collins 75A2 RX, $240.00; Astatic mike, 10-D, $20; CDR Ham-M rotor, $90; Cesco reflectometer (CM 52-2), $20.00. Headset $4.00. All equipment in exc. condx. Contact Bill Borden, W5ZMR/8, 61 Darlington Ave., Ramsey, N.J.

SELL Gonset G77A with modulator-power supply for 12 and 115V., $150. G66B with 12v. supply, $100. Bandhoppers RC, 239 Wooster, Ferguson, Mo.

FOR Sale or trade: AN/APA6: TS182; DAQ; AN-URA/6; ART13. Wanted: SP600JX; 51J2; 51J3. See CQ advertisement for other details. W2TAM, 140 Summit Ave., West Trenton, N.J.

ALL 3 Months old, Drake 2B with calibrator, extra xtal, $220; Ameco TX86 transmitter 6-80, $75; 250-watt Topaz transistor 12v supply 600/300, 0-120V., $65. Fred Breidbart, WA2JJJ, 1725 Broadway, Brooklyn 7, N.Y. GL 5-2222.

McMURDO-Silver masterpiece VI 20-tube model. Urgently require schematic. Finch, 1343E, 5935S, Salt Lake City 17, Utah.

HEATH Tener and 29.6 Mc xtal, $35; Collins 800 cycle filter for 75A-4, $35; RCA tube and semiconductor handbooks HB-3 and HB-10, complete, $15. Power connector for KWM-1, cost $12.65, sell for $4.00. BC-669 with heavy duty power supply, $75. Will not ship BC-669 because of weight. 20-watt all-band VFO free with BC-669 if sold in Denver area. WØCHM, 1527 Fifth St., Boulder, Colorado.

ALL-BAND KW P/P 813, 810 mod., $275. Collins 310B, $95. K6IYC, 101 B St., Roseville, Calif. Tel. SU 3-7777.

GPR-90 Receiver for sale, very reasonable! $350.00. New York City area. Jerry Soto, Glenmore 5-9125, 469 Central Ave., Brooklyn 21, N.Y.

BEFORE You buy receiving tubes or electronic components, send now for your giant free Zalytron current catalog featuring nationally known Zalytron first quality TB-Radio tubes, Ham, Hi-Fi Stereo equipment, kits, parts, special purpose tubes, antennas, etc. All priced to save you plenty. Why pay more? Zalytron Tube Corp., 220-Q W. 42nd St., N.Y.C.

VIKING Ranger, used very little. In excint condx. $170. No shipping, sry! W2OGR.

CHICAGOLAND Amateurs! Factory authorized service for Hallicrafters, Hammarlund, Johnson, Gonset. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. SKyline 5-4056.

HOUSECLEANING: Collins Autotune units, [15/60, $12.00; Hickok 305 'scope, $30; Dumont 256 'scope (list $1705), $90; Royal KMM typewriter, $40; large receiver cabinet, $4; Navy RBF Autotune rcvr, 110/60, $40; Microvolter signal generator, $30; Zenith Transoceanic, $35; Magnecord M33, $90; Scott custom receiver (swap for gud ham set); Navy 1 MC battleship amplifier (excint hi-pwr PS), $30; WA9DYE, 114 W. Lake View Ave., Milwaukee 17, Wis.

"HOSS-TRADER" Ed Moory says the Horse-Thief has come and my stable is empty. We need your used Sideband Equipment to replenish our empty shelves. We will give "Top Trades" or pay "Top Dollar" for following equipment: 20-As, 32S-1s, KWM-2, 200-V, HT-37, 75A-4, 51J-3 and Drake 2Bs. Summer sale: Used equipment—Drake 2-A, $199.00; 75A-4, $485.00; Collins KWS-1 and supply, $895.00; HT-37, $369.00; 75S-3, month old, $549.00; 30L-1, $399.00, 32S-1, $499.00, news demonstrator 200-V, $775.00; Swan transceiver week old, $239.00; 75A-3, $349.00; 2-B, $219.00; DX-40 and VF-1, VFO, $65.00. Terms, cash. "Ed Moory" Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

KWM-1, 516F-1 ACPS, 516E-1 DCPS, 312B-2 spkr with SWR bridge, excint condx, $795.00 delivered USA 48. WØRA.

COLLINS mechanical filters, several available, 500, 455, 300 and 250 Kc. Write for list. Will sell or swap for other filters I need. W8MGO, 1010 Burnham, Bloomfield Hills, Michigan.

7-TRANSISTOR Portable radio, works fine (case cracked), $7.50; VM 3-speed automatic record-changer, amplifier and spkr, $10; Bogen 5-station intercome master, $10. V. R. Hein, 418 Gregory, Rockford, Ill.

SWAP: Rider's Manuals, Nos. 1 thru 24 for ham receiver. Prefer National or Hammarlund, but will consider other makes or will sell for best offer. K9WMD, 803 W. Locust St., Bloomington, Ill.

HRO-50T, in top condx, coil sets A thru J complete, crystal calibrator, Collins mechanical filter, $225; freq. meter TS-17SU, 85 to 1000 Mcs., unused, $150; number of new 404A's. Make offer. J. Swift, 1381 Richmond Ct., East Meadow, L.I., N.Y.

MOVING, Must sell, NC-183 receiver, $165; Globe DSB-100 transmitter, $50; Hallicrafters HT-31 linear, $150; Johnson T-R switch, $15; Globe VFO model 555, $20. All for $375. WA2-QPN, Wulf, 1556 Lexington Parkway, Schenectady 9, N.Y.

WANTED: Air sockets for 4X150As. W7YBX, 5102 Wallingford, Seattle, Wash.

FOR Sale: Hammarlund HQ-160 w/speaker. Superb condition. $200 or best offer. L. Kinney, K6GVM, 766 Ocean Crest Road, Cardiff-by-the-Sea, California.

COLLINS 75A1, 310B3, both like new, $250. DeSalvo, 2890 East 197th St., Bronx 61, New York City. Tel. TA 9-3070.

SELL For $75.00, or trade: For receiver or tape recorder—complete 1961 ICS 2nd class telephone course with Candler System Code Course. Warner, 9460 SW 69 Ave., Miami, Fla.

SELL: New National NC-270, operated only 3 hours. Performs perfectly, still in warrantee. $215.00. Will deliver anywhere near New York City or Connecticut. L. Buckwalter, Wildridge Road, Georgetown, Conn. Tel. 544-8517.

VIKING II Transmitter, looks good and is on the air almost daily. $95 plus postage. Larry Loughren, K6SGD, 434 8th Ave., Menlo Park, Calif.

COLLEGE Bound, must sell, Heath Comanche, $99; DX-35 and VFO, $49. K8SLX, 575 Bryant Ave., Manistee, Mich.

HAM BUERGERS Used Equipment, Money Back Guarantee. B&W 370, $79.95; B&W 51SB, $174.95; Globe Linear Mohawk RX1 and speaker, $275; Globe 90A, $49.95; Globe Linear, $74.95; Gonset GSB100, $299.95; Gonset 2 Meter Linear, $124.95; Gonset 6 meter linear, $124.95; Gonset 2 meter Comm. IV, $284.95; Gonset Super 12, $54.95; Heath SB10, $89.95; Johnson Thunderbolt Demo., $494.50; Johnson Pacemaker, $324.95; National NC300, $244.95; National NC188 New, $124.95; National NC183D, $239.95; National NC183, $149.95; National NC303, $369.95; Phase Master II with VFO, $289.00; Polycom E-2 Demo, $339.00; RME 4300, $124.95. Trades. Write for free list. Ham Buergers, Wyncote, Penna. CA 4-1740.

SELL: 32S1 transmitter with 110 VAC supply and 75S1 receiver. All for $865.00. 51J3 receiver, $475.00. Cecil White, 1133 Canterbury, RI 7-1852, Dallas, Texas.

WANTED: 8000 feet RG-17AU or similar. 6000 feet RG/8U or similar. Also vacuum capacitors, 500 micromicrofarad and 1000 micromicrofarad. Ike Lee, engineer, P.O. Box 1103, WAPE, Jacksonville, Fla.

SELL: General Electric oscilloscope ST-2A, in new condition: $175.00. Fred Wiedenroth, Madison Lake, Minnesota.

GOING To College, Must sell my HRO-60T. In vy fine condx, $300. Also acc. E, F, G, H, J, AD coils. $25.00. Will consider any reasonable offer for all or part of above. All inquiries answered. Chris, WA6HTJ, 2515 No. Vermont, Los Angeles 27, Calif.

COMMAND Xmttrs, rcvrs (100) while they last; new $6.25, used $5.00; include postage! Sanders, W4EDW, 3596 Canadian Way, Tucker, Georgia.

GONSET GSB-100 and SX-111 receiver. Both in A-1 condx. First best offer over $450 for both. Lt-Col. Joseph Churan, W3JOM, Qtrs 268, USMA, West Point, N.Y.

SELL Crystal calibrators for NC-300, 303, $18 and $28. W8-BBA/6, 17552 Kittridge, Van Nuys, Calif.

BALTIMORE Area: Heath Apache accessories. Best offer. Call W3JVO, HO 7-2683.

APACHE TX-1, 1 year old, $210. KØIKN, V. A. Van Der Hyde, 747 14th St., S.W. Huron, So. Dakota.

DX-40 and VF1, in gud condx, $75 plus shipping. K5SLW, Box 355, Slidell, La.

WANTED: Heathkit Seneca in gud condx; Jim Montgomery, Pern Creek, Ky.

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Hey, Ham Fan...X.Y.L. and O.M.

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12TH NATIONAL A.R.R.L. CONVENTION

Memorial Coliseum—Portland, Oregon

September 1 · 2 · 3 · 1962

***Electronics EXHIBIT**

occupying many thousands of square feet will in itself be worth the trip. Included is a working model of the "Oscar" satellite that made communications history. Also National Aeronautical and Space Administration display of our first man-carrying satellite, Friendship Seven. Admission to this biggest ever exhibit will be $1 but it's FREE to all badge wearers . . . meaning all hams and non-hams who register.

Don't miss these exciting ham-filled days . . . and events

* Navy Radar Picket Destroyer—will be in the Portland harbor especially for this convention. Hams will be taken on special behind-the-scenes tours on this ship which is loaded with the latest gear.

* **ARRL Officials**—from Hartford will take part in technical discussions, bring us the latest news of legislation, frequency allotments, new headquarters building, etc.

* **Technical Papers**—and talks by engineers and leaders in the electronics field. Demonstrations and new ideas from the men "who know" from all parts of the country.

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G-66B Receiver.....$129.50
G-77A Transmitter..... 169.00
3175 6-Meter Converter..... 49.00
Super-6 Converter..... 29.00
Commander Transmitter..... 49.00

Eico
720 Transmitter..... 69.00

Heath
Cheyenne Transmitter..... 89.00
Comanche Receiver..... 99.00

Morrow
560A Transmitter..... 119.00
Falcon Receiver..... 89.00

Multi Products
AF-67 Transmitter..... 99.00
PMR-7 Receiver..... 89.00

NOVICE/SWL BARGAINS

Globe
Scout Deluxe Transmitter.... 124.00

Hallicrafters
S-85 Receiver..... 79.00
SX-99 Receiver..... 99.00
SX-110 Receiver..... 109.00
HT-40 Transmitter..... 74.00

Hammarlund
HQ-105TR (comb. SW Receiver and CB Transceiver)..... 189.00
HQ-140X Receiver..... 149.00
HQ-129X Receiver..... 119.00

Knight
R-55 Receiver..... 59.00
V-44 VFO..... 19.95

Lettine
240 Transmitter..... 39.00

Millen
50-Watt Transmitter (w/pwr supply built-in)..... 29.00

National
NC-88 Receiver.....$ 89.00
NC-188 Receiver..... 89.00
NC-270 Receiver..... 189.00

SSB EQUIPMENT VALUES

Central Electronics
MM-1 Scope..... 69.95

Collins
30S-1 KW Linear..... 995.00
32S-1 Transmitter..... 449.00
75S-1 Receiver..... 395.00

Drake
2A Receiver..... 229.00

Gonset
G-28 10-Meter Transceiver... 159.00

Globe
Sideband Transmitter..... 89.00

Hallicrafters
HT-31 500-W Linear..... 99.00
HT-32 Transmitter..... 350.00
SX-100 Receiver..... 179.00
SX-101 MK1A Receiver..... 199.00

Heath
SB-10 SSB Generator..... 79.00

Hammarlund
HX-500 SSB Transmitter..... 479.00
HQ-170 Receiver..... 259.00

VHF EQUIPMENT

Gonset
Communicator IV 6-Mtr..... 289.00
Communicator III 6-Mtr..... 179.00

Lincoln
6 Meter Transceiver..... 39.00

RME
VHF-126 1¼, 2 & 6 Mtr. Converter..... 179.00

Hallicrafters
S-95 152-174 mc FM Receiver 49.00
SR-34 6 & 2 Mtr. Transceiver Universal Model..... 299.00

OTHER USED GEAR SPECIALS

Collins
310B Exciter/Transmitter.....$ 99.00
32V-1 Transmitter..... 189.00

Hammarlund
SP-400 Super-Pro Receiver.. 165.00
HQ-160 Receiver..... 239.00

Johnson
KW Matchbox (standard model)..... 89.00

National
HRO-60..... 369.00
RDF-66 Direction Finder..... 12.95

RME
HF-10/20 Converter..... 39.00
4300 Receiver..... 119.00
4350 Receiver..... 129.00

Sonar
SRT-120 100 W. Phone & CW Transmitter..... 95.00

Inventory Clearance Closeouts:

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Gonset 40-50 mc Hybrid FM Converter.
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The National NC-303 is *not* for every amateur...

Frankly, the NC-303 is an expensive receiver. And not every ham is willing to spend $449 to enjoy the maximum in receiving convenience and performance. The NC-303 is not a "compact" light weight. It's packed with 78 pounds of husky components to provide a little bit better reliability and performance than the next receiver. The NC-303 offers certain advantages. Sensitivity, for example, is an honest 1.0 microvolt or better for 10 db AM signal-to-noise ratio (this is not a misleading CW measurement or one based on a 6 db S/N) and the NC-303 is quiet — no operator fatigue from background noise bursts.

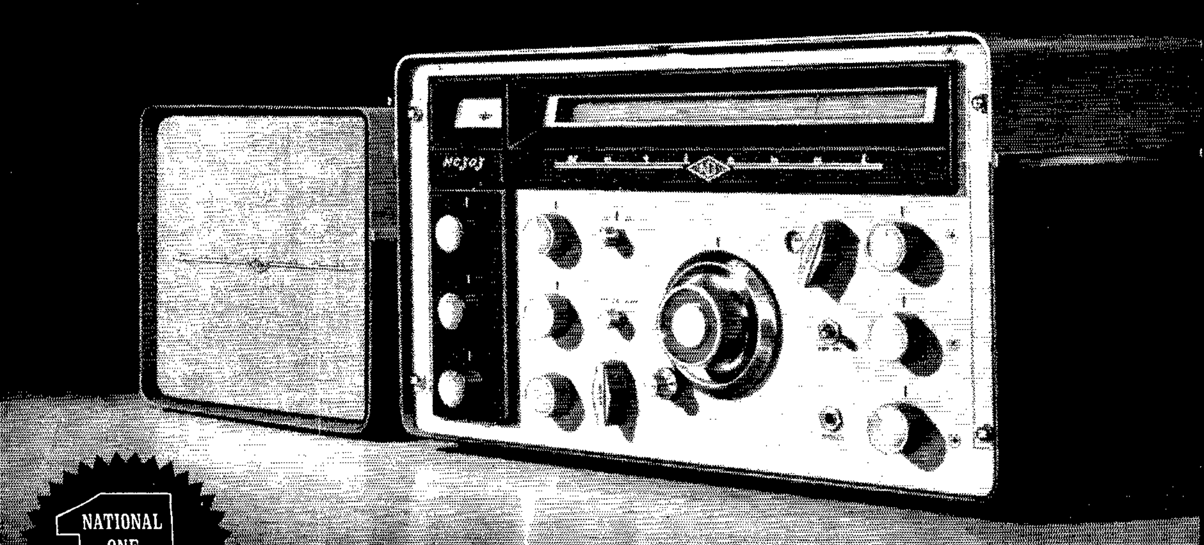
Selectivity is remarkable (six tuned circuits at 80 KC result in extremely steep skirts on SSB and CW) . . . and the '303 offers the widest selectivity range available on any hamband receiver — 400 cycles through 8 KC. Stability, both mechanical and electrical, is quite out of the ordinary. No need to tiptoe around the shack. In fact, tune a CW signal and employ the classic "drop test" to see for yourself. Incidentally, we consider 100 cycle thermal drift after a short warm-up to be unusual.

"This is all very well", you may say, "but not a great deal better than competitive receivers". We agree — for four hundred and fifty dollars you should expect much more than this, and so we give more to you. The most expensive dial drive in the industry to provide smoother inertia tuning than any receiver on the market, regardless of price. The NC-303's band switch mechanism even employs a Geneva movement . . . you just start it on its way . . . it does the rest of the job by itself. No wiggling back and forth to make sure every contact is engaged. This switch snaps in with a satisfying clunk and stays there. (Try tuning a signal on one band, then flip to another band and back again.)

Other extras include complete coverage from 160 (by the way, the '303 is the only SSB hamband receiver now on the market which incorporates 160) through 6 meters with separate 12" slide rule drum dials for each band, and accessory converters are available for the three VHF bands. Even a separate converter input is provided. Dial calibration is to 1 KC on the lowest band, to 2 KC through 10 meters.

The '303 also offers the best SSB AVC you've ever heard. No pops, thumps or distortion . . . just a constant gain level through local or DX QSO. There's an audio response control for CW peaking or VHF scatter work . . . an active nulling Q multiplier for 50-60 db notches, complete with depth control . . . an unusual noise limiter which cuts impulse noise without signal distortion, plus adjustable CW/SSB limiting. Even external provision for RF gain control for CW break-in operation and an accessory socket for receiver accessories or adapters are included.

The NC-303 was not designed to meet competitive price or performance, but to provide maximum hamband performance for every type of operation. Not just SSB, not just AM, not just CW . . . but every mode. As a result, it costs more than the average ham receiver. On the other hand, if your requirements are for more than "the average", perhaps the '303 should be your next receiver. Why not operate one soon and find out?



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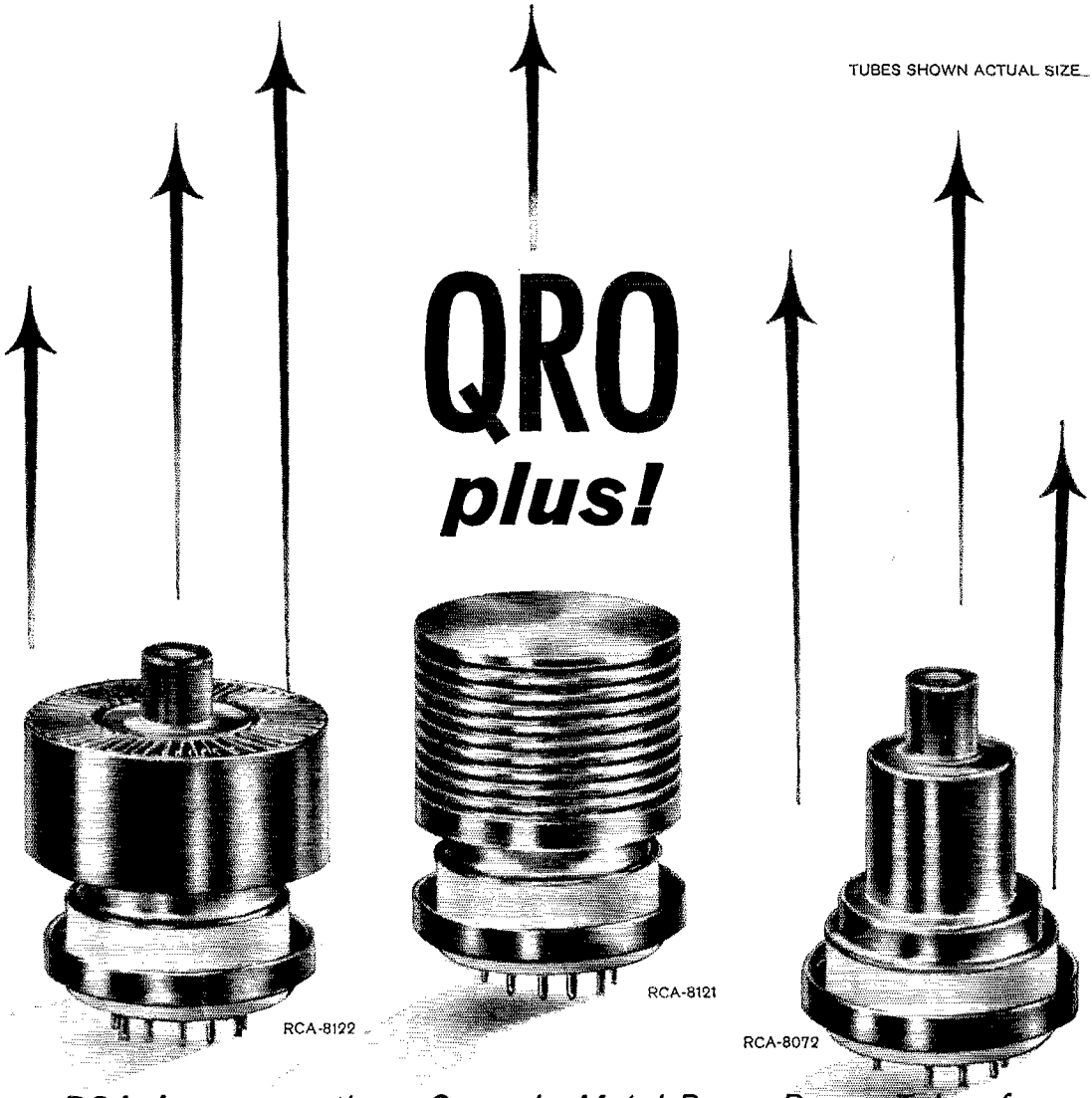

RCA Announces three Ceramic-Metal Beam Power Tubes for Higher-Efficiency Operation on Amateur UHF

You are looking at three of the most remarkable beam power tubes ever offered for amateur high-band operation. Ceramic-Metal construction makes them the toughest you can get for mobile service ... provides increased heat-handling capacity—reduces tube size for compact UHF transmitter designs. High-perveance design enables you to achieve UHF power output at relatively low plate voltages.

RCA-8072, RCA-8121, and RCA-8122 are manufactured with the RCA exclusive grid-making technique for precision grid alignment and exceptional structural stability. Each tube features a 13.5-volt heater. See chart at right for plate voltages, useful power outputs, and operating frequencies for typical CW operation.

When you build or buy for high-band operation—SSB, AM, or CW —you'll get top results with an RCA Ceramic-Metal beam power tube. See your RCA Industrial Tube Distributor for the types you need.

NEW RCA CERAMIC-METAL TUBES FOR AMATEUR USE

RCA No.	Type of Cooling	Plate Volts	Freq. Mc.	Useful Power Output Watts
8072	Conduction	700	50 175 470	110 105 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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