April 1965
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QST

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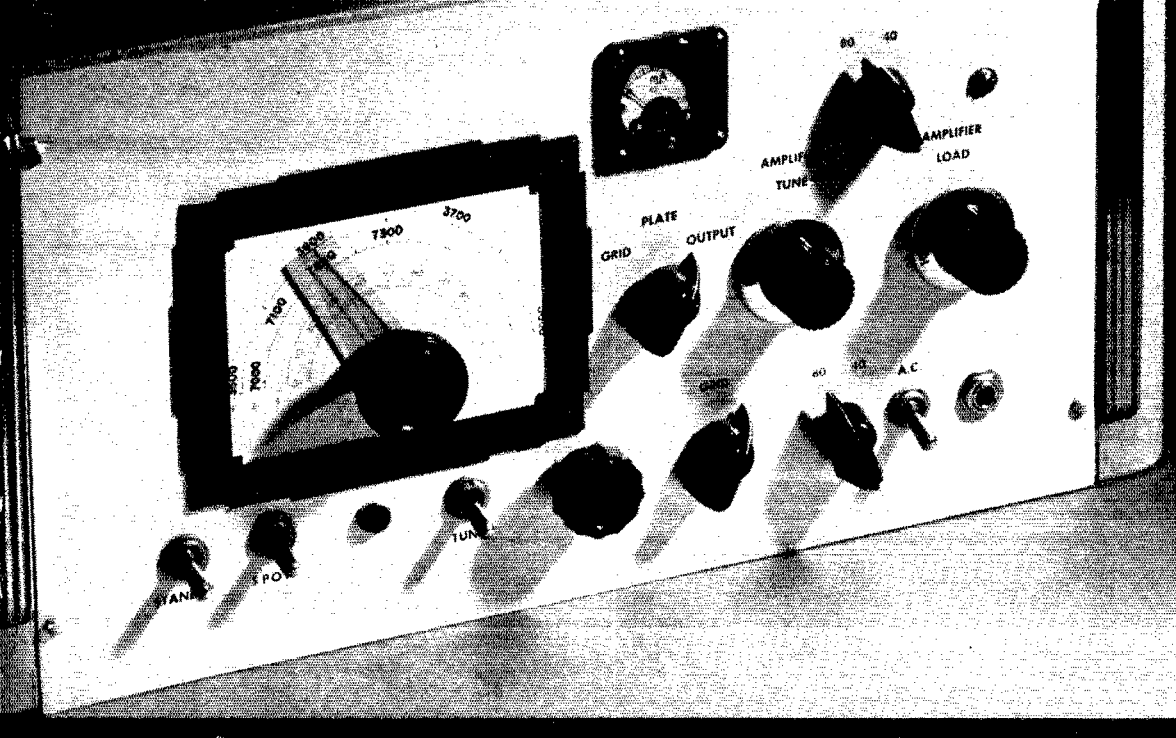
amateur radio



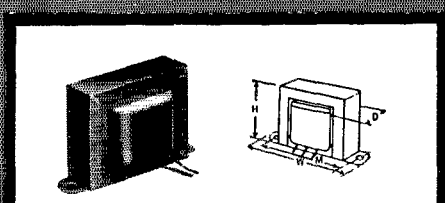
PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

REPLACEMENT TYPE TRANSFORMERS & REACTORS

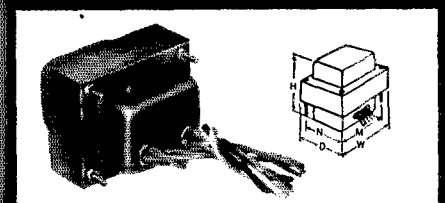
PIONEERS IN MINIATURIZATION

Thirty years of pioneering by UTC's research, design, and engineering staffs assures you quality and reliability unexcelled in the industry. UTC's line of stock and special custom built items covers virtually every transformer and filter requirement for both military and commercial use.

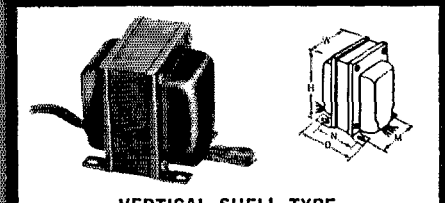
UTC replacement type transformers here described (Pri. 117 V 50/60 cycles) provide the highest reliability in this field. All units are low temperature rise, vacuum sealed against humidity with special impregnating materials to prevent corrosion and electrolysis. Shells are finished in attractive high lustre black enamel.



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	2 1/16	1 1/2	1 11/16	2 3/16	3/4
FT-2	6.3 VCT-1.2A	2 1/16	1 1/2	1 11/16	2 3/16	3/4
FT-3	2.5 VCT-6A	3 3/16	1 7/8	2	2 13/16	1
FT-4	6.3 VCT-3A	3 3/16	1 7/8	2	2 13/16	1
FT-5	2.5 VCT-10A	3 1/4	2 1/16	2 5/16	3 1/16	1 1/2
FT-6	5 VCT-3A	3 1/4	2 1/16	2 5/16	3 1/16	1 1/2
FT-7	7.5 VCT-3A	3 1/4	2 1/16	2 5/16	3 1/16	1 1/2
FT-8	6.3 VCT-8A	4	2 1/2	2 5/16	3 5/16	2 1/4
FT-10	24 VCT-2A or 12V-4A	4	2 5/8	2 5/16	3 5/16	2 1/2
FT-11	24 VCT-1A or 12V-2A	3 1/4	2 1/16	2 5/16	3 1/16	1 1/2
FT-12	36 VCT-1.3A or 18V-2.6A	4	2 5/16	2 5/16	3 5/16	2 1/4

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

FT-13	26 VCT-.04A	2 1/16	1 3/16	1 1/16	1 3/16	1/4
FT-14	26 VCT-.25A	2 1/16	1 3/16	1 11/16	2 3/16	3/4

DOUBLE SHELL POWER TRANSFORMERS

Type No.	High V.	DC ma	5V. Fil.	6.3 VCT Fil.	W	D	H	M	N	Wt. Lbs.
R-101	275-0-275	50	2A	2.7A	3	2 1/16	3	2 1/16	2	2 1/2
R-102	350-0-350	70	3A	3A	3	2 1/16	3 5/16	2 1/16	2	3 1/2
R-103	350-0-350	90	3A	3.5A	3 1/16	2 1/16	3 13/16	2 13/16	2 1/16	4 1/2
R-104	350-0-350	120	3A	5A	3 1/16	3 1/16	3 7/16	3 1/16	2 1/16	5 1/2
R-105	385-0-385	160	3A	5A	3 1/16	3 1/16	4 5/16	3 1/16	2 1/16	7

VERTICAL SHELL POWER TRANSFORMERS

Type No.	High V.	DC ma	5V. Fil.	6.3 VCT Fil.	W	D	H	M	N	Wt. Lbs.
R-110	300-0-300	50	2A	2.7A	2 5/16	2 13/16	3 1/16	2	1 1/16	2 1/2
R-111	350-0-350	70	3A	3A	2 5/16	3 5/16	3 1/16	2	2 1/16	3 1/2
R-112	350-0-350	120	3A	5A	3 5/16	3 11/16	4	2 1/16	2 5/16	5 1/2
R-113	400-0-400	200	3A	6A	3 7/16	4 5/16	4 5/16	3	3 1/16	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	2 3/16	1 3/16	1 3/16	2	1/2
R-14	8	40ma	250	2 7/16	1 1/2	1 11/16	2 1/16	3/4
R-15	12	30ma	450	2 7/16	1 1/2	1 11/16	2 3/16	3/4
R-16	15	30ma	630	2 7/16	1 1/2	1 11/16	2 1/16	3/4
R-17	20	40ma	850	3 5/16	1 5/16	2	2 13/16	1
R-18	8	80ma	250	3 5/16	1 5/16	2	2 13/16	1
R-19	14	100ma	450	3 3/16	1 7/16	2 3/16	3 1/16	1 1/2
R-20	5	200ma	90	4 1/16	2 1/16	2 5/16	3 5/16	2 1/2
R-21	15/3	200ma	90	4 1/16	2 1/16	2 5/16	3 5/16	2 1/2
R-220	100/8 Mhy 25/2 Mhy	2.5A 5A	.6 .16	3 3/16	2	2 5/16	3 1/16	1 1/2

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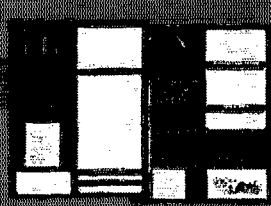
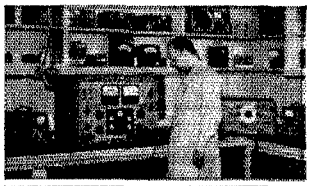
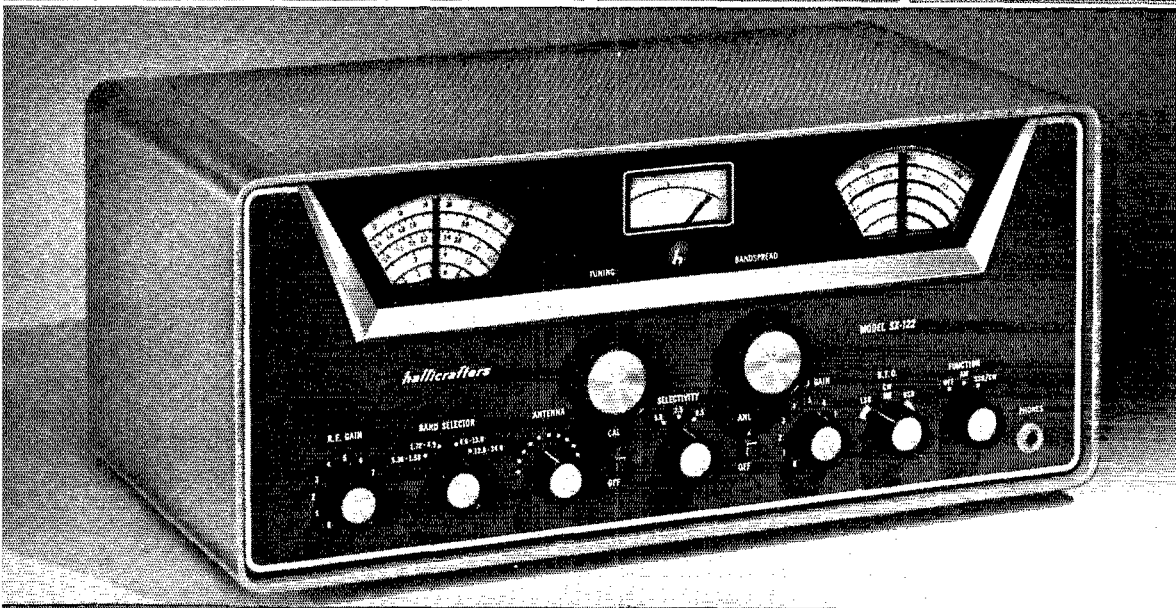


Compromise...
but not with quality!

The SX-122 is subjected to exactly the same exhaustive Quality Control Procedures applied to the most costly of Hallicrafters amateur-band equipment.





NEW SX-122 dual conversion general coverage receiver $295.00

If you operate **exclusively** on the amateur bands, we hardly need point out that an amateur-band-only receiver will give you more sophisticated features and performance for your money than **any** general coverage unit.

But if your personal interests require the versatility of a general coverage receiver, the wisest compromise you can make is the new SX-122 receiver.

For maximum flexibility consistent with the **high standards of basic performance you demand,** nothing even close to its price can touch the SX-122.

In addition to the solid value specifications listed alongside, the SX-122 brings you a major advance in stability through additional temperature compensation of the h.f. oscillator circuits and use of crystal-controlled 2nd conversion oscillator.

The SX-122 is in stock, at your distributor's today.

FEATURES: Deluxe general coverage receiver. Broadcast (538-1580 kc.) plus three S/W bands (1720 kc.—34 Mc.). Dual conversion, superheterodyne over the entire frequency range. SSB/CW/AM reception. Product detector for SSB/CW. Envelope detector for AM. Series noise limiter. Heavy-duty tuning capacitor with copper plates in oscillator section for maximum electro-mechanical stability. Audio output: 1.0 watts with less than 10% distortion. Three steps of selectivity: 0.5, 2.5, 5.0 kc. at 6.0 db down. Antenna trimmer, amplified AVC. 2nd conversion oscillator crystal-controlled. Size: 18¾" wide, 8" high, 9¾" deep. Provision for 100 kc. crystal calibrator accessory (HA-7). UL approved.

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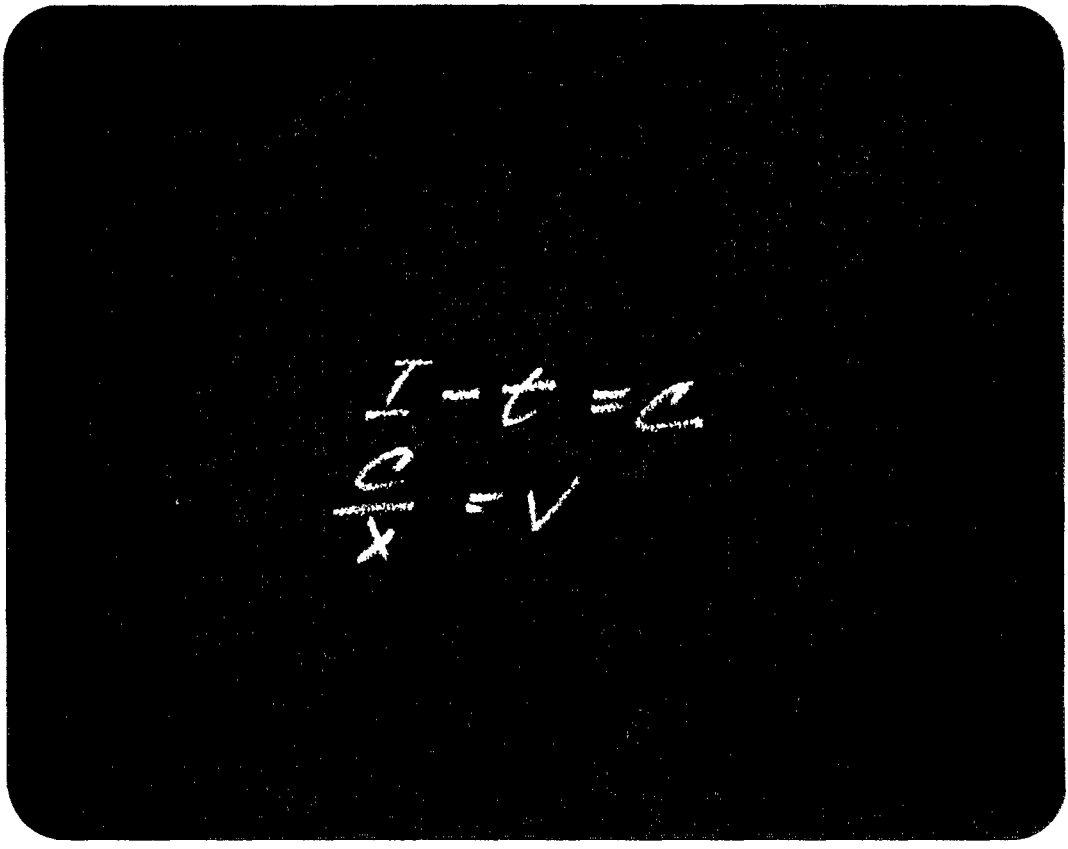
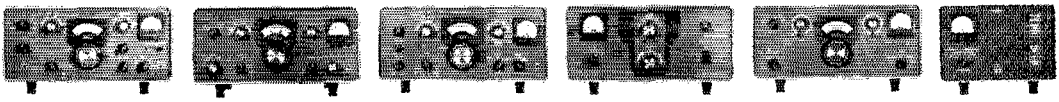


SIMPLE ARITHMETIC

No other equipment on the market holds its value like Collins' S/Line gear. That's one reason Collins is such a good investment. A little simple arithmetic brings home the point. Your initial investment minus trade-in value equals your cost for Collins' S/Line. Divide your cost by the number of years you keep your S/Line gear and you'll have the true value of how little it costs to own the finest. ☐ Check your Collins distributor and compare prices. Then check and compare equipment features. Collins offers you complete station compatibility; frequency stability; frequency calibration; more QSO's per kilocycle; mechanical filters; dual or single PTO control; automatic load control; negative RF feedback; light weight; distinctive simplicity and styling. ☐ Once, these features were all Collins "exclusives." Even today, Collins offers you all ten — Collins is still unexcelled. ☐ Visit your Collins distributor and see the S/Line. Then do your own simple arithmetic. Find out for yourself that it costs less to own the finest.



COLLINS

QST

APRIL 1965

VOLUME XLIX NUMBER 4

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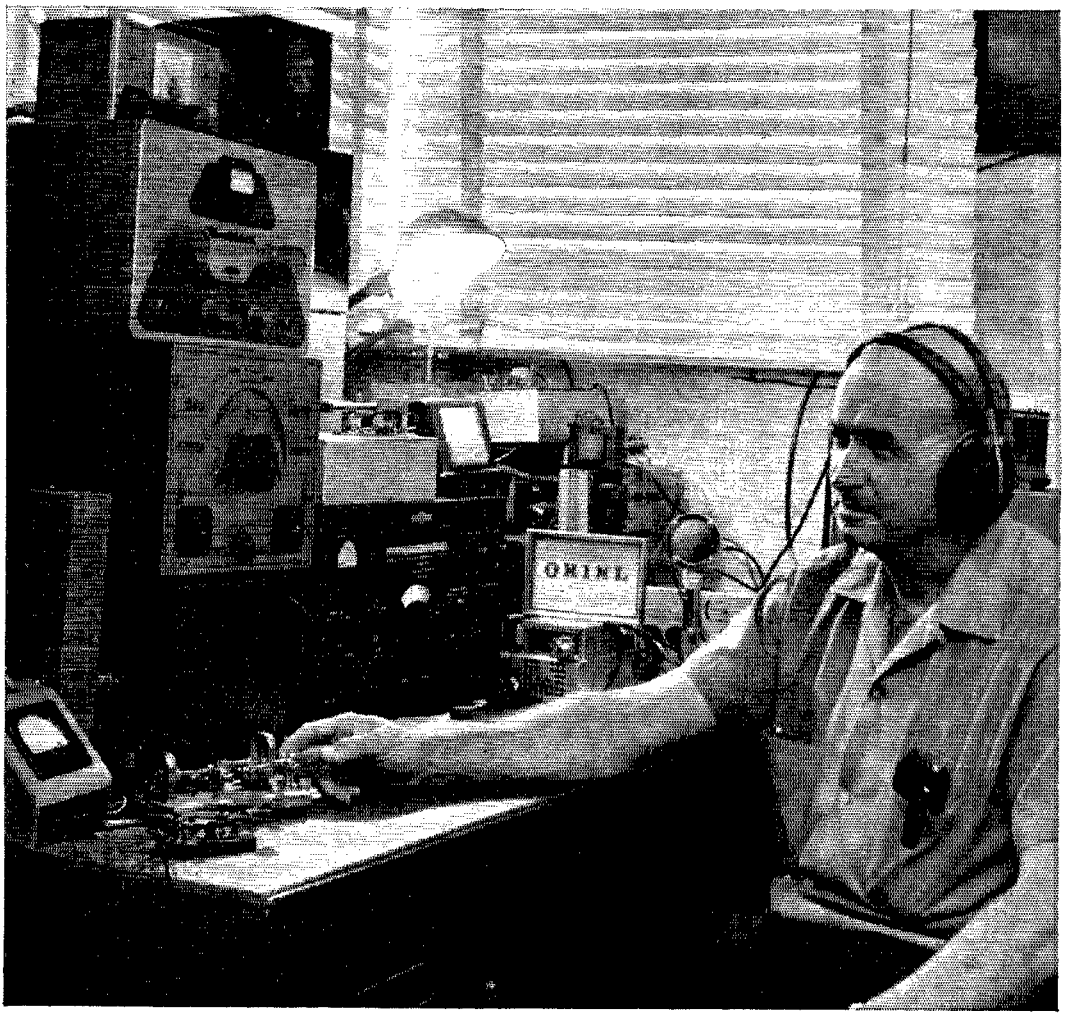
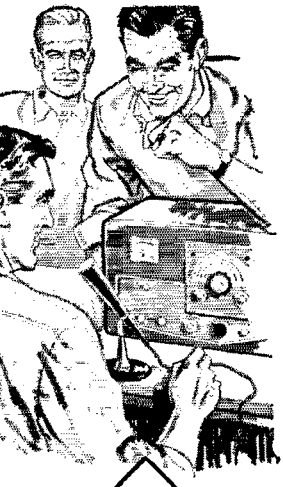
—CONTENTS—

EIMAC salutes W6DNG: first across the Atlantic on 144 Mcs!

On April 11, 1964, W6DNG of Long Beach, California and OH1NL of Nakkila, Finland established two-way 144 Mcs contact via moon-bounce! This record-breaking communication was the result of years of patient effort and experiment. The difficult earth-moon-earth path was successfully conquered by a combination of radio amateur "know-how," enthusiasm, and state-of-the art equipment. High gain antennas, low noise narrow-band receivers and a reliable kilowatt transmitter using Eimac 4CX250B's joined with VHF experience to break the VHF communication barrier between Europe and North America. Eitel-McCullough joins the A.R.R.L. and all radio amateurs in saluting W6DNG and OH1NL: two radio amateur pioneers, blazing a trail of achievement in long distance VHF communication. Eitel-McCullough, Inc., San Carlos, California. In Europe, you may contact Eitel-McCullough, S.A., 15 rue du Jeu-de-l'Arc, Geneva, Switzerland.





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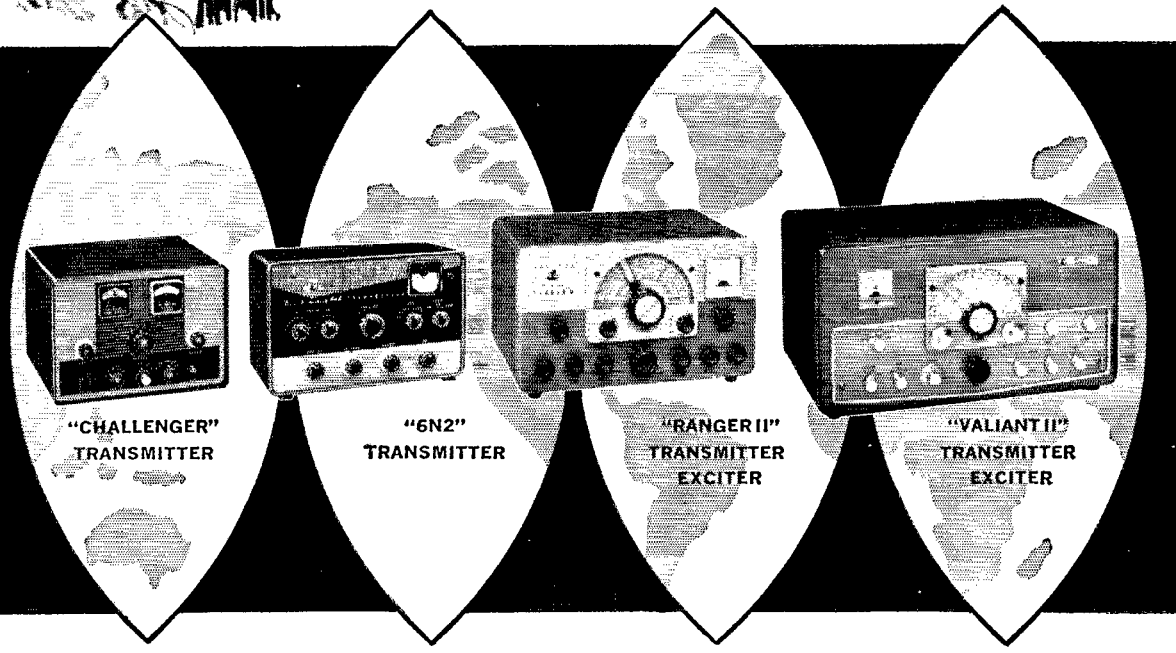
Excellent dollar value—solid performance—dozens of features—and an unmatched reputation for reliability—that's why, whether you're a novice or experienced amateur, it will pay you to investigate E. F. Johnson Company's complete line of Viking Amateur Radio Equipment!



4 Popular Transmitters for the novice or experienced amateur!

"CHALLENGER" TRANSMITTER—Ideal for fixed station or portable use. 70 watts phone input 80 through 6 meters—120 watts CW input 80 through 10 and 85 watts CW input on 6 meters. Crystal or external VFO control—TVI suppressed—wide range pi-network output. With tubes.

Cat. No.	Net
240-182-1 Kit	$124.75
240-182-2 Wired	$169.75

"6N2" TRANSMITTER—This compact VHF transmitter is rated at 150 watts CW and 100 watts phone. Bandswitching 6 and 2 meters—may be used with "Ranger II" or similar power supply/modulator combinations. Crystal control or external VFO with 8-9 mc output. With tubes, less crystals, key and microphone.

Cat. No.	Net
240-201-2 Wired	$194.50

"RANGER II" TRANSMITTER/EXCITER — Now—a new version of the popular "Ranger" transmitter. 75 watts CW or 65 watts phone input. Also serves as an RF/audio exciter for high power equipment. Completely self-contained, instant bandswitching 160 through 6 meters! Operates by built-in VFO or crystal control. High gain audio—timed sequence keying — TVI suppressed. Pi-network load matching from 50 to 500 ohms. With tubes, less crystals, key and microphone.

Cat. No.	Net
240-162-1 Kit	$249.50
240-162-2 Wired	$359.50

"VALIANT II" TRANSMITTER/EXCITER — 275 watts input CW or SSB (with auxiliary SSB exciter or the new Viking SSB adapter) 200 watts phone. Instant bandswitching 160 through 10 meters. Crystal or built-in differentially temperature compensated VFO control. Pi-network output matches antenna loads from 50 to 600 ohms. TVI suppressed — timed sequence keying — built-in low pass audio filter — self-contained power supplies. With tubes, less crystals.

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Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OES, OPS, OO and OBS. Technicians may be appointed OES, OBS or V.H.F. PAM. Novices may be appointed OES. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

ATLANTIC DIVISION				
Delaware	W3IYE,	Roy A. Belair	415 Brighton Road	Wilmington 19809
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.	Tamaqua 18252
Maryland-D. C.	W3QA	Bruce Boyd	415 Wickham Rd.	Baltimore, Md. 21229
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.	Palmyra 08065
Western New York	K2HUK	Charles T. Hansen	211 Rosemont Drive	Buffalo 26
Western Pennsylvania	W3GJY	John F. Wojtkiewicz	1400 Chaplin St.	Conway
CENTRAL DIVISION				
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	W9YYX	Ernest L. Nichols	RFD 7	Bloomington 47403
Wisconsin	K9GSC	Kenneth A. Ebneter	822 Wauona Trail	Portage 53901
DAKOTA DIVISION				
Minnesota	WØTCK	Herman R. Kopischke, Jr.,	RFD 2	Janesville
North Dakota	WØHVA	Harold A. Wengel	805-3rd St., S. W.	Minot
South Dakota	WØRRN	J. W. Sikorski	1900 S. Menlo Ave.	Sioux Falls
DELTA DIVISION				
Arkansas	W5DTR	Curtis R. Williams	Route 3, Box 230	Little Rock 72205
Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 354-E	Covington
Mississippi	W5EMM	S. H. Hairston	2321-27th Ave.	Meridian
Tennessee	W4UVP	William Scott	115 East Holston Ave.	Johnson City
GREAT LAKES DIVISION				
Kentucky	K4QIO	Mrs. Patricia C. Schafer	732 Greenridge Lane	Louisville 7
Michigan	W8FX	Ralph P. Thetreau	27209 W. Six Mile Road	Detroit 48240
Ohio	W8AL	Wilson E. Weckel	1317 Logan Ave., N.W.	Canton 44703
HUDSON DIVISION				
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive	Schenectady
N. Y. C. & Long Island	K2IDB	Blaine S. Johnson	266 Cypress St.	Massapequa Park, L. I.
Northern New Jersey	W2CVW	Edward F. Erickson	13 Robert Circle	South Amboy 08879
MIDWEST DIVISION				
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Kansas	WØALA	C. Leland Cheney	8114 Levitt Dr.	Wichita 67207
Missouri	WØTPK	Alfred E. Schwaneke	Edgar Star Rte	Rolla 65401
Nebraska	WØGGP	Frank Allen	Box 272	Gering
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Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.	Braintree 02185
Maine *	K1DYG	Herbert A. Davis	Lakes Ln.	Ellsworth Falls
New Hampshire W1SWX/	K1DSA	Robert Mitchell	Box 38, RFD 1	Chester
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket 02860
Vermont	K1MPN	E. Reginald Murray	3 Hillcrest Drive	Montpelier 05601
Western Massachusetts	W1BVR	Percy C. Noble	8 St. Dennis St.	Westfield 01085
NORTHWESTERN DIVISION				
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Idaho	K7HLR	Raymond V. Evans	Route 3	Twin Falls 83301
Montana	W7TYN	Joseph A. D'Arcy	1916 Haggin Ave.	Anaconda
Oregon	W7AJN	Everett H. France	3335 S.E. 116th Ave.	Portland
Washington	W7PGY	Robert B. Thurston	7700-31st Ave., N.E.	Seattle 98115
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Nevada	W7PBV	Leonard M. Norman	652 Utah St.	Boulder City 89005
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San Francisco	WA6AUD	Hugh Cassidy	77 Coleman Drive	San Rafael 94901
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno
Santa Clara Valley	W6ZRJ	Jean A. Gmelin	10835 Willowbrook Way	Cupertino
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South Carolina	W4PED	Charles N. Wright	711 Merriwether Dr.	North Augusta
Virginia	W4QDY	Robert L. Follmar	1057 Dune St.	Norfolk 23503
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554
ROCKY MOUNTAIN DIVISION				
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New Mexico	K5IQL	Newell Frank Greene	P.O. Box 406	Dexter
Utah W7MWR/	W7OAD	Marvin C. Zitting	P.O. Box 1813	Salt Lake City 84110
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601
SOUTHEASTERN DIVISION				
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Canal Zone	KZ5TD	Thomas B. DeMeis	P.O. Box 1111	Balboa
Eastern Florida	K4SJH	A. L. Hamel	220 N.E. 25th St.	Pompano Beach 33064
Georgia	W4RZL	Howard L. Schonher	P.O. Box 1902	Columbus 31902
West Indies (P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman Rio Piedras, P. R.
Western Florida	W4RKH	Frank M. Butler, Jr.	494 Elliott Rd.	Fort Walton Beach 32548
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Arizona	W7FKK	Floyd C. Colyar	3411 West Pierson St.	Phoenix 85017
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San Diego	W6LRU	Don Stansifer	4427 Pescadero	San Diego 92107
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WEST GULF DIVISION				
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Oklahoma	K5KTW	Bill F. Lund	1220 S. Owasso	Tulsa 74120
Southern Texas	W5AIR	G. D. Jerry Sears	5634 Eskridge St.	Houston
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British Columbia	VE7FB	H. E. Savage	1553 West 12th Ave.	Vancouver 8, B. C.
Manitoba*	VE4JY	M. S. Watson,	249 Lanark St.	Winnipeg 9
Maritime	VE1WB	D. E. Weeks		Harvey Station, N. B.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.	Willowdale, Toronto, Ont.
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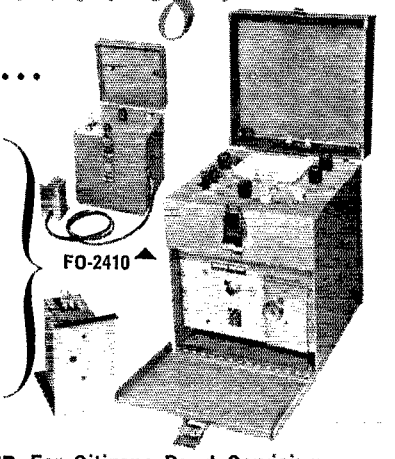
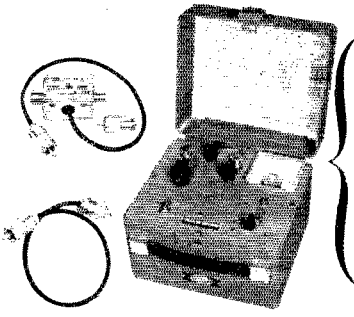


FM-5000 FREQUENCY METER 25 MC to 470 MC

The FM-5000 is a beat frequency measuring device incorporating a transistor counter circuit, low RF output for receiver checking, transmitter keying circuit, audio oscillator, self contained batteries, plug-in oscillators with heating circuits covering frequencies from 100 kc to 60 mc. Stability: ± .00025% +85° to +95°F, ± .0005% +50° to +100°F, ± .001% +32° to +120°F. A separate oscillator (FO-2410) housing 24 crystals and a heater circuit is available. Dimensions: FM-5000, 10" x 8" x 7½".

FM-5000 with batteries, accessories and complete instruction manual, less oscillators, and crystals. Shipping weight: 18 lbs. Cat. No. 620-103 . . . . . $375.00
Plug-in oscillators with crystal $16.00 to $50.00



C-12B FREQUENCY METER For Citizens Band Servicing

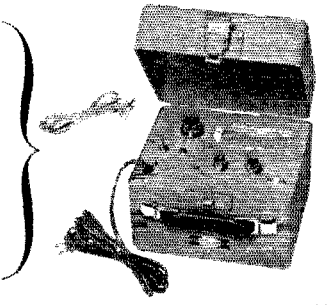
This extremely portable secondary frequency standard is a self contained unit for servicing radio transmitters and receivers used in the 27 mc Citizens Band. The meter is capable of holding 24 crystals and comes with 23 crystals installed. The 23 crystals cover Channel 1 through 23. The frequency stability of the C-12B is ± .0025% 32° to 125°F, .0015% 50° to 100°F. Other features include a transistorized frequency counter circuit, AM percentage modulation checker and power output meter.

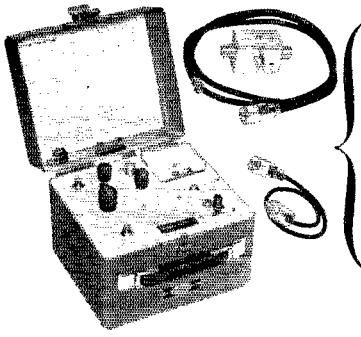
C-12B complete with PK (pick-off) box, dummy load and connecting cable, crystals and batteries. Shipping weight: 9 lbs. Cat. No. 620-101 . . . . . $300.00

C-12 CRYSTAL CONTROLLED ALIGNMENT OSCILLATOR

The International C-12 alignment oscillator provides a standard for alignment of IF and RF circuits 200 kc to 60 mc. It makes the 12 most used frequencies instantly available through 12 crystal positions 200 kc to 15,000 kc. Special oscillators are available for use at the higher frequencies to 60 mc. Maximum output .6 volt. Power requirements: 115 vac.

C-12 complete, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-100 . . $69.50





C-12M FREQUENCY METER For Marine Band Servicing

The International C-12M is a portable secondary standard for servicing radio transmitters and receivers used in the 2 mc to 15 mc range. The meter has sockets for 24 crystals. The frequency stability is ± .0025% 32° to 125°F, ± .0015% 50° to 100°F. The C-12M has a built-in transistorized frequency counter circuit, AM percentage modulation checker and modulation carrier and relative percentage field strength.

C-12M complete with PK (pick-off) box and connecting cable, batteries, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-104 . . . . . $235.00
Crystals for C-12M (specify frequency) $5.00 ea.

KEEPING YOU ON FREQUENCY IS OUR BUSINESS...

Write today for our FREE 1965 CATALOG

INTERNATIONAL CRYSTAL MFG. CO., INC.

18 NORTH LEE OKLAHOMA CITY, OKLAHOMA

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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

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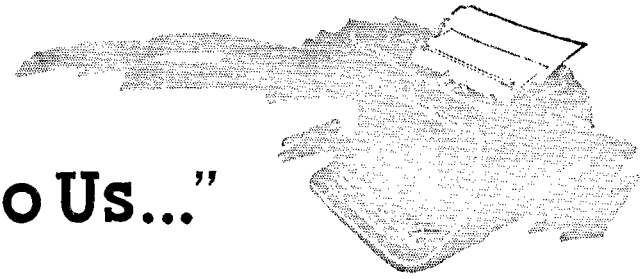


"It Seems to Us..."

REPRESENTATIVE DEMOCRACY

THE ARRL Board of Directors will hold its annual meeting this year on May 21. At the formal session, and in preliminary informal discussions, amateur radio in general and League affairs in particular will come under extensive scrutiny. Armed with views of their constituents, individual directors will bring together various proposals—sometimes common, sometimes widely divergent. The resulting decisions — affirmative action, rejection, or compromise — will chart the future course of the League.

While these decisions do not involve lives or fortunes, they do concern the proper utilization of an important natural resource, and the public service performance, investments, and personal enjoyment of a quarter million U. S. and Canadian amateurs. The responsibility is not taken lightly.

League members have generally nominated and elected extremely capable men as their representatives on the Board. In most cases a director has been a radio amateur and League member for many, many years. He has often been an elected official at the local club level, has held leadership appointments in the ARRL field organization, has quite likely served a previous director as an appointed assistant. He is a far more interested student than the average amateur in matters generally affecting amateur radio. There is the probability that his own livelihood is derived from business management or from one of the professions. He is almost certain to belong to service groups, trade associations or other non-profit organizations outside of amateur radio, and to have exhibited his leadership talent there as well.

But background and expertise are not the only qualifications for decision-making in a voluntary association such as the League. There must remain democratic control. In fact, by the power of his ballot, the member can *require* that his representative take the time and make the effort to become adequately informed as to membership needs and desires.

As a source of reference for their decisions, directors have a wide variety of methods for sounding out membership opinion — for examples, through personal, mail and on-the-air contact, through newsletters, through visits to clubs, area councils, hamfests and conventions. It is, additionally, highly important for each member to take the initiative in creative proposals. If you fail to submit your ideas, we all suffer for it. If we share our ideas, the League will be stronger and better for us all. We urge clubs, as well as individual members, to register views and proposals with their directors (address page 8 this and every issue of *QST*).

After all this preparation, the members of the Board must face their moment of truth — their hour of decision. The Board meeting is a model of unanimity on common objectives, and of compromise when divergent views exist. But no matter who gives and who takes, the object is to get the very best possible solution for amateur radio. The individual's desires are major factors, but not exclusively so; the good of the entire service is the first consideration. Thus an elected Board of volunteer directors, serving solely because of their devoted interests in amateur radio and in ARRL, sets the best balance between individual choice and informed opinion, the best balance between wants and needs, the best balance between desire and judgment.

If one reads back into the actions of the League directors in the aggregate, as did the staff in preparing last year's historical "gold edge" series, one finds the vast majority of decisions made by the Board have stood the test of time — although major ones often resulted temporarily in considerable controversy. And whatever the actions of the Board this year, it is inevitable that on some questions not every member will agree. There will be criticism, certainly, from individuals or groups who lament that the League is not representing them because it will not do what they dictate. They would, if they could, replace the well-considered judgments of your Board of Directors with selfish, short-range schemes. Their smoke screen often hides and confuses what is the legitimate issue in any representative democracy — the long-term welfare of *all* of the membership.

Let there be no more nonsense about smoke-filled rooms, powerhouses, ivory-tower control. When the Board meets, let it be with the back-

(*Continued on page 10*)

(Continued from page 9)

ing and good-will of all the members, and *constructive* criticism where sharp differences of opinion are visible. May the directors, as a result of *your* actions, be armed with knowledge of their members' needs and desires. May there be full discussion of issues, disagreement and argument when necessary — but no doubt as to the principles of government nor the motivation of the governing group. QST

COMING A.R.R.L. CONVENTIONS

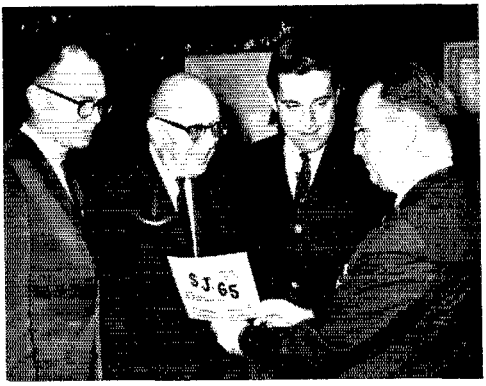
April 3–4 — Midwest Division, Des Moines, Iowa
April 24–25 — New England Division, Swampscott, Massachusetts
June 5–6 — Georgia State, Atlanta
July 2–5 — ARRL National, San Jose, California
July 9–11 — West Gulf Division, Oklahoma City, Oklahoma
July 17–18 — Rocky Mountain Division, Denver, Colorado
October 1–3 — Ontario Province, Sudbury

1965 ARRL NATIONAL CONVENTION
San Jose, California July 2–5

Plans are now well underway for the 14th ARRL National Convention to be held in San Jose, California, July 2–5, according to Frank Glass, W6MVL, general chairman.

The theme of the National will be ARRL organizational activities and technical talks, with an emphasis on the Amateur Radio Public Service Corps planning.

Convention headquarters will be the Hotel Ste. Claire in San Jose, with major talks and other activities held in the San Jose Civic Auditorium and the new McCabe Convention Hall. Thus far, many of the major manufacturers from across the country have reserved exhibit space for the showing of new products and equipment. The MARS groups are making plans to hold several exhibits and activities. Traffic nets, DX groups, VHF enthusiasts, RTTY operators and other organizations are making plans for dinners and other convention get-togethers.



Shown here discussing plans for the ARRL National Convention are (left to right) Frank Glass, W6MVL, General Chairman; ARRL Pacific Division Director Harry Engwicht, W6HC; Carter Smith, K6CWM and William Walters, W6MKE, President of the Santa Clara County Amateur Radio Association, one of the sponsoring groups.

This year the National will feature a two hour open forum session, with top ARRL officials present. Included in the meeting will be a report on the League and status of amateur radio, as well as a question and answer session.

On Sunday morning, July 4, there will be group breakfasts for those interested in traffic, DX, v.h.f., s.s.b., RTTY and other activities, and the general breakfast on Monday morning July 5 will feature a report on ARPSC with George Hart, W1NJM, National Emergency Coordinator, as well as President Hoover, General Manager Huntoon and Communications Manager Handy in attendance.

The ladies' program will carry activities for YL hams as well as XYLs, with luncheons, fashion shows, SWOOP, breakfasts and a tea, and will also include a separate ladies' lounge, with coffee and tea available throughout the major part of the convention activities.

The Sunday afternoon banquet will feature a Western Style Steak Barbecue held at the Santa Clara County Fairgrounds, with a twelve ounce steak as main course, complete with trimmings. There will be entertainment and a dance on Saturday night, as well as the traditional initiation ceremony for the Royal Order of the Wouff Hong.

Price for the convention is $9.50, which includes the banquet and convention meetings.

For further information and reservations, write Associated Radio Clubs, Post Office Box 6, San Jose, California. More details will appear in a later issue of *QST*.

NEW ENGLAND DIVISION CONVENTION
Swampscott, Massachusetts April 24–25

For the 6th consecutive year, the New England Division ARRL convention will be held at the New Ocean House Hotel, in Swampscott, Massachusetts on April 24–25. Speakers will include Rev. Daniel Linehan, W1HWK; Luis Salazar, senior staff engineer for Western Electric, with a laser demonstration; Stu Meyer, president of Hammarlund; and Ivan Loucks, W3GD, Chief of the Amateur and Citizens Radio division of FCC. The new division director, Bob Chapman, W1QV, will be introduced at the ARRL forum. An all-new NASA space program will be presented from 2 to 5 p.m. Saturday, *not* on Sunday as previously announced. There will be other technical talks and many exhibits and displays of the latest in amateur gear.

Following dinner Saturday evening, there will be dancing and entertainment. Sunday's program will include YL activities and the main banquet; following the banquet, the "Ham of

the Year" award will be presented (see page 47, March *QST* for details).

Early-bird reservations should be sent c/o John McCormick, W1KCO, RFD #1, Berkley Street, Taunton 1, Massachusetts before March 31; registration and banquet combined costs $8.50, or $3 for registration only. Room reservations should be made directly with the hotel; singles will be $10, doubles $15 and triples $18.

Hamfest Calendar

Alabama — The annual Birminghamfest, sponsored by the Birmingham Amateur Radio Club will be held this year on May 1 and 2. For full details write the Birmingham Amateur Radio Club, Box 603, Birmingham 1, Alabama.

Alabama — The annual Montgomery (Alabama) Hamfest sponsored by the Montgomery Amateur Radio Club will be held this year on April 11. For information write the Montgomery Amateur Radio Club, Box 6187, Montgomery 6, Alabama.

Florida — The Orlando Amateur Radio Club will hold its annual Orlando Hamfest at the Cherry Plaza Hotel on April 23, 24, and 25. Swap shop, technical talks, and a dance Saturday night. For details, contact Betty Kuller, WA4JIU, 401 Halsey St., Orlando, Florida.

Illinois — The annual auction of the Chicago Suburban Radio Association will be held on Wednesday, April 1, at National Hall, 3907 Prairie Ave., Brookfield, Ill. No admission charge. For more information contact Bob Vlk, K9PEN, 3010 Forest, Brookfield, Illinois.

Illinois — The Kishwaukee Radio Club will hold its annual Swapfest Sunday, May 2, at the Hopkins Park Shelter House on Illinois Route 23 in DeKalb, Illinois. One dollar donation is requested but no commission to swap or sell your gear. Further information from: Al Brand, WA9MBJ, 415 E. Sycamore St., Sycamore, Illinois.

Louisiana — The Baton Rouge Radio Club is planning their Hamfest for May 1 and 2.

Massachusetts — An auction will be held following the regular business meeting of the Massasoit Amateur Radio Association on Tuesday, April 20 at 8:00 P.M. The meeting place is the Hanson Grange Hall, Route 27 in Hanson, Massachusetts.

Michigan — In cooperation with the Detroit Amateur Radio Association and Council of A.R. clubs of Southeastern Michigan, the Henry Ford Museum will hold its Old Timer's Night activities on Saturday, May 8. Starting at 11:30 A.M., a lunch will be held at Historic Clinton Inn, at Greenfield Village. Advance reservations for this are $2.50. At 6:30 P.M., there will be a dinner at Lovett Hall, Greenfield Village where advance reservations are $3.75. The meeting will be held in the Henry Ford Museum Theatre at 8:00 P.M. where Dr. George Bailey, W2KH, will discuss Ham Radio, Past, Present and Future. Dr. Bailey is Executive Consultant of Institute of Electrical and Electronic Engineers, last Executive Secretary of the Institute of Radio Engineers prior to its merger into IEEE, past president, American Radio Relay League, and special consultant on communications, Department of State. The program is for all of those interested in wireless, ladies and guests are welcome. Mail reservations to Dept. of Communications, Henry Ford Museum, Dearborn, Michigan.

New Jersey — The Delaware Valley Radio Association will sponsor its 18th Annual Old Timer's Nite Round-Up and Banquet on Saturday, April 24 at 6:30 P.M., at Barretts Restaurant on the River Road, 4 miles west of Trenton. The affair will be stag, with a roast beef dinner and a speaker of national prominence on the list of activities. Tickets are by reservation only and may be obtained on or before April 20 by writing A. G. Wentzel, W2HX, 318 Gardner Ave., Trenton 8, New Jersey. Tickets are $7.00 per person. Tickets at the door will be $8.00.

New York — The Southern Tier Radio Club's sixth annual dinner will be held April 3 at 5:00 P.M. at St. John's Ukrainian Hall, Johnson City, New York. Dinner will be served at 7:00 P.M. Tickets are $3.50 each, children under 12, $1.75. Contact Harry Spencer, W2SDA, 1165 Vestal Ave., Binghamton, New York.

New York — The 10th anniversary Hamfest of the Radio Amateurs of Greater Syracuse (RAGS) will take place on Saturday, April 24 at Hinerwadels Grove, Fay Road, No. Syracuse, New York. There'll be a swap shop, transmitter hunts and interesting speakers. Advance tickets are $1.00, at the gate $5.00 each. For tickets and information write Norm Esterson, W2YRL, 118 Legion Drive, No. Syracuse, New York.

North Dakota — The fourth annual Sharivar Hamfest, sponsored by the North Dakota State University Amateur Society, will be held on the N.D.S.U. campus at Fargo, N. Dak. on Sunday, May 9. For more information contact WØHSC, N.D.S.U. Amateur Radio Society, Electrical Engineering Dept., Fargo, North Dakota.

Pennsylvania — The 20th annual banquet of the Lancaster Radio Transmitting Society, Inc., will be held on Saturday, May 8 at 6:30 P.M. at the Dutch Town and Country Inn at Vintage, about 15 miles east of Lancaster on U.S. Route 30. Make advance registration by contacting Arthur C. Jacoby, W3OY, 136 Springhouse Rd., Lancaster, Pa. 17603. Phone 717-392-6093.

Pennsylvania — The Reading Radio Club, Inc., is holding its 10th annual banquet on April 24 at Reeser's Restaurant, Route 61, Pottsville Pike, at 7:00 P.M. Tickets are $5.00 each for adults and $2.50 each for children. For further information and reservations write Elmer Worth, K3YNN, 946 Franklin St., Reading, Pennsylvania.

Pennsylvania — The Tri-State Pittsburgh S.S.B. Society will hold their spring dinner May 1, at Johnny Garneau's Smorgasbord Restaurant, one mile west of Pittsburgh exit of the turnpike on Route 22, at 6:30 P.M. Tickets are $4.00 each. For further information and reservations, write Frank Frantz, K3FUH, 960 Greensburg Pike, East Pittsburgh, Pa. 15112.

Pennsylvania — The West Branch Amateur Radio Association of Williamsport, Pa., will hold its second annual Ham Get-Together on May 2 at the Fireman's Social Hall, Montoursville, Pennsylvania. Auction and contests from 1 until 6 P.M. Dinner and speaker from 6 until 8 P.M. Tickets are $3.75 each. For more information contact Ted Crowe, W3GPR, 345 Pearson Ave., Williamsport, Pennsylvania.

South Carolina — The sixth annual Greenville Hamfest will be held Sunday, May 2, 1965, at the Greenville County Fairgrounds, Greenville, S. C. A complete program for the entire family is planned. Lunch will be served. Advance Tickets and information from: Don Robertson, WA4KLT, 101 Griffin Drive, Greenville, South Carolina 29607.

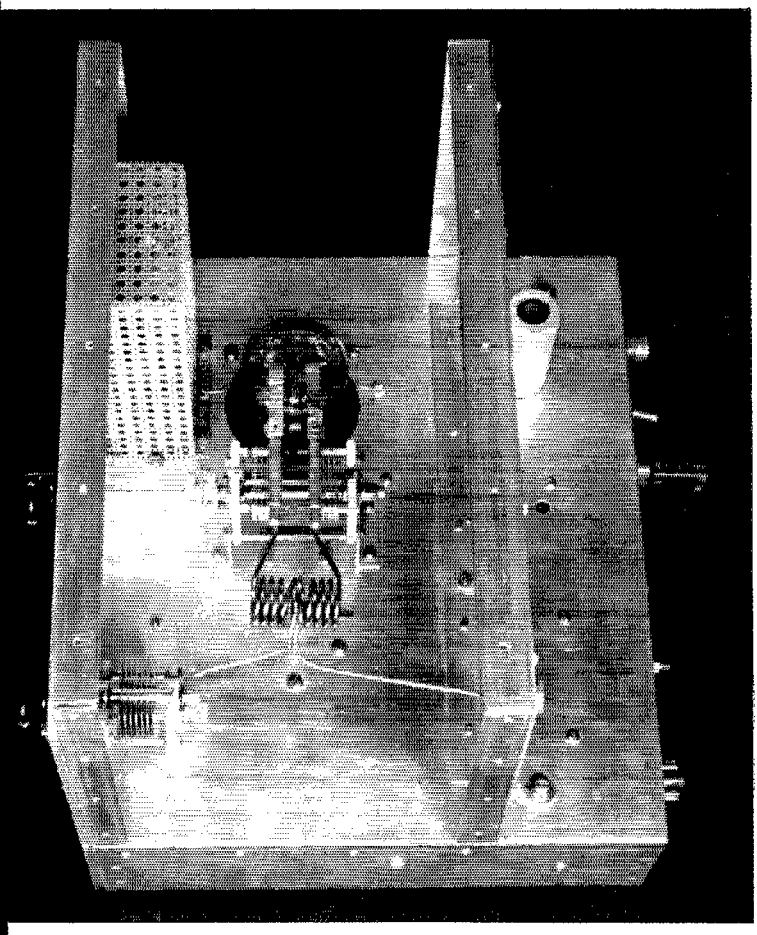
Washington — The annual hamfest of the Skagit Amateur Radio Club will be held on April 24 at the Bryan Grange Hall in Bryan, Washington.

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Considerations to bear in mind include a clean signal, good keying, careful enunciation, correct procedure, judgment and courtesy. The League's Operating Aid No. 11 lists further examples. Send your vote for "Operator of the Month" to the ARRL Communications Department.

During February the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1BVR	K5CPZ
K1IJV	WN5KAJ
K2MQO	W6OZ
K3UFV	K8JCC
K3YVG	W9BNII
WA4BVF	K9FHP
WA4DRA	KØDYA
WA4PDS	EL6E



Top view of the 100-watt 6-meter transmitter. The final-amplifier tube and output circuit are to the left. The perforated metal shields the meter and its connecting leads. Behind the baffle shield, on which the output connector is mounted, are the 5763, the adjusting screw of L_2 (partially visible behind the 5763), and shaft of C_{12} (bottom). The v.f.o. input connector J_1, crystal socket, S_1, and power connector are mounted in the rear edge of the chassis

100 Watts on 6 Meters

A Three-Stage Transmitter of Simple Design

BY FRANCIS M. YANCEY,* W8DRU

The construction of this unit requires no special or hard-to-get components. In fact, most of the items needed are the sort commonly listed in surplus and bargain sheets.

SEVERAL hundred 6-meter stations have been worked from the ham shack on Freezeland Mountain. A good percentage of operators of these stations say they have no intention of ever operating on any frequency below 50 Mc. It is surprising, therefore, to find that many of these 6-meter operators who never intend to operate on any lower band are using transmitters that cover 80 through 6 meters. Not so surprising are the complaints most of these operators have against their transmitters: insufficient grid drive, tube plates red hot, the low-band coil assembly hot (probably self-resonant at 50 Mc.), plate current creeping (final needs to be retuned every minute or two), TVI (attributable to the transmitter), parasitic suppressors burning up, and low r.f. output. These transmitters do a good job on the low bands, and they are adequate for the low-band operator who wants to get on 6 for an occasional local rag chew. As a general rule, however, they are not efficient enough for the serious 6-meter operator.

By using some ingenuity and a little effort accompanied by a whole lot of pride, a ham can come up with a nice-looking 6-meter transmitter that has none of the bad points listed above. By careful shopping for parts, it can provide more power output and yet be more economical

* Box 398, Hinton, West Virginia.

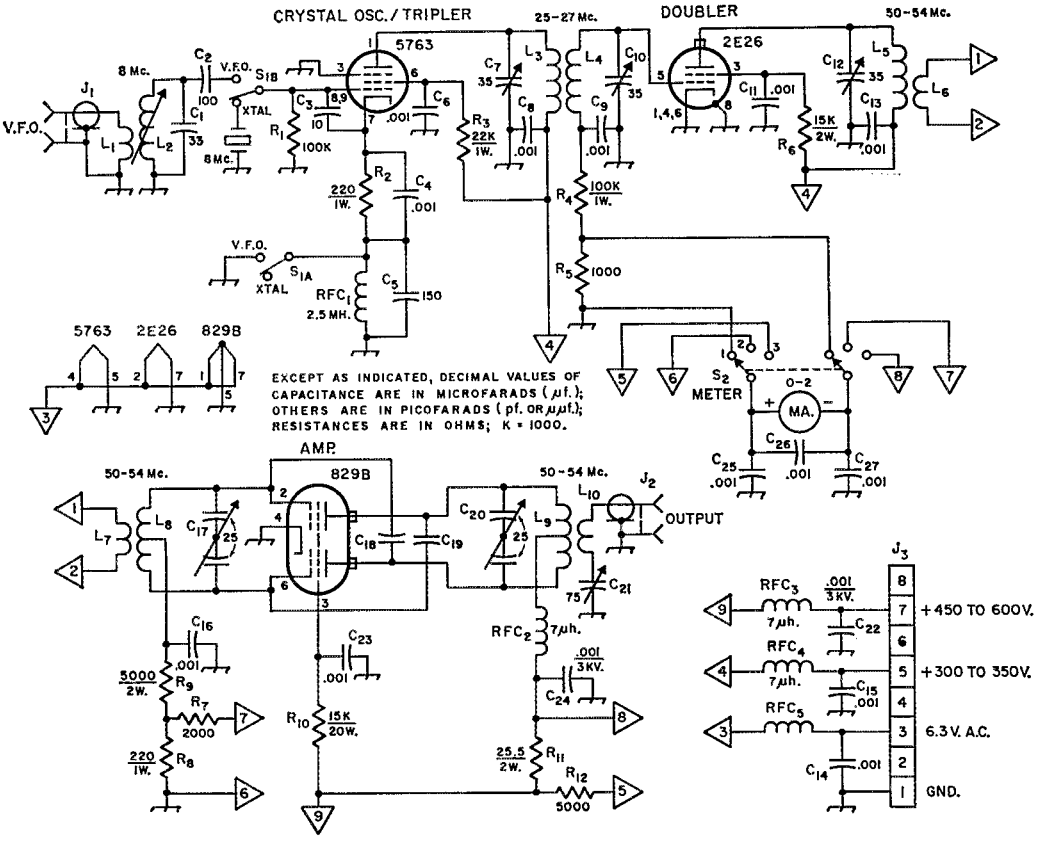


Fig. 1—Circuit of the 100-watt 6-meter transmitter. Fixed capacitors of decimal value are disk ceramic (1000-volt if not specified); others are mica. Unless indicated, resistors are ½-watt-watt composition. Component designations not listed below are for text-reference purposes.

C_7, C_{10}—APC-type air trimmer.
C_{12}—Midget variable (Hammarlund MC-35-S or similar).
C_{17}, C_{20}—Dual-section variable, 25 pf. per section (Johnson 167-51 or similar).
C_{21}—Midget variable (Hammarlund MC-75-S or similar).
J_1, J_2—Chassis-mounting coaxial receptacle.
J_3—Octal chassis-mounting plug.
L_1—1 turn hookup wire over ground end of L_2.
L_2—23 turns No. 28 enameled, close-wound on ½-inch iron-slug form (National XR-50 form, or similar).
L_3, L_4—12 turns No. 20, ⅝-inch diam., 16 turns per inch (B & W) 3007 Miniductor, or Illumitronics 516T AirDux). See text for construction.
L_5—10 turns No. 10 wound on ½-inch ceramic pillar, turns spaced to make coil length 1½ inches.
L_6—2 turns hookup wire interwound at low-potential end of L_5.
L_7—1 turn No. 12, 1-inch diam. See text for mounting.
L_8—6 turns No. 12, 1-inch diam., 1 inch long, space at center for L_7.
L_9—8 turns No. 10, ¾-inch diam., 1½ inches long, space at center for L_{10}.
L_{10}—2 turns No. 12, ¾-inch diameter.
R_7, R_8, R_{12}—5-per-cent tolerance.
R_{11}—Two 5-per-cent 51-ohm 1-watt resistors in parallel.
RFC_1—Standoff type (National R-300S or similar).
RFC_2, RFC_3, RFC_4—V.h.f. choke (Ohmite Z-50).
RFC_5—25 turns hookup wire, ¼-inch diam., self-supporting.
S_1—D.p.d.t. toggle switch.
S_2—Double-pole three-position rotary switch.

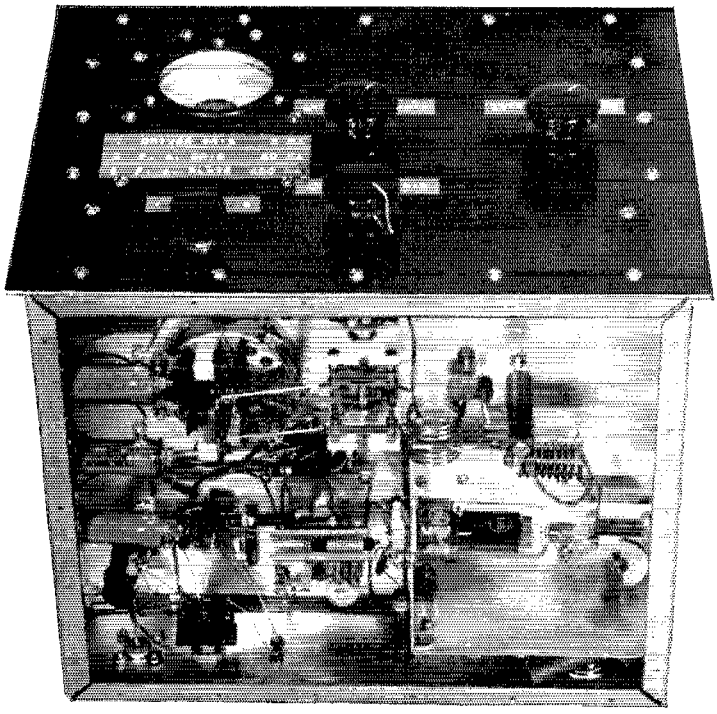
than many of the all-band kits.

It is good practice to build power supplies, modulators and r.f. units as separate assemblies. Each section is then readily available for use with other units. This article covers the construction of a 6-meter r.f. unit. Excellent companion units have been covered by W1ICP.[1]

[1] McCoy, "Plate Modulation for the TV-Set/Surplus Transmitter," *QST*, July, 1961.
McCoy, "Surplus Tubes and an Old TV Set = 150 Watt Amplifier," *QST*, April, 1961.

Circuit Details

The oscillator-tripler circuit (see Fig. 1) will be recognized as one which has appeared in the ARRL *Handbook* for the past several years. With an 8-Mc. crystal plugged into the crystal socket and S_1 in the crystal position, the 5763 oscillates on 8 Mc. and triples in the plate circuit to 25 Mc. With S_1 in the v.f.o. position, RFC_1 and C_5 are shorted out, and L_1, L_2, C_1 and C_2 are switched into the circuit to match the low-impedance



This photo shows the arrangement of components on the bottom side of the 100-watt 6-meter transmitter, as well as the panel layout. L_2 and S_1 are in the lower left-hand corner. C_7, C_{10}, L_3 and L_4 are grouped together to the right of the switch. The 2E26 is mounted horizontally from an L-shaped bracket, with its output-circuit components to the right. The final-amplifier tube socket and grid tank are at the top of the chassis. The insulating pillar in the upper right-hand corner of the chassis supports L_7. See Fig. 3.

output of a v.f.o. If this unit is to be used with a v.f.o. having high-impedance output, L_1, L_2 and C_1 may be omitted, and C_2 connected directly from S_1 to J_1. In the v.f.o. position, the 5763 is a frequency multiplier, tripling the 8-Mc. output of the v.f.o. to 25 Mc. The 2E26 operates as a frequency doubler with $C_{12}L_5$ tuned to 50 Mc.

The 829B amplifier is link-coupled to the 2E26 by L_6 and L_7, with L_8C_{17} tuned to 50 Mc. The 829B is neutralized by C_{18} and C_{19} which are actually small pieces of No. 12 wire connected to the grid pins (2 and 6) of the socket. These wires cross each other across the bottom of the socket, go through clearance holes in the chassis, and each wire is then bent to place it near the opposite plate. $C_{20}L_9$ also tune to 50 Mc., and this output circuit is link-coupled to the antenna by L_{10}. The reactance of L_{10} is tuned out by C_{21}.

Provision is made for measuring 2E26 grid current, 829B grid current and 829B plate current. Almost any low-range milliammeter can be used by proper selection of values for R_5, R_7, R_8, R_{11} and R_{12}. (See measurements chapter of the *Handbook*.) The values shown were selected for use with an 0—2-ma. meter. With the meter switch in position No. 1, the full-scale reading of the meter will be 2 ma. With S_2 in position No. 2, the full-scale reading of the meter will be 20 ma. The full-scale reading will be 400 ma. when the meter switch is in the third position.

TVI Precautions

The transmitter is thoroughly shielded. There are six tuned circuits between the oscillator and the antenna when a crystal or high-impedance v.f.o. is in use, and at least two more when a low-impedance v.f.o. is used. Each stage is inductively-coupled to the following stage with coupling as loose as possible. The output link L_{10} is tuned to the operating frequency to afford additional selectivity against unwanted frequencies. The power-lead filtering as shown on the schematic is the bare minimum. However, provisions have been made in the construction of the unit, so any amount of additional filtering found necessary can be added. These measures have been found sufficient for this location. Any additional precautions that may prove necessary at another location are fully covered in the chapter dealing with TVI in the *Handbook*.

Construction

The unit is constructed on an aluminum chassis measuring 10 by 12 by 3 inches. The front panel is made from $\frac{1}{16}$-inch sheet aluminum and is 10 inches high by $12\frac{3}{4}$ inches wide, to allow a little overhang at each end of the chassis. The back of the amplifier compartment is also cut from $\frac{1}{16}$-inch aluminum and is 7 inches high by 12 inches wide. The amplifier compartment is completed by using $\frac{1}{2}$-inch angle aluminum and perforated aluminum sheet. The bottom cover is also cut from perforated aluminum. All of the cutting and most of the drilling can be completed before actual assembly is started. The panel was sprayed first with a primer coat, and then with two coats of gloss-black enamel.

The relative placement of parts can be determined by studying the photographs. The power connector, J_3, is wired first so that power will be available to check each stage as it is finished. RFC_3, RFC_4, RFC_5, C_{14}, C_{15}, and C_{22} are con-

nected to the pins of the power plug and the capacitors grounded with the shortest possible leads. The other ends of the chokes are connected to a terminal strip where power can be picked up for the various stages.

There is an L-shaped bracket directly to the front of the power plug. The short side of the L is used for mounting the socket for the 2E26 doubler. The long side of the L forms a shield to keep excessive r.f. away from the power plug. Mentioned earlier is the possibility of adding additional power-lead filtering, if found necessary. The short side of the L can be extended to the rear of the chassis. Short lengths of ½-inch angle can be bolted to this extension and to the long side of the L. After the bottom cover is in place, several sheet-metal screws through the bottom cover into the angle will make a completely shielded compartment. Connections for heaters and low voltage can be made by using 0.001-μf. 500-volt ceramic feedthrough capacitors. Connections for high voltage can be made by a feedthrough bushing and a separate 0.001-μf. 3000-volt disk ceramic bypass capacitor. Also, it may be necessary to make all power leads from shielded wire.

The 5763 stage is wired next. S_1 is mounted on the rear wall of the chassis, directly behind the 5763 tube socket. J_1 is also mounted on the rear wall of the chassis between S_1 and the corner of the chassis. The crystal socket is mounted on the opposite side of S_1. S_1 is wired so that the handle will point toward the crystal when the crystal is in the circuit, and point toward J_1 when the v.f.o. is in the circuit. L_2, with its associated link L_1, is mounted near J_1. The 5763 tube socket is mounted with a ground lug under each mounting screw. RFC_1 can be seen mounted to the left front of L_2. A pigtail-type choke may be substituted by mounting a terminal strip at this location. C_7 and C_{10} can be almost any small variable capacitors. The ones in the photograph are mounted on a piece of ceramic; they were removed from a discarded i.f. transformer.

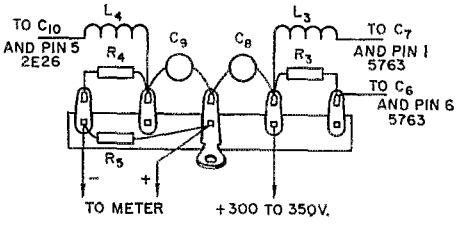


Fig. 2—Sketch illustrating mounting of L_3, L_4 and associated components on terminal strip, as mentioned in the text.

A terminal strip having four insulated terminals and one grounded terminal is mounted under one of the capacitor mounting bolts. This strip holds C_8, C_9, R_3, R_4, R_5, and the cold ends of L_3 and L_4, as indicated in Fig. 2. L_3 and L_4 are made from a single length of coil stock. Five turns are removed at the center, as shown in the bottom-view photograph. The inner ends of the two remaining coil sections are the ground ends. Turns are then removed from the outer ends of the coils to reduce the turns to the number specified for each section. The wire unwound is used as the connecting leads.

The meter and meter switch are mounted and wired next. Two small feedthrough insulators are mounted through the chassis, 1 inch apart, directly below the meter. A ground lug is bolted under the chassis between the insulators. C_{25} and C_{27} are connected to the insulator terminals and to the ground lug with short leads. C_{26} is connected across the meter terminals at the meter. Leads are run from the meter to the top of the feedthrough insulators and from the bottoms of the insulators to S_2. Twisted leads are connected from S_2 to R_5 on the terminal strip. The rear of the meter is shielded by a rectangular cover made of perforated aluminum. This cover extends from slightly above the top of the meter to the chassis so that it encloses not only the meter but the meter leads as well. The cover has ½-inch lips on all open edges so that it can be fastened to both the panel and the chassis with machine screws at frequent intervals.

The 2E26 socket is mounted with ground lugs under both mounting screws. After making the necessary connections to Pins 1, 2, 4, 5, 6, 7 and 8 of this socket, it is time to check out the 5763 stage. Plug in a crystal, set S_1 to the crystal position, and plug in the 5763 and 2E26. Turn on the filaments and the two tubes should light up. After a couple of minutes, turn on the oscillator plate voltage and tune C_7 and C_{10} for maximum 2E26 grid current as shown by the meter—between 1 and 1½ ma. If the 5763 stage was wired for use with a high-impedance v.f.o. output, it should be necessary only to connect the v.f.o. to J_1, turn the v.f.o. on, adjust it to the same frequency as the crystal, and move S_1 to the v.f.o. position. Grid current to the 2E26 should be approximately the same as when a crystal is in use. The same procedure would be followed with low-impedance v.f.o. output, except that it would be necessary also to adjust the slug in L_2 for the desired value of 2E26 grid current (about 1½ ma.).

The 2E26 stage is completed by wiring in C_{13}, R_6 and the plate-circuit components. A standoff insulator ½ inch in diameter by 3 inches long, or a piece of polystyrene rod the same size, makes a convenient mounting for L_5 and L_6. C_{12} is mounted vertically on the chassis with the shaft extending above the chassis.

Space was reserved at the bottom right-hand side of the panel for a mode switch to be added later. In the event your mode switch is included in the modulator, or if you desire a.m. operation only, it will be a simple matter to bring the shaft from C_{12} to the front panel. The capacitor can be mounted on a bracket and the bracket bolted to the chassis just to the front of L_5. It should be positioned so that a shaft extension will come through the panel in the right place to be symmetrical with the three large knobs already on the front panel.

Details of L_7 and its mounting that permits adjustment of coupling to L_8 are shown in the sketch of Fig. 3. L_6 is made of hookup wire. The ends of this coil are twisted together, left long enough so L_7 may be adjusted, and soldered to the ends of L_7.

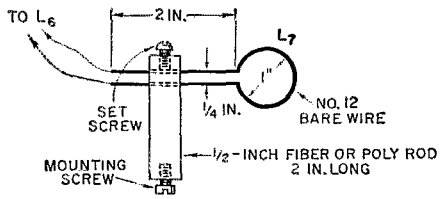


Fig. 3—Coupling link L_7 is made adjustable by mounting through an insulating rod as shown. The set screw locks the coil in the desired position.

L_8 is soldered directly to the stator terminals of C_{17}. No connection is made to the rotor of C_{17} and it is not grounded. The feedthrough insulator, which can be seen under L_8, carries high voltage into the amplifier compartment. The disk ceramic capacitor connected between it and the chassis is C_{24}. The lead leaving the center tap of L_8, and coming toward the front panel, goes to a terminal strip which holds R_7, R_8 and R_9. The 829B socket is mounted with Pin 4 (the big pin) toward C_{17}. Pin 4 is grounded to the chassis with a thin piece of copper strip ¼ inch wide. The copper strip is tinned with solder where it touches the aluminum to prevent oxidation between the two metals. C_{16} connects between the center tap of L_8 and Pin 4 on the 829B socket. C_{23} connects between Pin 3 and Pin 4. A short piece of wire connects Pins 4 and 5. The stators of C_{17} connect to Pins 2 and 6. Pins 1 and 7 are connected together and to the filament circuit. The resistors on a terminal strip near the center of the chassis are R_{11} and R_{12}. The large resistors on the right-hand wall of the chassis are each 5000 ohms, and they are connected in series to make up R_{10}. There is sufficient room for one 15,000-ohm 20-watt resistor.

The amplifier plate circuit is completed next. C_{20} is mounted on brackets to raise the stator connections even with the plate leads of the 829B. The plate connectors are connected to C_{20} with thin strips of copper ¼ inch wide. L_9 is soldered to the stator connections. No connection is made to the rotor of C_{20} and it must not be grounded. RFC_2 connects between the center tap of L_9 and the top of the feedthrough insulator which brings high voltage into the amplifier compartment. The link L_{10} connects between C_{21} and J_2. Leave loose coupling between L_9 and L_{10}.

Adjustments

Plug in a crystal and all tubes. Set S_1 to the crystal position. Set S_2 to position No. 1. Turn on the filament supply and see that all filaments light up. Turn on the low-voltage supply just long enough to peak C_7 and C_{10} for maximum 2E26 grid current. Move S_2 to position No. 2. Turn on the low-voltage supply and peak C_{12} and C_{17} for maximum 829B grid current. Adjust L_7 for about 12 ma. of current. In making adjustments of the link coupling, be sure to turn off the power because 300-350 volts is exposed at the 2E26 plate components.

If all of your operation is to be within a 600-kc. segment of the band, C_7, C_{10} and C_{12} can be peaked to the center frequency and forgotten. For example, if you operate only between 50.1 and 50.7 Mc., those capacitors can be peaked at 50.4 Mc. If you operate over more of the band, it will be necessary to stagger-tune C_7 and C_{10}. Tune one a little higher than the center frequency and the other lower. Careful adjustment will result in very little variation in 2E26 grid current as frequency is changed. C_{12} will have to be retuned if frequency is changed more than 300 kc. either side of its setting.

Be sure there is no voltage on the screen or plates of the 829B. With low voltage turned on, and the meter reading 829B grid current, slowly tune C_{20} through resonance. If any dip in grid current occurs, the 829B must be neutralized. Mount a small feedthrough insulator on each side of the socket near Pins 2 and 6. Connect insulated wires to Pins 2 and 6. These wires cross each other across the bottom of the socket and connect to the insulator terminals. On top of the chassis, solder ¾-inch lengths of No. 12 bare wire to each insulator terminal. Let each wire go straight up parallel to the plates of the tube. Now reapply excitation to the 829B, and adjust neutralization by cutting ⅛-inch lengths from the neutralizing wires until there is no noticeable change in the grid current as C_{20} is tuned through resonance.

Now connect a load to the antenna terminal of the transmitter. A 100-watt light bulb is OK. Move S_2 to position No. 3. Set C_{21} to minimum capacitance. Apply all voltages and quickly rotate C_{20} for maximum dip in plate current. Adjust C_{21} for maximum plate current. L_{10} is now tuned to the operating frequency. If everything has checked out all right so far, replace the light bulb with the antenna lead. Listen around the frequency to which the transmitter is tuned, to make sure you won't cause any QRM. Apply all voltages. Check C_{20} for maximum dip in plate current. Check C_{21} for maximum plate current. Now adjust the coupling between L_9 and L_{10} for 200 ma. of plate current. Remember, *switch to safety;* there is high voltage on L_9. Turn off the high voltage each time you make adjustments to L_{10}. Recheck C_{20} to see if it is still tuned to maximum dip. Move S_2 to position 2 and check the 829B grid current. It should indicate 12 ma. for a plate voltage of 450 and up to 15 ma. for a plate voltage of 600. Adjust L_7 for proper current.

The bottom cover and amplifier compartment cover can be fastened in place with sheet-metal screws at approximately 2-inch intervals.

The labels were made on gold vinyl tape with a tapewriter. QST

Effective Spectrum Use

The ARRL Executive Committee, in a resolution later heartily endorsed by the Board of Directors, has laid down a set of band usage principles that can mean more effective communication for all of us. They should be put into practice by every amateur — not tomorrow, not next year, but right *now*.

Too many of us indulge in operating practices that clutter up our bands unnecessarily. Example: the thoughtless use of DX frequencies for short-distance contacts. How many times have local ground-wave ragchews on 14 Mc. pushed some poor soul to the verge of apoplexy because he couldn't maintain a long-distance QSO through the QRM? Especially now, when the sunspots aren't working for us, it makes no sense at all to misuse those bands that still offer a chance for long-haul work.

Our objective should be to get *all* local communication out of bands that have long-distance capabilities. By simple logic, we should aim at getting work of that nature — local ragchews, city-wide nets and the like — onto v.h.f. (or ten meters, when it is useful only for ground-wave communication). If you still have the antiquated notion that v.h.f. isn't good for anything but line-of-sight, don't let a v.h.f. man hear you say it out loud!

All this points to the need for greater equipment flexibility. Use that band switch! A one- or two-band transceiver is fine if (1) there is other equipment in the station for other bands or (2) the operator is only interested in distances suitable to that available band or bands. But a ham with a one-band 14-Mc. job should realize that he is restricting himself primarily to longer-range communication, and any use for local ragchews when the band is open is strictly a violation of good frequency-engineering principles.

Use common sense, of course, in applying these principles. For example, in a 3.5-Mc. section net, stations in the same city are not precluded from participation because some of their contacts may be only a few blocks away; they don't have to move to v.h.f. for this purpose! Here the band is chosen on the basis of an area to be covered by a group of stations.

The use of minimum power for desired communications can also make more room in our bands. Every amateur station should be equipped to reduce power at times when it is appropriate. A report of "40 over 9" inflates the ego, but at the same time proves that the transmitting station is running much more input than he needs. If it is a brief contact, such as in a contest — OK. But if it commences a ragchew, it should be the cue for an immediate power reduction. Give some consideration to others, those nearby trying to work on adjacent channels, or those at a distance trying to employ the same channel.

Actually, the Committee's recommendations are a plea for closer compliance with broad aspects of law. Various portions of regulations, international and domestic, point to use of minimum power, minimum bandwidth and an appropriate choice of frequency. So none of these principles is really new. Like Truth and Justice, they are known, desirable objectives. But they are ones we often lose sight of in our enthusiastic pursuit of ham activities. So let's take a good look at our personal operating habits and see how well they comply. In this restatement of principles, the Executive Committee has provided us a concise code of cooperative techniques in these days of overcrowded bands. QST

ARRL Recommends . . .

In view of increasing congestion in our limited frequency assignments, caused by the steady growth of the amateur body, The American Radio Relay League urges upon all amateurs a more strict observance of the following principles:

1) To make a proper choice of bands below 30 Mc. appropriate to the distance to be covered.

2) To achieve equipment flexibility so that an adequate choice of frequency bands and powers for desired communications distances may be available.

3) To use minimum bandwidth, consistent with good engineering practice and compatible with the mode of transmission being employed.

4) To expand the use of v.h.f. for local contacts wherever possible, with the ultimate aim of conducting all short-distance communication in this portion of the spectrum.

5) To use the minimum power necessary for each communication.

Calibrating the LM Frequency Meter

Using Internal Beats as Check Points

BY GILBERT L. COUNTRYMAN,* W4JA

LM and BC-221 surplus frequency meters are available at much lower cost if you get them without the individual calibration books. This article describes a method of making your own calibration using only the internal beats generated in the unit. Those who already have calibration books will also be interested, since the method provides additional accurate check points.

At some stage in the career of every ham he becomes interested in accurate frequency measurements. Also, periodically, it becomes necessary to trim up the antenna, r.f. and i.f. stages of the ham receiver, likewise the oscillator. Bargain signal generators are of little use in this application as their calibration is not accurate enough for modern communication receivers. Low-frequency i.f. stages, 50 kc. or so, rarely require any trimming, but any i.f. from 300 to 3000 kc. should be checked at least annually, and always when tubes are replaced.

The Navy type LM and the Army type BC-221 frequency meters are ideal for these purposes, and they also make excellent c.w. transmitter monitors. Most previously published articles have dealt with the BC-221, but this article will consider the LM, which is compact and includes 500-cycle modulation in all models. This feature is of value in receiver adjustments and other test procedures. The LM is especially easy to calibrate as high-order harmonics are readily identifiable. Many of the suggestions contained herein are equally applicable to the BC-221.

The best buy in LMs today is in units without crystal or calibration book. They have been advertised for as low as $5.00, while units with crystal, book, and sometimes the power supply and cable, bring from $50.00 to $125.00. Even if the original calibration book is included, recalibration is necessary for more accurate frequency measurements. Calibration of both the low- and the high-frequency ranges is not difficult, albeit somewhat time-consuming, by using only the audio beats generated within the LM itself.[1]

* 75 East Bay St., Charleston, South Carolina 29401.

[1] Dudley, "Calibrating a BC-221 Frequency Meter," *QST*, March, 1950.

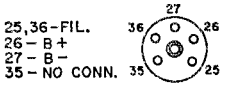


Fig. 1—Sketch showing LM power terminal as viewed from the outside. Terminal 27 is the one toward the rear of the chassis. In some models, Terminals 27 and 36 are connected together and grounded.

Power Supply

A power supply is easy to assemble, generally from junk-box parts, so this article will not deal with that. However, Fig. 1 is included to show the power terminals on the LM from the outside, in case no power cable is available. LM-1 and LM-3 used external batteries. LM-13 and LM-17 had self-contained batteries. LM-4 required a 24-volt filament supply. All other models can be operated on 12-volts at 0.67 amp. for filaments, and 200 to 260 volts d.c. at 10 ma. In addition, some models include interior link switches to permit the use of 260 to 475 volts, and 24 volts for filament in addition to the lower plate and filament voltages. Most of the units available today are the a.c. models LM-10 or later, which are to be preferred over the earlier ones.

Crystal

If the LM includes a crystal in the "octal-tube-style" holder, the chances are that it has aged and no longer oscillates at 1000 kc. Incidentally, not all crystals are interchangeable between the LM and the BC-221 unless the sockets have been rewired. Assuming that an LM without crystal is procured, the first step is to order from Barry's a new hermetically-sealed can-type octal-plug crystal for $5.50. These crystals were used in some of the later LM models and normally retain their calibration indefinitely. While ordering from Barry's, it would be wise to include spare 6A7, 76 and 77 tubes and, if a Navy LM power supply is used, also order a spare 84/6Z4 rectifier tube. These now obsolete tubes are often not available at the local radio emporium. It would be prudent to check the tubes used in your own model, of course.

Models LM through LM-9 have a low-frequency range of 195 to 400 kc. Minor improvements were made in the LM-2 and were included in subsequent models. LM-7 and subsequent models have a redesigned capacitor and drive assembly. LM-10 and all subsequent models are virtually identical, type CRR-74028, and the low-frequency range was changed to a fundamental frequency of 125 to 250 kc. All LM models have high-frequency ranges of 2000 to 4000 kc., permitting continuous calibrated coverage, using both ranges, from 125 to 20,000 kc and, with higher-harmonic use possible, well through the 10-meter band. A few units, not the entire run of one model, included a tubular trimmer capacitor across the crystal (and R-109), which is designated C-118, but it is of questionable value. As the crystal ages, it usually requires less capacitance across it, not more, to bring it back to 1000 kc.

To check your crystal unit with WWV, remove

the chassis and set it on a grounded metal plate so the crystal oscillator will be in approximately the same position with respect to ground as when in the cabinet. Turn on the filament, plate and crystal switches for 15 minutes. The modulator switch must be off. The position of the band switch is immaterial. Drape an insulated wire across the crystal oscillator (lower left rear corner of the chassis as you face it). Zero-beat your receiver with WWV at the lowest frequency possible and bring the coupling wire from the LM adjacent to the antenna input of your receiver. The LM crystal note should be in zero beat with WWV as heard on your receiver, or within a very few cycles, if accurate frequency measurement is your goal. Normally, the addition of an NP0 trimmer across R-109 will only pull the crystal frequency further away and therefore is of no value. Get a new crystal.

Recalibration

For highly-accurate frequency measurements, the book calibration is inadequate, even assuming that the crystal oscillates at exactly 1000 kc. For example, one check point listed in the book is 3667 kc. Actually it is 3666.667 kc., the 11th crystal harmonic beating against the 3rd v.f.o. harmonic. Additionally, only four crystal check points are given for the ham bands which cover quite a wide range. This makes possible substantial errors between check points.

It is best to prepare your own calibration similar to Table I, and only one check point is necessary for the entire range. The first and last columns must be filled in by yourself. Figures shown in the first and last columns are from the author's calibration of his own LM, and will not necessarily be the results you obtain. The three frequency columns should, of course, be filled in as shown. An LM corrector knob of larger diameter makes adjustment easier. A Bristol wrench, not an Allen wrench, must be used to loosen the LM set screw.

Ground the LM case to the station common ground. This should be a permanent connection. Let the LM warm up for 60 minutes with filament, plate and crystal switches on. The filament switch is a double-pole type which also controls the plate circuit and is in series with the plate switch. The modulation switch should be off.

Select a dial setting close to 3500 kc. and zero-beat the crystal with the corrector knob, using low-impedance (500 to 1000 ohms) phones or speaker plugged into the LM. Do not touch the corrector knob again. Now slowly tune the LM, noting in the first column of the table the dial settings at each zero beat heard. The author's calibration extended only to 3800.000 kc. for c.w. There is also a very strong beat note at 4000 kc. for extension of range.

Now comes the time-consuming part. Starting with the second entry for 3545.454 kc., determine the difference between this dial setting and the previous dial setting. For your convenience, the difference between one frequency and the previous frequency is shown in parentheses. Now divide the dial-reading difference into the frequency difference and fill out the final column. It is easy to make arithmetical mistakes. If you get any result of less than 515 cycles, or more than 530 cycles, recheck your subtraction and division, and verify the beat-note dial reading.

Table I

LM High Range Calibration for Ham C.W. Bands

LM Dial Reading	*Fundamental Freq. in Kc.*	*Frequency × 3*	*Frequency × 4*	*Number of Cycles per Dial Division to Previous Check Point*
3410.0 (Very strong)	3500.000	7000.000	14,000.000	
3496.9 (Very weak)	3545.454 (45.454)	7090.908	14,186.816	523 1046 2092
3516.1 (Weak)	3555.555 (10.101)	7111.110	14,222.220	526 1052 2104
3546.3 (Medium)	3571.429 (15.874)	7142.858	14,285.716	526 1051 2102
3601.1 (Strong)	3600.000 (28.571)	7200.000	14,400.000	521 1042 2085
3648.5 (Weak)	3625.000 (25)	7250.000		527 1055
3670.1 (Weak)	3636.364 (11.364)	7272.728		526 1052
3727.9 (Very strong)	3666.667 (30.303)			524
3818.9 (Medium)	3714.286 (47.619)			523
3887.0 (Strong)	3750.000 (35.714)			524
3940.0 (Medium)	3777.778 (27.778)			524
3982.3 (Medium)	3800.000 (22.222)			525

Figures in parentheses are explained in the text. The first eight in the second column are the only harmonics that can be heard as dial is rotated. During the balance of the scale, other intermediate harmonics can be heard. Calibration can be extended to cover the 21- and 28-Mc. bands, using the appropriate multiplier.

For those hardy souls who want to recalibrate the entire range, or have no calibration book, Table II lists beat notes that are all very strong and easily identifiable.

The formula used in arriving at beat notes, assuming that the crystal oscillates at exactly 1000 kc., is:

$$f_V = \frac{1000\,N_X}{N_V},$$

where f_V = Fundamental frequency of the LM v.f.o.

N_X = Order of harmonic of the LM crystal oscillator

N_V = Order of the harmonic of the LM v.f.o.

Table II

Easily-Identifiable Beats

High-Frequency Range kc.	*Low-Frequency Range kc.*
2000.000	125.000
2166.667	133.333
2250.000	142.857
2333.333	153.846
2500 000	166.667
2666.667	181.818
2750.000	200.000
3000.000	214.286
3250.000	222.222
3333.330	230.769
	250.000

For frequency measurement of either your transmitter or a received signal, and for monitoring use, a 6- or 8-inch piece of pickup wire attached to the LM r.f. coupling binding post is sufficient. If a stiff vertical wire is used, it is wise to bend the top end down just in case you accidentally lean over it and the sharp wire should come in contact with an eyeball.

Measuring Frequency

The following procedure is used to measure a received signal. Modern "single-signal" receivers make it more difficult to zero-beat both a carrier whose frequency you desire to measure, and the output from the LM, but it can be done if the suppressed sideband can be heard at all. Turn crystal, filament and plate switches on, modulation switch off. Zero-beat the LM at a check point using phones or speaker plugged into the LM. Be sure you get it exactly on zero beat. Turn the crystal switch off, and zero-beat the received carrier on your receiver. Now turn the LM dial until its signal is heard in the receiver, and carefully zero-beat this signal using the LM dial. Then, note the dial setting, and determine the frequency from the calibration book, or from your prepared chart (Table I), interpolating as necessary.

Unless the LM has been warmed up for an hour, the measurement must be made as soon as the check point has been zeroed. Any appreciable delay may result in a measurement error because of drift in the LM frequency.

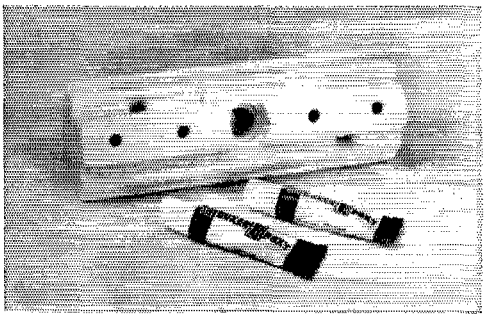
The author discourages the conversion of the LM to an additive-type meter by the addition of an r.f. plate load with coupling capacitor to the mixer-tube circuit. This was recommended for the BC-221 by W1JJY in the January, 1956 issue of *QST* but, with the LM, so many harmonics are simultaneously generated in the low-frequency range that it is almost impossible to determine the applicable one.

With care in the calibration that has been described, and with reasonable operating skill, frequency can be determined within about 50 cycles on 80 meters, 100 cycles on 40 meters, and 200 cycles on 20 meters. This is about five times the accuracy required for appointment as a Class I Official Observer. QST

• *New Apparatus*

Antenna Connectors

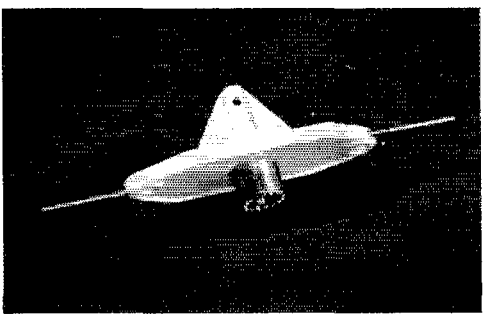
INVERTED Vs, dipoles and some other antennas require an insulator at the center of the antenna, and at the same time must be fed at the same spot by the transmission line. Lots of ideas for doing this have been presented in Hints &

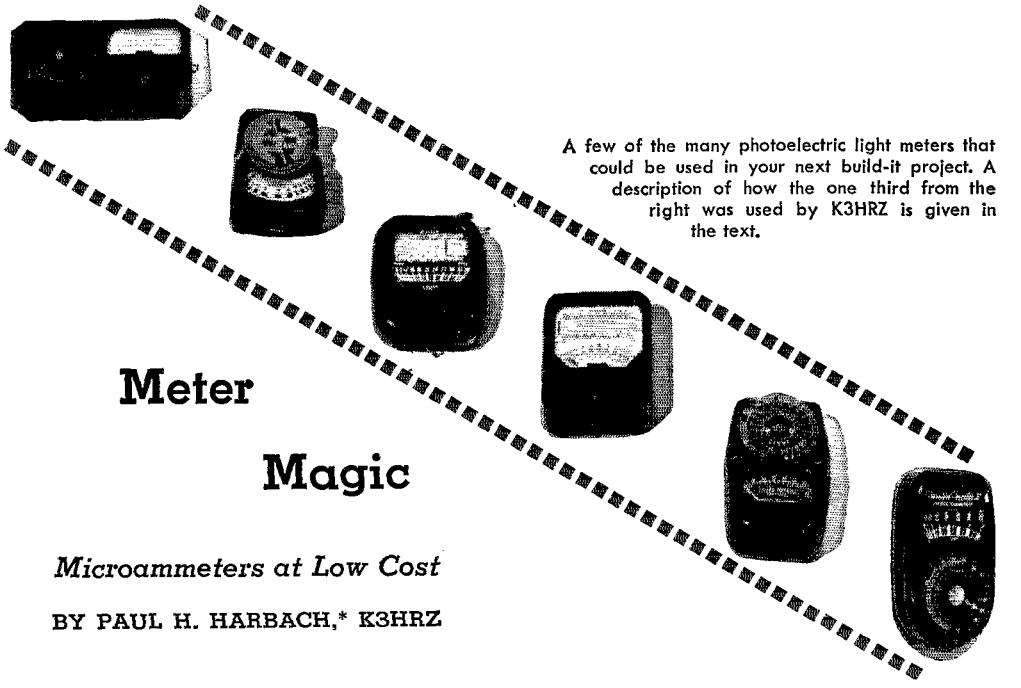


Kinks, and ordinary antenna insulators have been used for years. However, there are special insulators designed specifically for this job and a couple of them are shown below.

The Yatter Laboratories, Bradley Beach, N. J. manufactures the Strain Axial Antenna Connector shown in the above photograph. It is solid porcelain and is made with a series of holes and longitudinal slots to facilitate different applications of the connector. A hole in the center of the insulator is large enough so that RG8/U coaxial cable will pass through. The antenna wires go through other holes of smaller diameter. The wire and coax can easily be made fast mechanically and then soldered. Included with the insulator is epoxy cement for making permanent connections. If open-wire feed line is used, there are holes in the insulator that line up for most of the common open-wire-line spacings. The insulator measures 5 × 1¾ inches and weighs 12 oz.

The photograph below shows another rugged specially-designed fitting for connecting a coaxial feed line to the antenna elements. The insulator is molded plastic with holes at both ends for antenna-wire tie points. Copper leads are molded in the fitting and are internally connected to the SO-239 coaxial connector. Once the antenna wires are secured to the insulator, they are soldered to the molded-in wires. There is a reinforced center rib on the insulator for strength and to provide a handy point for attaching the assembly to a center support, if desired. The insulator is manufactured by the Budwig Manufacturing Co., P.O. Box 97, Ramona, California. It measures 3½ × 1¾ inches, and weighs 1½ oz. — *W1CUT*





A few of the many photoelectric light meters that could be used in your next build-it project. A description of how the one third from the right was used by K3HRZ is given in the text.

Meter Magic

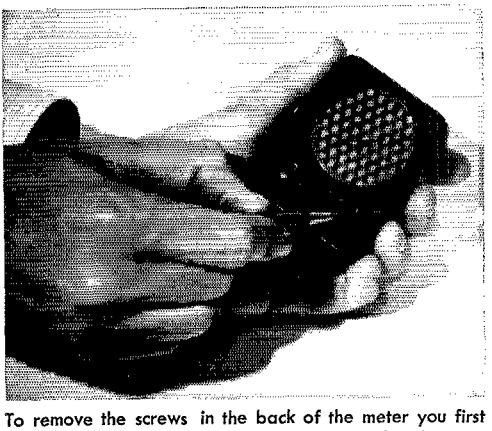
Microammeters at Low Cost

BY PAUL H. HARBACH,* K3HRZ

THE article, "Resolve To Build Something," in *QST* for March, 1964 no doubt inspired many readers as it did me. A project that I had had in mind for some time was the construction of a Monimatch. I would probably have done something about it earlier had it not been for the rather discouraging price tags on microammeters, even when they can be found in surplus. W8DRU's article prodded me into wondering if there was some way of licking the problem.

I've been in and around photography for a long time, which accounts for the fact that I decided to investigate the meter movements in exposure meters and their availability in outmoded models or damaged condition. Inquiry at a local supply house revealed that there were several on hand that could be tested and, if found to be usable, could be had for a dollar apiece. A check on several of these instruments showed that the full-scale range of the movements varied from 100 to 150 μa.

* 404 Rively Ave., Glenolden, Penna. 19036.



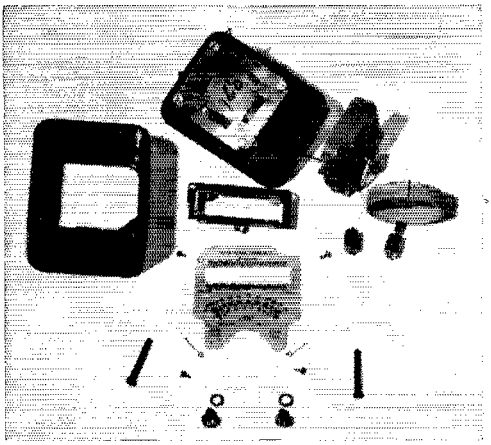
To remove the screws in the back of the meter you first must carefully score a slot in each screw head.

Disassembly

Disassembling the unit to remove the light-sensitive element and get at the terminals of the meter movement is not a difficult task, but it is one requiring a certain amount of patience and care. Here is how it was done with one particular model — the Weston Model 850 which, incidentally, appears to be one of the most widely available.

First locate the four screws on the back of the meter; then, with a small sharp screwdriver, carefully score a slot in the head of each screw, thus providing a means of removing the screws. Remove these screws, the two small ones first, then the larger two. From now on, the meter movement is loose from the case, so be extremely careful in performing the operations that follow. All it takes to ruin your meter is a sudden slip. Do not touch the needle or the movement at any time. Now carefully lift off the front cover from the meter proper, and remove the knurled knob from its top. Next, remove the meter scale held by four small screws and note that the two bottom ones secure the needle limiters. Remove the scale, being careful not to touch the needle or the movement, and lift off the rubber scale in its metal mount.

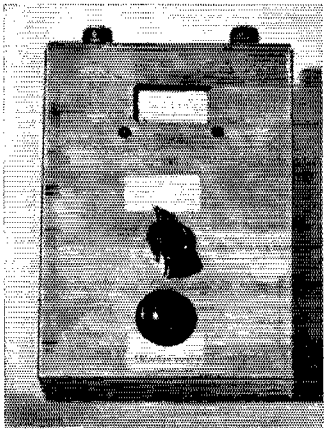
Now comes an operation that we can't be clumsy about. Remove the four screws on the copper plate that holds the cell in position. You



An idea of what to expect after you open the meter. The microammeter movement is above the drum dial at the upper right.

must raise your precious movement back out of the way to do this, so be careful. Remove the cell and note a black wire attached to a silver ring. Cut off this wire up close to the ring, which allows a metal strip to stay with the wire. Now replace the copper plate only. This is your plus connection. Bring the black wire out through the back of the meter. Reassemble the meter and make connections. I reversed the meter scale and covered it with a pressure-sensitive label for recalibration. Don't forget to reinstall the needle limiters as they were.

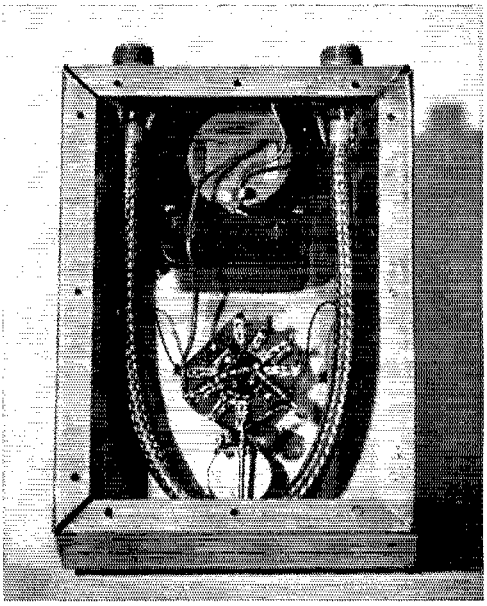
Now before putting on the cover you must calibrate. This can be done with a 1½-volt dry cell, a 25K control, the salvaged meter, and a borrowed microammeter, all connected in series. Be sure that the control is set at maximum resistance before connecting the battery. Adjust the control for various deflections of the salvaged meter, each time marking the scale with the reading shown on the calibration microammeter.



The recalibrated meter is recess-mounted in the Monimatch box. Note the screws for mounting, and the small hole for the zero adjust.

Mounting the Meter in Equipment

The meter cover is held on by the two long, thin screws. The two sockets these two screws fit into are a natural for behind-the-panel mounting. Take a No. 45 drill and drill through these sockets and through the case. Try to keep the drill centered and straight so as not to remove the existing threads. Now tap these two holes with a 3-48 tap. How you locate the meter and drill the chassis is your meat ball. I merely laid the meter on the face of the chassis and spot drilled — not as accurate perhaps as making a template of the meter face. You could also make use of one of the fine adhesive cements that are available today. Notice the small hole under the center of the meter opening in the panel of the finished Monimatch. This provides access to the zero-adjust screw on the meter. A small hole was drilled. This hole was countersunk on the inside with a 3/8-inch drill. This allows the zero screw to recess, and the meter to lie flat. Obtain two short 3-48 screws and screw the meter cover into place. Reinstall the meter into the cover, making sure that you have the zero adjust engaged. Tighten



The meter mounts flush behind the panel.

the two long screws, but make sure that they don't touch the two mounting screws. I had to file about two threads from mine. Now you can solder the plus connection to the copper plate, and the negative to the black wire, and you are in business.

Give this idea a whirl — at least try one meter once. Build that one item you decided was too expensive because of the cost of the meter, and know that you have in a large way helped further amateur radio, by your personal accomplishment. After all, it is what each of us personally accomplishes as a ham that helps amateur radio — not what some other ham does. QST

Vacuum Tubes The Hard Way

Building Home-made Tubes

BY SAM DIAZ PUMARA*, ex-LU2DII

My interest in vacuum tubes dates back forty years to when I was a boy not yet ten years old, in Buenos Aires, Argentina. My father had just brought home a WD11 tube, for which he had paid $24, to replace a burned out tube in his regenerative receiver. My interest and enthusiasm for tubes mounted as I was able to examine the old WD11. Right then, I promised myself that I would someday build my own tubes. Seventeen years later I made my first one — a very, very primitive thing — for I did not have the necessary equipment or the materials.

Today I have the equipment I need. That which I could not buy I have built myself. I am able, therefore, to build many types of tubes and rebuild tubes of various sizes and types.

My avocation has fascinated many persons who believe that if one can produce workable radio tubes with high vacuum in one's own home, the process must be relatively easy. When one has the necessary equipment and knowledge of materials and techniques, some of the problems of building tubes are solved. Even so, the process is not as easy as it appears.

The Problem of Vacuum

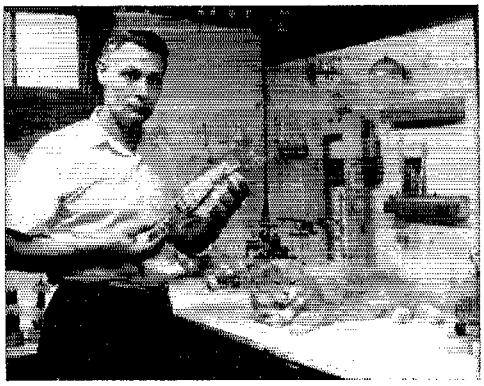
Consider the fact that a high vacuum pump connected to a chamber and pumping continuously would never be able to remove all molecules of gas from the chamber. Although it is impossible to produce a perfect vacuum with today's equipment, science is always progressing and bettering systems. It is now possible to produce vacuums up to and over 10^{-14} of a millimeter, but a vacuum of 10^{-9} or 10^{-10} is considered excellent. The higher the vacuum produced, the greater the difficulty in finding instruments sensitive enough to measure the molecules of remaining gas.

After the envelope is blown and the internal parts of the tube are constructed, one must produce and maintain a good vacuum for the lifetime of the tube. All further processes are directed to this end.

A major part of this problem is to extract occluded gases from the various parts of the tube. Generally the tube parts are submitted to an intense heat treatment in vacuum chambers for this purpose. After the tube is mounted in its glass envelope, the whole unit is submitted to a temperature of nearly 500 degrees Centigrade for hard glass bulbs, such as Pyrex. Soft glass, such as lead and soda glass, require a temperature of almost 400 degrees Centigrade. This amount of heat will extract gases from the tube parts, as well as much of the water vapor that is always present on the surface of glass. The entire operation is performed with the high vacuum pumps working and the process may last from one to several hours, depending upon the size of the tubes.

* Electronic Specialist, HRB-Singer, Inc., State College, Pennsylvania.

The author and a view of the vacuum shop where the tubes are constructed and evacuated.



The author holding a tube envelope and anode for a 2 kw. transmitting triode. Some of the apparatus used for making the tubes can be seen in the background. Observing the goings-on from table-top level is Rica.

When the vacuum has reached 10^{-6} millimeters or more, it is time to heat the elements of the tube with an r.f. generator or by electronic bombardment. The latter is used in my workshop.

With the filaments lighted, high voltage is gradually applied to the plate until the anode of the tube begins to show color. This operation must be conducted with extreme care because gas begins to leave the element and the tube may arc, melting the electrodes. Therefore, the heating must be very gradual and the results constantly observed on the vacuum gauge. Eventually, at the end of the heating process, the anode is glowing brightly and the highest possible vacuum is achieved. The next step is to fire a small barium getter which helps to maintain vacuum throughout the life of the tube.

In my basement vacuum shop three pumps are used. A mechanical oil pump, producing a vacuum better then 10^{-2} millimeters, is connected to a second pump of the diffusion type, with two stages. The high vacuum pump is a three-stage oil pump. With these three pumps it is possible to obtain vacuums of nearly 10^{-8} millimeters, which is more than sufficient for my purpose.

All glass seals used in the tubes which I build and repair are made with tungsten metal and uranium glass which assure a perfect hermetic seal even though the tubes in operation are submitted to great differences of temperature.

Filaments

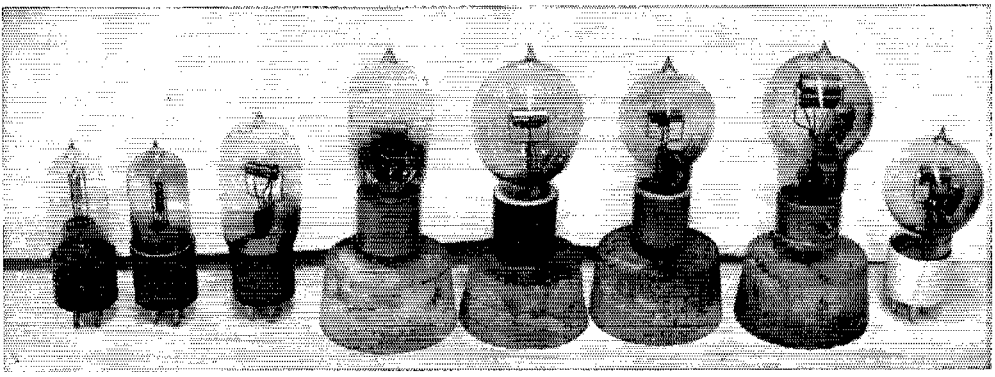
Most of the filaments used in my tubes are tungsten and thoriated tungsten. For small tubes, where the filament consumption is low, fine thoriated wire is preferred. This wire is also indicated for restoration of old-fashioned tubes used in antique equipment.

Pure tungsten filaments are interesting in that they are not easily poisoned by gases in the envelope and thus the vacuum required in the tube is not so great. However, tungsten filaments require relatively higher current for producing electron emission. As a bonus, they will last from 2000 to 3000 hours, all the while giving excellent service. In tubes with tungsten filaments, the elements have to be spaced farther apart and larger envelopes are required, due to the great generation of heat produced by these filaments.

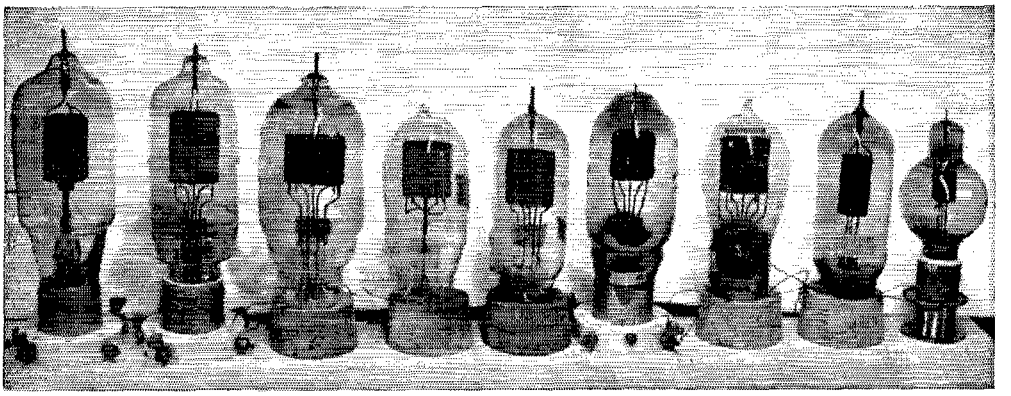
Thoriated filaments on the other hand have the advantage of emitting more electrons at lower currents but they have to be used in the highest possible vacuum in a very well cleaned-out tube, otherwise they are easily poisoned by even the smallest trace of gas.

Barium and strontium filaments are not as good for my purposes as the tungsten and thoriated tungsten. Barium and strontium are the best emitters but they contain a great deal of gas which prolongs the pumping time of the tube, and if filaments of these types are not made evenly, hot spots will develop. These hot spots shorten the life of the tube and produce unstable operation.

The thoriated filaments must be activated when the tube is about to be finished. Activation is accomplished by applying three times the normal filament voltage for a period of a few seconds. This procedure produces a temperature of about 2800 degrees Kelvin and the thoria in



Some of the hand-made receiving tubes. From left to right are two WD12 tubes, a German tube, two British "R" tubes and two French tubes of the 1920's. Bases are salvaged from commercially made tubes.



Transmitting tubes made in the basement workshop. Tubes 1, 2, 3, 6, 7 and 8 from the left have thoriated tungsten filaments; others have pure tungsten filaments.

the wire is diffused to the surface of the filament where it forms a layer. After many thousands of hours the thoria will be consumed and the tube is rendered useless.

If the tube is thus made useless, it is sometimes possible to use it as a pure tungsten filament tube, if additional voltage is applied to the filament. However, in many cases, the spacing of the tube elements is so small that the grid will get too hot and start emitting.

Other Elements

All the tube parts are welded by my homemade spot welding machine. The metals used include molybdenum, nickel, tantalum, stainless steel, and copper. Molybdenum is excellent for great strength, but it is a difficult metal to weld. For this reason, in big tube structures where anodes are working at high temperatures, it is best to rivet the molybdenum. If the anode is working at low temperatures, it can be welded easily to nickel.

Filaments are welded to nickel wires three or four times the thickness of the tungsten filament. This avoids excessive vaporization and assures better conductivity. The recommended procedure is to bolt them, but this is costly and takes extra time.

Grids for my tubes are made on a mandrel of copper utilizing two wires of nickel of approximately 70 mils, depending upon the size of the tube to be built. The grid may be round or oval. It is made by coiling the nickel wire, of approximately 10 to 15 mils diameter with enough spaced turns to cover the two transversal nickel wires. If the tube is going to use much power, the thin nickel wire is replaced by molybdenum or tungsten.

The Envelope

The anode is generally sealed in the upper part of the bulb, becoming self-supporting. If the envelope or bulb is made of Pyrex glass, a piece of uranium glass will have to be welded to the element-supporting tunsten rod. The uranium glass will closely match the coefficient of expansion of the tungsten as well as the Pyrex glass of the bulb. If the tube is Nonex glass, which is used extensively in commercial tubes, the tungsten can be welded directly to the glass. Nonex requires a high oxidizing flame. Otherwise, the glass turns dark. Nonex is a very good glass to work on the glass lathe since the flame doesn't touch the glass continuously in the same spot and discoloration does not appear.

For small receiving tubes, the best glass to use is either soda or lead glass, with the sealing wire being Dumet or copper-clad wire. This glass requires careful annealing, much more so than Pyrex glass, if cracks are not to appear. Small tubes can be made in Pyrex, but working with this glass requires an oxygen cylinder and a special valve, both of which I have in my shop.

Other people may think I'm a nut about vacuum tubes and maybe I am. My happiest hours, however, are spent during evenings and weekends when I can go down to my basement workshop and build tubes. My thanks to Mr. Carl Volz, Jr., who took the photographs used in this article. QST

Strays

The International One Sixty Society is a newly-formed group of 160-meter enthusiasts aimed at promotion of common interests, agreement on mode usage between a.m., sideband and c.w., exchange of technical data, etc. Dues are $2; a bi-monthly news letter will be published. Address the acting director, Ike Kerschner, RD 1, Box 254, Telford, Penna.

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K9BRI has a problem. Bugs congregate around the main tuning dial opening. Presumably some of the spray repellants would mar the finish. Any BRIght ideas?

New Distance Record on tne 21,000-Mc. Band

BY A. HARRY SHARBAUGH,* W2UKL

DURING the past twenty years the author has been keenly interested in pioneering amateur communication techniques in the microwave region. To this end, R. L. Watters and he christened the newly-assigned 21,000-Mc. band in 1947 to the tune of an 800-foot distance,[1] this distance being later extended in 1959 to some 13½ miles.[2] Also in 1959, the unassigned region of the spectrum above 30,000 Mc. was explored and two-way voice transmission was established at 50,000 Mc. (6 mm.).

A theoretical calculation[2] of the expected 21,000-Mc. range with the available power and antenna gain showed that it should be possible to communicate at distances greater than 50 miles. Spurred on by this fact, the author and a number of experimentally-minded amateurs have since been doggedly trying to extend the range. Recently the old distance record was doubled to a resounding 27 miles. Following is a brief description of the equipment and refinements which were necessary to make communication possible over this greater distance.

Experimental Gear

The equipment used was basically similar to that used previously and will be described only briefly here. Emphasis will be given to the changes that were necessary in order to increase the range. A block diagram of the circuit is shown in Fig. 1, in which waveguide and coaxial transmission-line connections are indicated by double and single lines, respectively. Using this circuit, the r.f. carriers of the two communicating stations are transmitted simultaneously. Duplex communication, like that employed on land telephone lines, is accomplished by the method that has become almost standard procedure for amateur microwave work.

At Station I, r.f. power at frequency f_1 is fed through a crystal mixer to free space. A part of this power is absorbed by the mixer. An identical arrangement at Station II transmits power at a frequency f_2, so that (f_1-f_2) equals the intermediate frequency. Thus a signal at this difference frequency may be amplified and detected at both stations. The same tube operates as both local oscillator and transmitter, reducing the necessary equipment by one half. Furthermore, should it be desired, automatic frequency control circuitry is required at one station only, since it is only necessary that the two transmitted signals be held at a constant *difference* frequency.

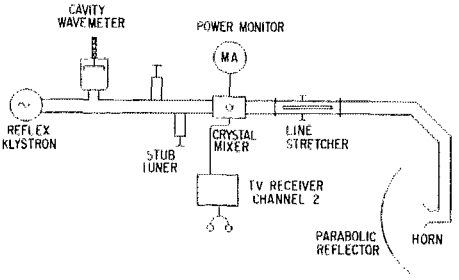


Fig. 1—Block diagram of duplex transmitter receiver.

The crystal diode mixers were either selected 1N26 or standard 1N53 silicon crystals.[3] The outer diameter of the 1N53 crystals was increased to that of the 1N26 units by the use of a brass sleeve. This permitted their use in the mixer blocks which were designed to fit the larger 1N26 unit. The local oscillator current was limited to 1 ma. by the use of a flap attenuator to avoid possible burnout. Experimentation showed no improvement in signal strength above this level of current. The 1N53 is designed for use at 8-mm wavelength and performed much better than selected 1N26 crystals.

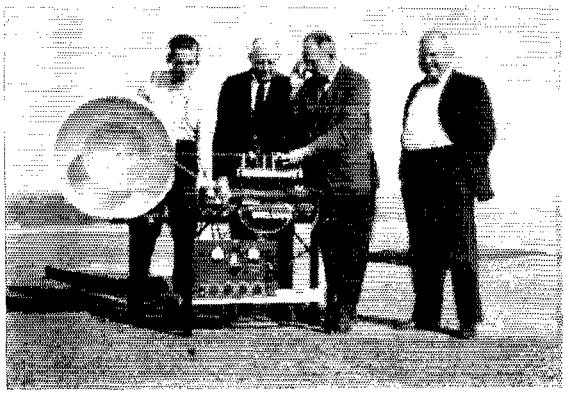
Parabolic reflectors were used as antennas. They were mounted rigidly to a wooden framework which also supported the waveguide. The waveguide was terminated in a small horn which fed the parabolic antenna, and both the guide and antenna were mounted to the wooden frame. The ability to slide the parabola in and out along the axis of the horn permitted precise adjustment of

* 39 Pine St., Scotia, New York 12303.

[1] Sharbaugh and Watters, "Our Best DX — 800 Feet!," *QST*, August, 1946.

[2] Sharbaugh and Watters, "The World Above 20,000 Megacycles," *QST*, May, 1959.

[3] The author would like to thank the Microwave Associates of Burlington, Mass., for the use of several 1N53 crystals.



Left to right: Bob Jefts, K2BST; Don Bulger, WN2QLN; Bob Johnson, WA2VMI; the author, W2UKL, checking the 21000-Mc. gear on a Schenectady rooftop.

the beam for maximum power in a known direction. The optimization of power output was accomplished by the use of a field-strength meter consisting of a horn, crystal rectifier and microammeter assembly.

The parabola having a diameter of 15 inches has a theoretical beam width of about 2 degrees. At a distance of 27 miles, a one-degree movement of the parabola changed the beam direction about ½ mile, hence the alignment of the beam toward the receiving location constituted one of the most difficult parts of the experiment. This was accomplished by aligning the beam with bore-site telescopes at close range with a bore-site target board. This technique is similar to that used to align a radar equipment in telephone and armed forces use.

At 27 miles distance, one cannot rely on visibility of the target. Therefore, it was necessary to take bearings on nearby visible reference points and deduce the target location with the help of topographical maps and a surveyor's transit. It was very important to make the feed horn integral with the parabola mount, and maintain parallelism of the axis of the parabola and sighting telescopes. The entire wooden frame mount could be adjusted for azimuth and elevation by blocks and jack screws under the legs and by rotation of the equipment assembly.

The frequency of the transmitted power was measured by the use of a resonant cavity wavemeter shown in Fig. 1. When not in use, the wavemeter was replaced by a sliding short circuit in the arm of the "T" section connecting the wavemeter to the main waveguide. The location of this short circuit was adjusted for maximum output.

Since all available power had to be conserved for useful communication, the mixer crystal and all attenuator pads were removed during transmission. One pair of klystron tubes tuned to the proper frequencies remained quite stable, aside from an initial frequency drift during warmup. Two types of klystron tubes were used for generating the r.f. power: the General Electric Z-668 and the 2K33A. The former tube has less power output (10 mw.) than the 2K33A (30 mw.), but the tuning is so much smoother (constant output over a wide frequency range), that we preferred to use the Z-668 whenever possible.[4]

Since the frequency of klystrons is dependent upon the various applied voltages, it is necessary to use voltage-regulated power. The line voltage was adjusted by means of a Variac. An attempt to use d.c. voltage on the heaters to reduce the 60-cycle ripple was not sufficiently successful to warrant the necessary addition of a heavy storage battery. Forced-air cooling of the klystron was employed to insure long tube life and minimize frequency changes due to breezes.

The useful bandwidth of the i.f. amplifier (a TV receiver on Channel 2) was about 2 Mc., hence the two tubes had to be maintained about 57 ± 1 Mc. apart in frequency. No automatic frequency control was employed, and slow drifts occurring over several minutes could be compensated for by adjustment of the first focus or reflector voltages. This procedure provided a finer control of frequency than could be accomplished by the mechanical tuning of the tube. The output frequency of the klystron decreases about 1 Mc. for an increase of 1 volt applied to the reflector, and no current is drawn by this electrode. This makes the tubes very easy to frequency-modulate, in the manner shown in Fig. 2. During preliminary adjustments it was convenient to modulate with about 10 volts output from a 1000-cycle audio generator. Low-impedance carbon microphones were used to minimize the 60-cycle pickup problem encountered with high-impedance crystal microphones.

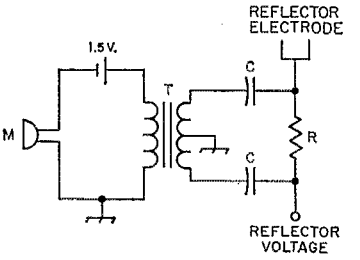


Fig. 2—Circuit for frequency modulation of the klystron.
C—2-μfd. 2000-volt isolating capacitors.
M—Microphone, single button carbon.
R—0.1 megohm.
T—Microphone transformer to match 200 ohms to 0.1 megohm, center-tapped secondary.

A GE 14-inch portable television receiver tuned to Channel 2 served conveniently as the i.f. amplifier and discriminator, using the slope of the response curve. The audio was taken off between the video connection to the picture tube and the chassis. Crystal earphones were used, although the raster pattern could also be used for visual identification of output. The contrast control served as a gain control. An increase in noise could be readily heard when the mixer crystal was plugged in, so the TV set was performing fairly efficiently as an i.f. amplifier. An i.f. amplifier with a lower noise figure could be made, but this was not found necessary in these experiments.

Details of the Transmission

In the 21,000-Mc. amateur band we are confronted with the absorption of radio energy by water vapor in the air (about 1 db. per mile at 100 per cent humidity and room temperature). The amount of water vapor in the air depends exponentially on the temperature. Therefore, if the experiments are made at the lowest possible temperature, one can gain a great deal. This fact, and the difficulty in transporting gear up mountaintops under adverse snow conditions, contributed to our problems!

(*Continued on page 158*)

[4] We are indebted to the designer, Dr. James M. Lafferty of GE, for the loan of several experimental tubes which regrettably have never been produced commercially.

Public Service Through Civil Defense Communications

A Ten-Point Program on Organizing Amateurs to Provide a Communications Service

BY GARLAND E. WHITE,* W4THM

The practical application of the League's cut-and-dried, tried-and-true methods of amateur communications organization sometimes do not work out at local levels. W4THM's ten easy steps to RACES organization present a somewhat fresh approach to an old problem.

THERE is always the need for communication, no matter what the endeavor. Natural and man-made disasters create an ever-present need for communications, and therein lies the reason for a voluntary public service for the radio amateur whether or not there is any organized civil defense activity in a given locality to which the amateur group may volunteer its service. The plan presented herewith is quite general and not detailed. In fact, one cannot envision all the details which would be encountered in a given situation and locality.

Let us take, then, a random group of amateurs, as yet unorganized (but not yet *dis*organized!) who wish to provide a public service communications group, and see what steps may be taken logically to produce an organized and efficient unit. For convenience, I will present the mechanics of organization in ten easy steps.

I. Spread the Word

Write postcards, make telephone calls, and get on the air to spread the word. Give local newspapers and broadcast news editors full particulars and ask them to publicize a general meeting to discuss a communications service organization for the town, city, county, to be associated with civil defense and/or the Amateur Radio Public Service Corps. See that everyone eligible gets the word, no matter what his station in life — rich or poor, doctor, lawyer or indian chief. Let each know that his operating skill and experience are valuable and wanted. Beat the bushes and turn the stones, you must have these people.

* EC Virginia Area 9, 1006 Chester St., Bristol, Va.

II. Meet!

Look for and find (a) the local c.d. director, (b) the local c.d. communications officer, (c) the local or section ARRL emergency coordinator, (d) the mayor or other chief executive, and (e) other interested officials, prominent persons in the community and responsible citizens who are, or might be, concerned with the safety and well-being of the general population. The c.d. communications officer and the ARRL EC are key people — use them! You will find them open-minded and enthusiastic about the business at hand. The EC especially has an "inside straight" to communication on a national basis through the crack-shot ARRL National Traffic System, and he will be only too happy to explain it.

Take inventory of your communications potential in terms of personnel and equipment at this meeting. Register everyone and start making a file on people and their activities right then. Invite comment, discussion and speeches on the subject of c.d. communications. Don't forget to include representatives of radio and TV stations, the telephone company, industrial radio users, etc. They all have communication potential. Include Red Cross officials: they are always interested in emergency communication.

If this meeting isn't what you thought it shou'd be in the way of participation by all parties, do what you can with it and use it to publicize another and larger future meeting. Keep at it until you feel you have enough people and have stimulated enough interest on which to predicate and build an organization.

III. Organize

Set up the communications organization both verbally and on paper. Pick a likely candidate or volunteer as a leader, coordinator, chief of service or any other title appropriate and applicable. He should be elected by majority vote or acclamation of those interested and present. This

organization may be accomplished at the first or second meeting.

Elect, or call on the group leader to appoint, assistants as necessary, such as to take charge of the local (v.h.f.) network and perhaps one for maintaining network liaison with the state Emergency Operating Center (EOC). Give a definite assignment to each operator. Obtain maps and charts of the whole area covered and mark off designated areas of communications responsibility. Make notes and keep records of all activity and assignments. Work with the ARRL EC if there is one, otherwise proceed with independent organization.

Place an article and picture in local news media, if possible. Let the communications head take the responsibility for organizational management immediately. He will spark-plug the organization from here on, and its success may well be the measure of his action and perseverance. The person for this job may well be recommended to the SCM for appointment as emergency coordinator if one does not already exist.

IV. Establish a Communications Network

Here is where everyone in the communications organization goes into action. Begin by providing public service and deriving operating pleasure and skill in the bargain. An efficient network is basic and fundamental to a good communications organization.

The designated net manager will set the date and time of net sessions. He will be, ideally, an ARRL Communications Department appointee (ORS, RM, PAM) who is familiar with net operations, traffic handling and the National Traffic System. He will have the responsibility of managing the local (v.h.f.) net and instructing and aiding communications organization and traffic handling procedure by both phone and CW.

Local nets should be v.h.f. wherever possible, and frequencies should correspond to those designated by the state radio officer in the quadrant system of frequency designation.[1] It is realized that a v.h.f. net is often impractical in mountainous terrain and in sparsely populated areas. Neither is it practical to set up in an already-overloaded low frequency band, so good judgment in this matter is required. For instance, 160 meters should not be overlooked! The band has interesting possibilities for local net operations in certain areas. In any case, the communications chief and net manager will decide the matter after consultation with the group and then promote and stick to the decision.

One thing for certain, there is no room for "maverick" or self-styled c.d. or "independent" groups. The adopted system must work and be compatible with local, area, state and national efforts or it is relatively worthless. For the same reason, uncooperative individuals or "personalities" simply must be bypassed with the hope that they will reconsider when the value of the organization is apparent.

At this stage, all licensed radio amateurs should have registered in the AREC. If there is no EC in the area, the registration form may be sent to the SEC or SCM. The AREC provides the necessary tie-in with NTS and is a division of ARPSC which lays the groundwork for a concurrent RACES organization. Local Red Cross officials may now be contacted and communication services volunteered. You will find them receptive and enthusiastic — and why not?

...YOU WILL FIND THEM RECEPTIVE AND ENTHUSIASTIC

V. Establish State Liaison

Now that you have an organized approach to communications and have a local network in operation, attention should be given to establishing liaison with the state. It is hardly necessary to emphasize the requirement for communications at the county-state level since without it any local group is isolated. The state radio officer (RO) has already designated, via the Quadrant System, both the frequencies and the mode of emission to be used. It is necessary, therefore, to provide only equipment in an EOC suitable for this purpose. Of course, only one set of equipment will be needed (reducing cost of equipment — a prime consideration for small budgets). Actual operation of this station may be delegated to one or more persons in the communications organization. It is the responsibility of such operators to maintain schedules made by the state radio control center.

Liaison with the state will normally be a RACES function and may use NTS as an intermediary. On the other hand, a c.d. and/or AREC group which does not yet have RACES licensing may communicate directly with the state, and they would be most welcome in the interim.

Communication with the state involves nothing more than normal net procedure and message handling techniques in daily use by the NTS. Maintaining communication with the state is the "end of the line" as far as your organization is concerned. If you have promoted and implemented the local network and provide consistent check-in with the state EOC, you are beginning to

[1] The quadrant, or ABCD, plan of frequency allocation for RACES was originally proposed by the Northeastern States Civil Defense Amateur Radio Alliance (later expanded to USCDARA) in 1951 and was adopted by OCD in 1961.

dispense in a full measure your responsibility for public service through the amateur fraternity.

VI. Use the Radio Amateur Civil Emergency Service

The Radio Amateur Civil Emergency Service is nothing more than a special case of the AREC group which you should already have. It is the same group which has the endorsement of the local c.d. coordinator and special licensing by the FCC to provide the same communications service you have already been providing. The special licensing authorizes continued emergency communication by amateurs under RACES when many other radio services may be discontinued.

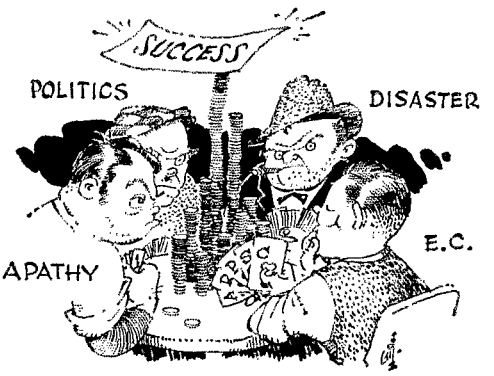
For your RACES group, the first need is a radio officer. He may be the communications chief, the EC, or any qualified licensed amateur in the group. The next step is to draft a communications plan. This is an operational plan under which the group will operate during a civil defense emergency. It should include communications assignments, organizational charts, frequency allocations, etc. The plan is submitted (a) to the local c.d. director, (b) to the state RO and coordinator and, finally, in the approved form, (c) to the FCC. Concurrent application should be made by the radio officer for a RACES station license.

On approval of the communications plan and license issue, additional licenses, as necessary for additional qualified amateur operators, may be obtained by endorsement of the RO and the FCC through normal licensing procedure. It is entirely possible to have a RACES group without having an AREC group, but it will be found that the RACES group is formed easily and naturally from amateurs and that the objectives of RACES are easily understood through a good AREC. Sometimes there is misunderstanding and conflict between these groups, which is ridiculous because the communications services rendered are identical.

The RACES group is, in other words, a natural, logical outgrowth of a good AREC and an extension of the public service which an AREC may provide. They should be, and in a manner of speaking are, synonymous. It is emphasized, then, that the RACES group is most easily formed from an already-organized and operating group.

VII. Establish an Emergency Operating Center

By this time (if not already available and in use) a base of operations is sorely needed. This is the communications control center for all available communications. It may be called an EOC, a C.D. Control Center, or whatever other name you might choose, and will normally be shared with other c.d. services such as warning, radiological (RADEF), welfare, etc. This is most convenient because the communications service is a service organization of c.d. to all groups which have the need for communications. Obviously, a service to these groups is most expediently effected through first hand and person-to-person liaison with the various services comprising the entire c.d. organization.



The responsibility of obtaining a suitable building for use as a c.d. operational base is primarily that of the local director, but should be shared by the various service heads. The communications service is rightfully entitled to a prominent allotment of space and facilities in this EOC. All local and state communications are net controlled and coordinated from this EOC by the communications chief and/or RO. If you don't already have one, push hard for an EOC because it will add greatly to the stature of the communications group and in the final analysis is indispensable.

VIII. Procure Proper Equipment

Quality communications equipment in proper quantity is a must. In the beginning, use what is available (i.e., owned and operated) in the amateur group. When the EOC is available, someone may volunteer the use of his station to set up in the EOC as an interim measure. Perhaps individual contributions by interested amateurs may be sufficient to complete a station.

Initially, equipment needs are modest and may be no more than one transmitter-receiver installation for each of the local and state networks. Later, an operating budget must be established (be it ever so modest) and funds provided for the minimum beginning requirements for equipment. As the c.d. organization progresses, additional sets may be procured for serving all local as well as the state net.

Judicious selection of equipment is in order, and this job falls to the RO. Attention must be paid to the budget, frequencies involved, mode of transmission (s.s.b.-c.w.-RTTY, etc.) and the equipment utility, power, provisions for mobile and battery operation, etc. The RO should make a careful survey of immediate and future equipment requirements and so advise the c.d. director. If it is an AREC group only, the equipment will normally be owned and provided by the individual amateurs. If it is an AREC-RACES group (which it should be), then funds may be available from local and state governments.

Equipment and operational assignments should be made to individual operators by the RO, who will outline areas or locations after consultation with the e.d. director. The RO should ascertain if federal matching funds for equipment are available. Another possible source of equipment is the acquisition, conversion and utilization of surplus communications equipment. Such equipment is often made available at nominal cost to e.d. organizations and may be a good budget-stretcher.

IX. Beware of Let-Down!

So, now you have a crack-shot communications organization going, and it wasn't so difficult after all, because you found a lot of talent in the amateurs of the surrounding area. Most amateurs are ready, willing and capable. Many of them are "sleepers"; that is, they have potential that needs example, incentive, encouragement and reason for development.

But, back to our flourishing organization. Everything's fine. We are now in a state of operational readiness for anything short of a direct hit by a hydrogen bomb. So, there is no national emergency, no local disaster, no anything. Nothing ever happens. Disciplined communications gradually deteriorate to listless rag-chewing. Ho hum!

Beware! There are countless groups throughout the country which have greatly deteriorated in operational readiness because of the false sense of security occasioned by the fact that "nothing ever happens." To combat this situation, the RO must institute training programs, network operations, equipment construction and maintenance, communications subject seminars; he must promote speakers, seek favorable publicity, simulate emergency conditions and traffic and discuss civil defense and other related subjects in regularly scheduled activities and meetings. And keep it up! Of course, choose things which are pleasing to the group and do not infringe unduly on their (volunteered) services and time.

Make no mistake — a good program for the "care and feeding" of a good e.d. communications organization is in order. Continuously maintain a running appraisal of your organization.

X. Take Advantage of ARRL Assistance

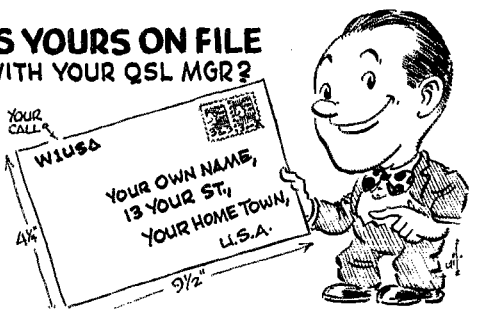
Finally, identify always with the ARRL. The League is so basic and fundamental to any organized amateur communications endeavor that it is taken for granted or sometimes overlooked altogether. The League is there, nevertheless, and through the management philosophy, the publications, the activities, the direct support and encouragement, it is in fact our "parent" organization. The direct service contributions which the ARRL Communications Department can make through their EC and the local AREC group are enormous. By all means, take advantage of them. QST

A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All *you* have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

W1, K1, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
W4, K4, WA4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta, Ga. 30320.
W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.
W7, K7, WA7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon 97301.
W8, K8, WA8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland, Ohio 44110.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60126.
WØ, KØ, WAØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn. 55921.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 135 Thorncrest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
VE8 — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P.R.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

(Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)



The Desk-n-Door Console

BY TOM MCKENNA,* K7DPO

As I recall, I was painting doorway trim when it occurred to me that a solid flush door would make an excellent desk top. As it worked out, the idea wasn't half bad; not only did the XYL let me count the time spent as credit toward her "must" projects, but I ended up with a first-class console.

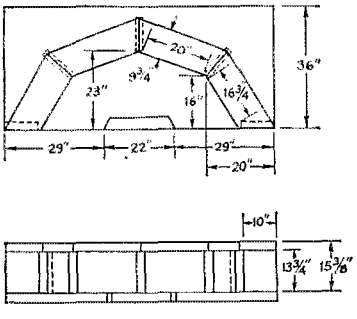
The desk-n-door console is basically quite simple. Just replace the desk top with a solid flush door and

The author, the door, and the topless desk.

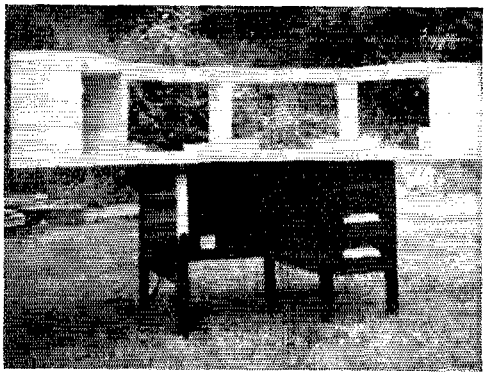
add a superstructure to fit whatever equipment you choose. Using a door just about doubles desktop working space, and gives solid support to the gear mounted atop it.

Some of the features built into the console at K7DPO are non-swivel casters, added so that the console can be pulled away from the wall for easy access to the wiring; the main power switch placed underneath and to the left of the center drawer, also within easy reach; control switches panel-mounted front and center; the working area covered with clear acetate (you might use glass) with maps and reference charts beneath; and a dummy load, clock, tape deck, oscilloscope and extra gear are all mounted

*12428 68th Ave., Kirkland, Wash. 98033.



Dimensions of K7DPO's console. Measurements will differ for other builders, depending on size and shape of doors, desks, and equipments.

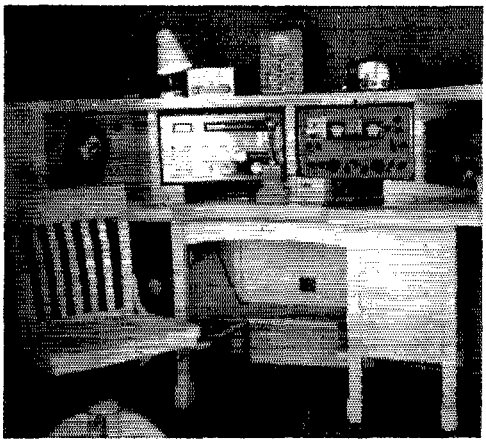


Superstructure complete and fastened to the desk. The three tiny holes just visible in the center are for station control switches.

within easy reach of the operator. A piece of plywood added across the bottom of the entire desk lent support to the unit and provided another shelf.

Since we used a second-hand door, there were some holes to hide. By mounting it hingeside-to-the-rear, the hinge indentions are behind the superstructure and out of view. The hole we cut at the operator's position eliminated the knob and lock scars. The exposed door (oops, desk top) edges were faced with ¼-inch, 3-ply mahogany plywood, and the superstructure is made of 2" hardwood cut to size. I've skimmed over exact dimensions, because they'll be determined by different sizes of doors and equipment. One helpful thing is that the receiver and transmitter are raised slightly by wooden blocks (bottom photo). This provides air circulation, and a place to store logs, a *Callbook*, and a keyer.

So much for the desk-n-door. I guess that the next project is to replace the blanket that covers the front doorway . . . QST



The completed desk-n-door console. Note the plywood reinforcement that extends from beneath the bottom drawer across the leg space and beyond. On the left it forms a shelf for the scope. At center, it adds support for the console.

Hints and Kinks For the Experimenter

POWER AND MUTING FOR MOBILE CONVERTER

THIS idea is not original with the author. In fact, the scheme is quite commonly used in commercial communications equipment. In most

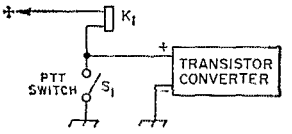


Fig. 1—Method for obtaining operating voltage and muting for the mobile converter.
K_1—Transmitter's push-to-talk relay.
S_1—Microphone push-to-talk switch.

transmitters equipped for push-to-talk operation, a voltage is present at the p.t.t. microphone switch when the transmitter is unkeyed (p.t.t. switch open: see Fig. 1). This voltage can be used to power a transistor converter. In most mobile installations, the voltage will be the same value as that of the automobile battery. When the mike p.t.t. switch is closed, the voltage will be removed from the converter, thus giving automatic converter muting. The converter current drain should be less than the holding current of relay K_1.

—*James W. Watson, K5IEB*

SOLDERING IRON CLEANER AND HOLDER

THE device shown in Fig. 2 has proved so useful to me that I decided to pass the information along to others. Basically, the idea is to use a moist cellulose sponge for removing excess solder and oxidation from soldering-iron tips. The idea works particularly well with pencil-type soldering irons used in small work. The sponge is enclosed in a metal box which anchors down the sponge and provides a cradle for the iron when it is not in use.

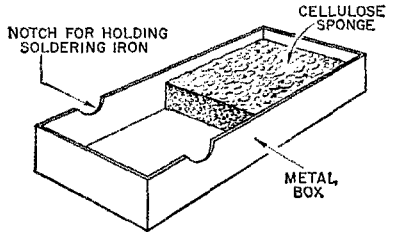


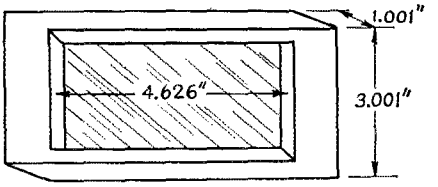
Fig. 2—WA6JSA's soldering-iron cleaner and holder.

Brush the tip of the iron across the sponge before using. This will produce a clean, shiny tip which greatly facilitates soldering operations.

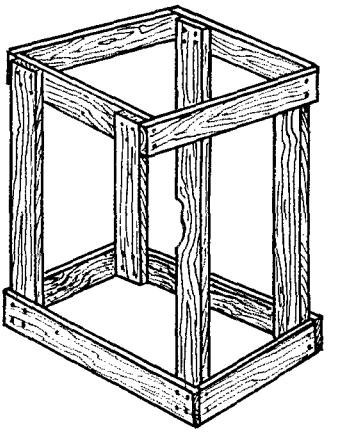
—*Frank T. Wyatt, WA6JSA*

MORE ON THE BALANCED-MODULATOR TRANSFORMER CORE

THE unusual balanced-modulator transformer core reported on by W1QWJ in Hints & Kinks, *QST*, April 1964, has been duplicated by many of our readers. Dan Smith, K5FSZ, wrote in to say that he spent a good part of a year collecting materials, building, and tuning-up his copy of the core. He felt that after spending that much time on the project, it would be advisable to build a small box to protect the core's delicate design when it was not in use. The sketch below shows the dimensions of the container.



Bob Reed, K5LFS, also constructed one of the cores during his spare time and later found that he had to transport the device to a new location. A special packing crate was necessary because of the unusual shape of the core. Bob went to work building a crate and was nice enough to send us a sketch of the final design.



NIFTY EQUIPMENT FEET

TAPERED porcelain cone insulators make swell equipment feet. Four cones of the same length can be used, or two long and two short, in order to tilt the equipment. The insulators have threaded holes at both ends — a rubber grommet is mounted to one end, the other is attached to the equipment. A coat of flat black enamel will give the feet a finished look.

—*C. R. Greene, W1IOW*

Happenings of the Month

Conditional Class Changes
Reciprocal Operating Rules
Canadian Tariff Efforts
FCC Exam Point Changes

CONDITIONAL CLASS MILEAGE CHANGED

The Federal Communications Commission has adopted the rules amendments it proposed in Docket 15640 (page 56, November *QST*), changing the mileage criterion for Conditional Class licenses from 75 to 175 miles airline distance, and including the semi-annual examining points in these measurements. The rules become effective April 15. An applicant who was eligible under the old rules but will not be eligible under the new rules may, nevertheless, complete the Conditional Class test if he has passed the code test prior to April 15 and his examiner promptly certifies the fact to FCC.

The new rules will greatly reduce the number of applicants eligible for Conditional Class. East of Wichita, Kansas, only small sections of Maine, Florida, Michigan, Minnesota and Wisconsin remain as Conditional Class territory. The Dakotas, Montana, Nevada and Wyoming largely continue under mail privileges, along with sparsely-settled portions of other western states. The FCC realizes that the new rules make work a hardship in a few cases, where the difficulty of travel is due to factors other than distance alone (as for instance in Hawaii), but points out that waivers may be requested in such cases.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of Amendment of Sections 97.9(d)(1) and 97.27(a) of the Commission's Rules governing eligibility for the Conditional Class license in the Amateur Radio Service	DOCKET NO. 15640

REPORT AND ORDER

By the Commission: Commissioners Bartley and Lee absent.

1. On October 1, 1964, the Commission released a Notice of Proposed Rule Making to amend Sections 97.9(d)(1) and 97.27(a) of its Amateur Radio Service Rules to provide that only those individuals whose actual residence and proposed station location are more than 175 airline miles distance from a Field Office, quarterly or semi-annual examination point shall be eligible for the Conditional Class license on a distance basis. The present rules permit individuals, whose residence and station location are beyond 75 miles of a Field Office or quarterly examination point, to apply for the Conditional Class license on a distance basis. This Notice was duly published in the Federal Register, October 7, 1964 (29FR13834), and all comments filed in response thereto have been considered by the Commission.

2. Most of the comments received supported the proposal. Typical of these comments was that submitted by the American Radio Relay League (ARRL), which stated:

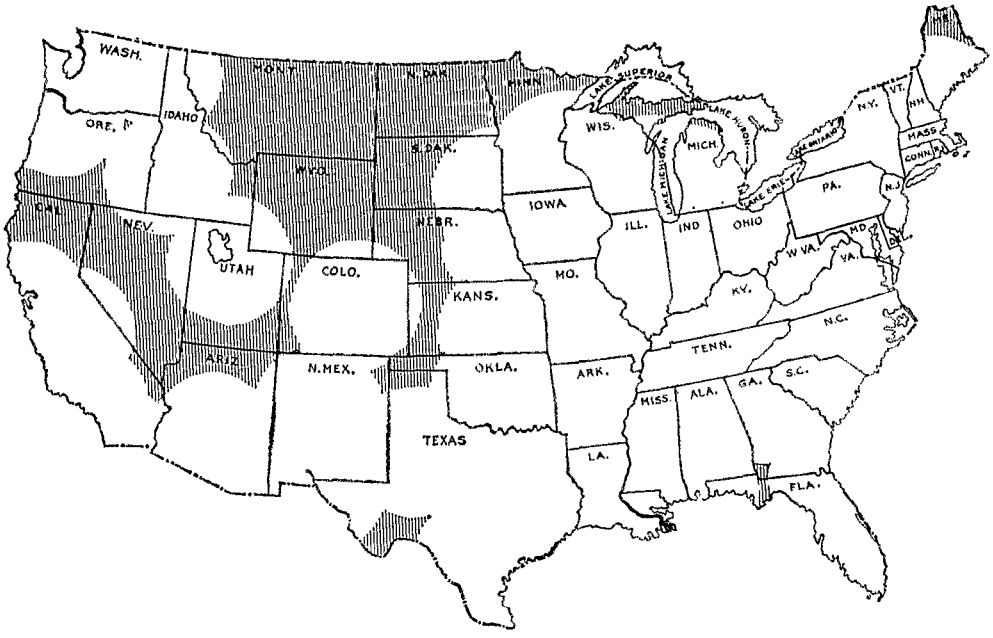
> "Inasmuch as the proposed amendments will strengthen the existing license structure, the League supports the proposal and respectfully urges its adoption."

3. Qualified support was received from a number of licensees who feel that the present holders of the Conditional Class license, excluding the physically disabled, should be required to appear for Commission-supervised examination for license renewal or when they move within 175 miles of an examination point. As stated in our Notice, it is not intended that any action be taken with regard to present Conditional Class licensees in this rule making proceeding. It is noted, however, that a continuing comprehensive study is being made as to the feasibility of, and necessity for, the imposition of a requirement of the nature suggested by these comments.

4. Objections to the proposal were submitted by some licensees who maintained that because of extreme conditions for travel in their areas, the 175 airline miles distance would impose an undue burden upon potential applicants. In this respect, the Commission is aware that the proposed amendments could possibly result in genuine hardship in some few instances such as at remote areas in Alaska or Hawaii. For such cases, there is, of course, provision for consideration to be given to a possible waiver action.

5. A counter-suggestion to the Commission's proposal was received from Mr. Wayne Green of Peterborough, New Hampshire. Mr. Green, as well as a number of other licensees who submitted identical comments, recommended that the Conditional Class license continue to be available as at present "with the amendment that the administration of the license examination be by any licensed amateur in the presence of at least two other licensed amateurs, no two from the same immediate family." The primary objection to this proposal is that such a procedure does not conform to the Commission's policy that, where feasible, the qualifications of those applicants for the higher classes of amateur licenses be directly verified by Commission personnel.

6. After consideration of all of the comments, it does not appear that cause has been presented for modifying the originally proposed rule amendments. Therefore, for the reasons set forth herein and in the Notice of Proposed Rule Making, the Commission concludes that the proposed rule making should be



The shaded areas on this map give a rough indication of remaining Conditional Class territory within the "old 48". Most of Alaska remains Conditional Class, while most of Hawaii will now be General Class territory.

adopted without modification. An additional editorial amendment, of Section 97.35(c), will also be accomplished hereby to reflect the new 175 airline miles distance.

7. With adoption of these rule changes, eligibility for the Conditional Class license on the basis of distance from an examination point in the Continental United States is quite limited. East of Wichita, Kansas, only small northernmost sections of Maine, Michigan, Minnesota and Wisconsin remain as Conditional Class territory.[1] West of Wichita, Kansas, major portions of Montana, Nevada, North Dakota, South Dakota and Wyoming and small sparsely populated segments of the remaining Western states, except Washington, will also remain as Conditional Class territory.

8. Authority for the amendments set forth in the attached Appendix is contained in Section 4(i) and 303 of the Communications Act of 1934, as amended.

Therefore, IT IS ORDERED, That effective April 15, 1965, Sections 97.9(d)(1) and 97.27(a) and 97.35(c) of the Commission's Rules are amended as set forth in the Appendix attached hereto.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Secretary

APPENDIX

Amendment of Part 97, Amateur Radio Service Rules.

1. Section 97.9(d)(1) is amended to read as follows:

§ 97.9 Eligibility for new operator license.

* * *

(d) ***

(1) Whose actual residence and amateur station location are more than 175 miles airline distance from the nearest location at which examinations are held at intervals of not more than 6 months for General Class amateur operator licenses.

2. Section 97.27(a) is amended to read as follows:

§ 97.27 Availability of Conditional Class license examinations.

* * *

(a) If the applicant's actual residence and proposed amateur station location are more than 175 miles airline distance from the nearest location at which examinations are conducted by an authorized Commission employee or representative at intervals of not more than 6 months for amateur operator license.

3. Section 97.35(c) is amended to read as follows:

§ 97.35 Additional examination for holders of Novice, Technician, or Conditional Class operator licenses.

* * *

(c) A holder of a Conditional Class license, obtained on the basis of an examination under the provisions of §97.29(b), is not required to be re-examined when changing residence and station location to within a regular examination area, nor when a new examination location is established within 175 miles airline distance from such licensee's residence and station location.

RECIPROCAL OPERATING RULES

On May 28, 1964, President Johnson affixed his signature to Public Law 88-313, which allows the United States to enter into reciprocal operating agreements for amateurs with other countries by a simple exchange of notes. At press time, only agreements with Costa Rica and the Dominican Republic had been adopted but many others were in various stages of negotiation. (U.S.-Canadian reciprocity is authorized by an earlier

[1] And a small part of Florida — *The Editor.*

formal treaty and it is not affected either by Public Law 88-313 or Subpart G of the rules, published below.)

The Federal Communications Commission has now adopted rules under which amateur visitors from these countries may obtain permits to operate in the United States, its possessions and the Commonwealth of Puerto Rico. Application will be made in English on a new FCC Form 610-A, expected to be available about March 29 (the effective date of the rules) from FCC offices and from some U.S. offices overseas, sixty days in advance of the proposed operating period. Copies of the home station and operator licenses must be furnished. The visitor will indicate a U.S. address through which mail will reach him rapidly, and if mobile operation is intended, will furnish a rough itinerary. The visitors will be able to alter their plan of operation, go portable or mobile and so forth for temporary periods in the same manner as a U.S. licensee, simply by furnishing a notice in advance under the provisions of Sections 97.95(a) or 97.99(b) or the FCC rules. Permanent changes of address or extensive alteration of a mobile itinerary require modification of the permit through submission of another Form 610-A. All applications for foreign amateurs will be handled through the Washington offices of the Commission.

The visitor will operate under the call-sign issued to him by his licensing country, followed by an indication of the appropriate U.S. call prefix. Thus, on c.w., we could have: "W1LVQ de TI2XX/W2" with an identification of the actual site of operation once in each QSO. On phone, the operator will sign in English "W1IKE, this is TI2XX fixed W One" ". . . from TI2XX portable W Three" or ". . . this is TI2XX mobile K H Six" as appropriate, again giving his specific location as nearly as possible by city and state once in each contact.

The new rules collectively form Sub-part G of Part 97, and comprise Sections 97.301 through 97.313 inclusive, as reproduced below.

Subpart G — Operation of Amateur Radio Stations in the United States by Aliens.

§ 97.301 Basis, purpose, and scope.

(a) The rules in this subpart are based on, and are applicable solely to, alien amateur operations pursuant to Section 303(1) (2) and 310(a) of the Communications Act of 1934, as amended. (See Public Law 88-313, 78 Stat. 202.)

(b) The purpose of this subpart is to implement Public Law 88-313 by prescribing the rules under which an alien, who holds an amateur operator and station license issued by his government (hereafter referred to as an alien amateur), may operate an amateur radio station in the United States, in its possessions, and in the Commonwealth of Puerto Rico (hereafter referred to only as the United States).

§ 97.303 Permit required.

(a) Before he may operate an amateur radio station in the United States under the provisions of Sections 303(1) (2) and 310(a) of the Communications Act of 1934, as amended, an alien amateur licensee must obtain a permit for such operation from the Federal Communications Commission. A permit for such operation shall be issued only to an alien holding a valid amateur operator and station authorization from his government, and only when there is in effect a bilateral agreement between the United States and that government for such operation on a reciprocal basis by United States amateur radio operators.

§ 97.305 Application for permit.

(a) Application for a permit shall be made on FCC Form 610-A. Form 610-A may be obtained from the Commission's Washington, D. C. office, from any of the Commission's field offices and, in some instances, from United States missions abroad.

(b) The application form shall be completed in full in English and signed by the applicant. A photocopy of the applicant's amateur operator and station license issued by his government shall be filed with the application. The Commission may require the applicant to furnish additional information. The application must be filed by mail or in person with the Federal Communications Commission, Washington, D. C., 20554, U.S.A. To allow sufficient time for processing, the application should be filed at least 60 days before the date on which the applicant desires to commence operation.

§ 97.307 Issuance of permit.

(a) The Commission may issue a permit to an alien amateur under such terms and conditions as it deems appropriate. If a change in the terms of a permit is desired, an application for modification of the permit is required. If operation beyond the expiration date of a permit is desired, an application for renewal of the permit is required. Application for modification or for renewal of a permit shall be filed on FCC Form 610-A.

(b) The Commission, in its discretion, may deny any application for a permit under this subpart. If an application is denied, the applicant will be notified by letter. The applicant may, within 90 days of the mailing of such letter, request the Commission to reconsider its action.

(c) Normally, a permit will be issued to expire one year after issuance but in no event after the expiration of the license issued to the alien amateur by his government.

§ 97.309 Modification, suspension, or cancellation of permit.

At any time the Commission may, in its discretion, modify, suspend, or cancel any permit issued under this subpart. In this event, the permittee will be notified of the Commission's action by letter mailed to his mailing address in the United States and the permittee shall comply immediately. A permittee may, within 90 days of the mailing of such letter, request the Commission to reconsider its action. The filing of a request for reconsideration shall not stay the effectiveness of that action, but the Commission may stay its action on its own motion.

§ 97.311 Operating conditions.

(a) The alien amateur may not under any circumstances begin operation until he has received

The Board of Directors, at its meeting in May, 1964, voted a special plaque be awarded to John Troster, W6ISQ now a Contributing Editor of QST, for his many articles turning the glaring spotlight of satire on the foibles of hams. The plaque was presented in December, at a joint meeting of the Santa Clara County Amateur Radio Association and the West Valley Amateur Radio Club, by Harry M. Engwicht, W6HC, director of the Pacific Division.

a permit issued by the Commission.

(b) Operation of an amateur station by an alien amateur under a permit issued by the Commission must comply with all of the following:

(1) The terms of the bilateral agreement between the alien amateur's government and the government of the United States;

(2) The provisions of this subpart and of Subparts A through E of this part;

(3) The operating terms and conditions of the license issued to the alien amateur by his government; and

(4) Any further conditions specified on the permit issued by the Commission.

(c) An alien amateur may operate on dates, at locations, or via an itinerary, significantly different from that specified in the application for his permit only under the condition that he has given advance notice of the particulars of such operation to the Commission in accordance with the requirements of §97.95(a) or §97.99(b)

§ 97.313 Station identification

(a) The alien amateur shall identify his station as follows:

(1) Radiotelegraph operation. The amateur shall transmit the call sign issued to him by the licensing country followed by a slant (/) sign and the United States amateur call sign prefix letter(s) and number appropriate to the location of his station.

(2) Radiotelephone operation. The amateur shall transmit the call sign issued to him by the licensing country followed by the words "fixed", "portable" or "mobile", as appropriate, and the United States amateur call sign prefix letter(s) and number appropriate to the location of his station. The identification shall be made in the English language.

(b) At least once during each contact with another amateur station, the alien amateur shall indicate, in English, the geographical location of his station as nearly as possible by city and state, commonwealth, or possession.

LEAGUE SEEKS TARIFF REDUCTION

Canadian officials of ARRL last year approached the Canadian Government seeking a reduction in customs duties levied on amateur radio equipment imported into Canada.

A further approach is being made through public hearings on Notice R-157 of The Tariff Board scheduled to be held this autumn. The League's brief will be filed before the deadline for such proposals, presently set at April 30, 1965.

EXAMINATION POINT CHANGES

The FCC District 24 office in Washington, D.C. has been moved to a new location, Room 204, 521 12th Street, N.W. Amateur examinations continue to be conducted on Tuesdays and Fridays each week, with code tests scheduled to begin at 9:30 A.M. and 1:00 P.M. Examinations not requiring a code test are administered Tuesdays, Wednesdays and Fridays from 8:30 A.M. to 5:00 P.M.

At the field examining point of Albuquerque, New Mexico, an extra session has been added for Saturday, April 10, 1965 with amateur and commercial telegraph tests at 1:00 P.M. and radiotelephone exams at 8:00 A.M. This schedule supplements the one already scheduled for the following Monday April 12, with the same time division.

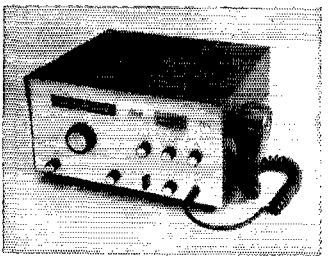
Howard Seefred, W6EA

The name of Howard Seefred, W6EA, in the Silent Keys listing for January, calls to mind the earliest days of organized traffic handling within amateur radio. Many were the test relays conducted prior to World War I wherein the West Coast anchormen were the Seefred brothers, Howard and Lyndon, W6EB, including one notable relay in 1917 wherein a message left New York City at 1:40 A.M. and an answer received back at 3:00 A.M., just one hour and twenty minutes later. The Seefreds were district managers of Trunk Lines B and F. Howard was first Division Manager for the Pacific Division when the system was created in 1917, and he was one of 12 directors elected under the League's first constitution, serving from February 28, 1917 until February 20, 1920. Readers with access to early *QST*s might want to read the September and November 1916 issues, pages 266 and 351, featuring the Seefreds and their station. Amateurs of the present generation owe a debt of gratitude to old timers like W6EA who were the backbone of amateur radio and the League.

(Continued on page 162)

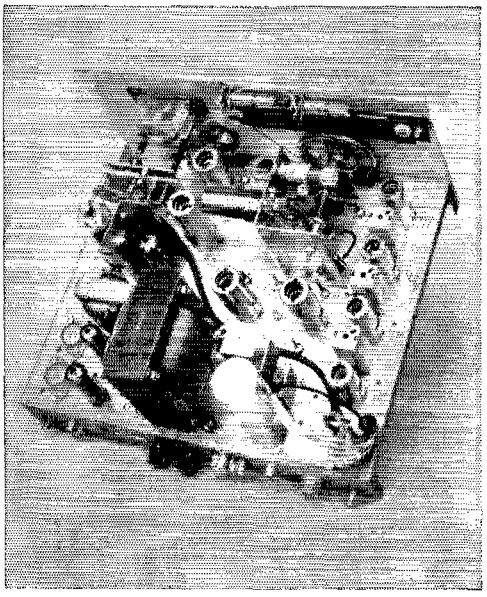
• Recent Equipment —

The Clegg 22'er



THE latest offering of Squires-Sanders, the Clegg 22'er, is a 144-Mc. transceiver with built-in a.c. and d.c. power supplies. Both transmitter and receiver have sufficient overlap to cover the MARS and CAP frequencies near the 144-Mc. band.

The 22'er has the appearance and workmanship that amateurs have come to expect in Clegg equipment. Service should be a breeze, too, for most of the parts are readily accessible for service, as a look at the photographs will show. There is none of the complex shielding found in many commercial and home-constructed



Top view of the 22'er. The transmitter section is in the upper-hand corner of the chassis, the receiver on the right, and the modulator and power supply at the lower left. The transmit-receive relay is at the lower right.

v.h.f. units. It might seem that with a triple-conversion receiver and a transmitter using broad-banded oscillator and multiplier stages there might be a few spurious frequencies, but that is not the case — not a single spurious response was found by the writer in on-the-air operation . . . and like its relatives in the Clegg line, this transceiver is full of ideas that could be used by the home constructor in v.h.f. projects.

Transmitter

Referring to the block diagram, Fig. 1, the transmitter uses either 8- or 12-Mc. crystals with the triode section of a 6KE8 as the oscillator. The output of the oscillator is on 24 Mc., and the pentode section of the same tube triples it to 72 Mc. This is followed by a 12BY7A amplifier on 72 Mc. to insure sufficient drive. All tuned circuits up to this point are broad-banded, and no retuning is necessary with changes in frequency.

A second 12BY7A doubles to 144 Mc., and its plate circuit is a tuned impedance-matching network to feed the final grid. A 2E26 is used as final amplifier, at about 20 watts input. The pi-network tank circuit will match "moderately wide ranges of impedance," to quote the instruction book. The only tuning controls on the front panel are the grid network tuning, final tuning, and loading. The S meter functions as a relative r.f. output indicator for tune-up. There is no provision for c.w. operation included, alas!

Receiving Section

The first r.f. amplifier is a grounded-grid 6CW4 with a tuned input circuit for matching the antenna to the tube's cathode. The sensitivity of this configuration is rated at 0.35 microvolts for a 6-db. signal-plus-noise-to-noise ratio.

The tuning system uses a novel frequency combination, and home builders might be interested in trying it in tunable converters having 10.7-Mc. output, or in transistor 144-Mc. receivers using the i.f. transformers sold for transistor f.m. radios. The oscillator tunes a one-megacycle range, 33.3 to 34.3 Mc. The triode section of a 6KE8 is used as the variable oscillator, and the pentode section is a buffer stage. This signal is tripled in the triode section of another 6KE8 to 100–103 Mc. and mixed in the pentode section with the 144-148-Mc. signals from the r.f. amplifier, hetrodyning them to 44–45 Mc. The variable oscillator's basic frequency of 33.3–34.3 Mc. is then mixed with the 44–45-Mc. first intermediate frequency to provide an output of 10.7 Mc., the second intermediate frequency. Hence one variable oscillator has provided double conversion, and an output on a frequency for which transformers are available. Of course the stability of the receiver will only be as good as that of the variable oscillator.

The 10.7-Mc. i.f. signal is amplified by a

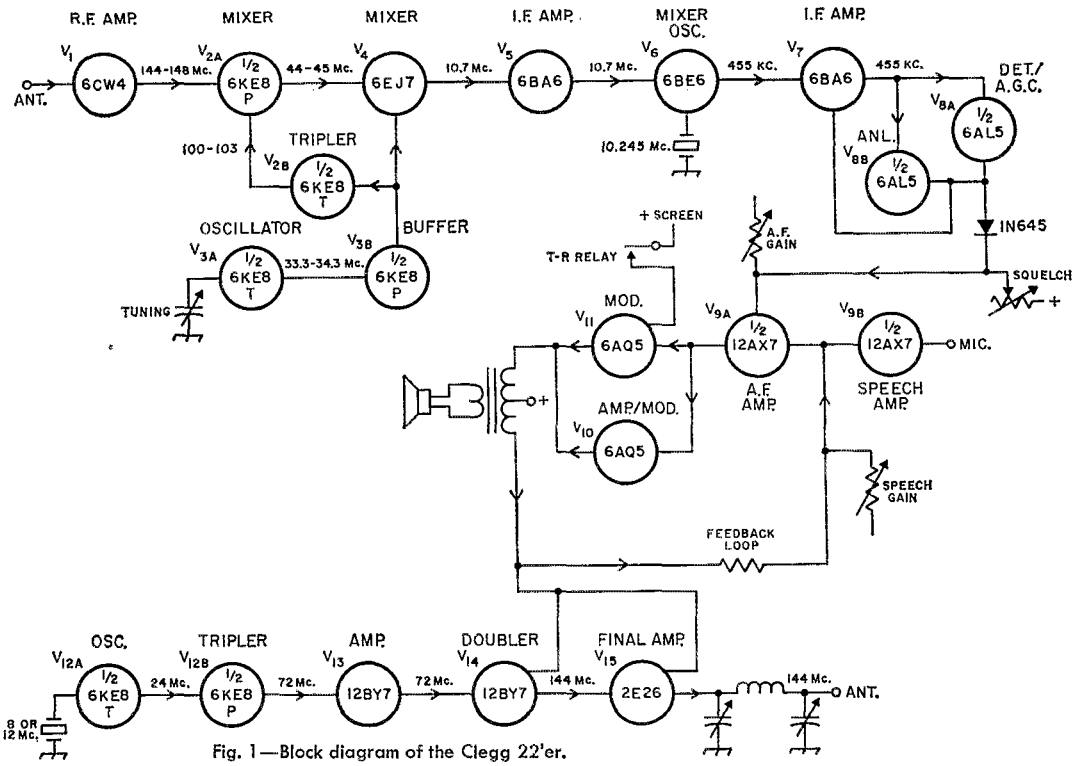


Fig. 1—Block diagram of the Clegg 22'er.

6BA6, and then mixed in a 6BE6 which provides its own oscillator signal on 10.245 Mc. by using two of the grids as a crystal oscillator. The output of this mixer is 455 kc., the third i.f. A second 6BA6, the 455-kc. i.f. amplifier, provides the signal voltage to a 6AL5 detector, a.g.c. rectifier, and noise limiter. A string dial system is used with a fast tuning rate that takes only a couple of turns to cover the band.

Another interesting innovation is the simple squelch circuit. The 455-kc. i.f. amplifier is made to do double duty as a d.c. amplifier, V_5, for the squelch. The a.g.c. voltage variations on the grid of this tube produce amplified variations in the screen voltage which will be proportional to the strength of the received signal. This voltage is used as forward bias to a 1N645 diode switch in the audio output of the detector, as shown in Fig. 2. Reverse bias for the diode is obtained through a variable resistive divider from the plate supply. When the reverse bias — adjustable with the squelch control — exceeds the signal-voltage forward bias the diode does not conduct, and looks like a high resistance. Most of the audio output of the detector is dropped across this resistance. When the signal voltage exceeds the reverse bias, the diode conducts and the audio passes to the first audio amplifier. This squelch system is not as completely effective as the relay circuits, for the diode is never an infinite resistance, so some small amount of audio will get through. But, considering its simplicity, it works very well indeed.

Audio Circuits

In receiving, one 6AQ5, V_{10}, functions as the audio output amplifier, and is transformer coupled to the speaker. In transmit, a second 6AQ5, wired in parallel with V_{10} except for the screen, is activated by applying screen voltage, and the two act as plate and screen modulators for the final of the transmitter. Modulation is also applied to the screen of the doubler stage. The primary of the audio output transformer functions as the modulation transformer in transmit, with a feedback circuit from the transformer to the speech amplifier. The speech gain is controlled by varying the amount of feedback. This circuit has the advantage of

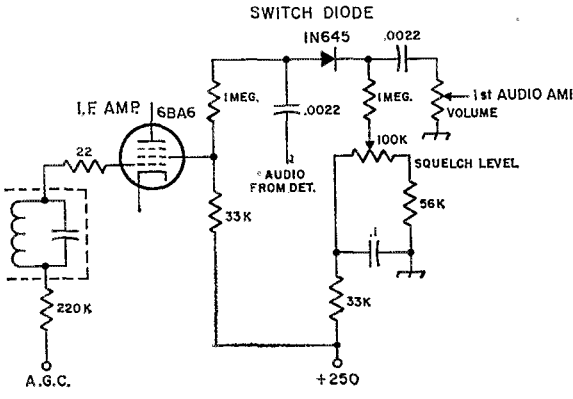
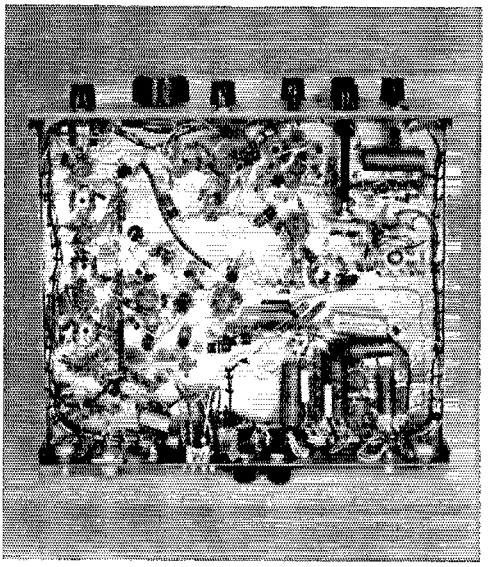


Fig. 2—Simplified diagram of the diode squelch circuit.

Bottom view showing the clean layout of the two-meter transceiver. Controls on the rear deck are the s-meter zero and speech gain. Separate fuses are provided for a.c. and d.c. The phono-type jack is for audio output.



being somewhat self-adjusting so it is not easy to run more than the legal percentage of modulation. A multi-pole relay performs the change-over functions in the transceiver, and is actuated by a push-to-talk microphone. No provision is made for keying the relay from the 22'er itself.

The power supply may be operated from 115 volts a.c., or 12 volts d.c. The input voltage is selected by using the proper plug. Its small size and weight make the 22'er a natural for mobile or for taking along on a vacation. The power requirements are not mentioned in the instruction book — which is also rather light on circuit details and contains no maintenance information. The appearance is similar to the other Cleggs, with a white front, black knobs, and dark gray cabinet.

— *W1KLK*

NEW BOOKS

Practical Electricity, by Joseph F. McPartland and William J. Novak. Published by McGraw-Hill Book Company, 330 West 42nd St., New York, N. Y. 10036. 90 pages, including index. Illustrated, 6¼ by 9¼ inches, cloth cover. Price, $4.50.

This book is intended for those in the electrical trade, but will provide a good basic text for the beginning amateur. In this text the authors have presented the basis of electricity and electronics in simple language, using mathematics only in sample calculations that show the use of electrical formulas. Many sections have blocks which contain examples, formulas, and sample calculations that can be used by the student for quick reference. Several parts of the book are concerned with the problems of power distribution. The book starts with the physics of current, and explains the electron theory of current flow. Many examples are given to help the reader thoroughly understand the ideas of Ohm's Law. The meaning, calculation, and measurement of work, power, and energy are discussed. Electrical conductors and their ratings are explained, which with the load and voltage source make an electrical circuit. Magnetism and electromagnetic induction are studied as the basis for the following chapter on inductive reactance. Capacitive reactance and alternating current are also discussed, and the more complex ideas of impedance and phase introduced. The book ends with examples of common electrical circuits for lighting and power.

TV Video and Sound Circuits, by Thomas M. Adams. Published by Howard W. Sams & Co., Inc., 4300 W. 62nd St., Indianapolis 6, Indiana. Cat. No. BEW-1. 160 pages, including index, illustrated. Paper cover. Price, $2.95.

Although intended for the television technician-serviceman, hams who are interested in f.m., pulse work, or wideband i.f.'s, may find this book valuable. All diagrams are presented in four colors to represent the various signal paths. In this manner it is easier to see the operation of the circuits. This presentation will help to overcome one of the most difficult problems of a reader—how to visualize what is going on in the circuit the author is talking about. Each circuit is explained in a non-mathematical manner, and its place in the over-all operation of the television receiver discussed. With each circuit diagram a complete list of functions for each component is given. The first chapter discusses the nature of the video signal and how it is reproduced on the screen for black and white and color sets. The next chapters discuss the different circuits found in the TV tuners, followed by what happens in the i.f. amplifier, detector, and picture-tube signal circuits. The last chapters are concerned with the sound paths and audio amplifier circuits. Power supplies are also covered. The use of many diagrams, graphs, and charts carry on the theme that the best way to master a more complex circuit is to be able to visualize its operation.

— *W1KLK*

Strays

The Korean Amateur Radio League and the Eighth United States Army Radio Club will jointly sponsor a Korean Field Day from 0001 GMT on July 3, 1965 to 2400 GMT, July 4, 1965. A special QSL card will be issued. Operation will be on 80, 40, 20, and 15 meters. A.m., s.s.b. and c.w. will be utilized. The station in each U.S. call area contacting the greatest number of HL or HM stations will receive a special certificate. The Kimchi award will be granted for two-way contacts with any five HL stations. Send extract of logs to HL9US, Hq. EUSA, Signal Officer, APO San Francisco, 96301.

—•••—

April 10, 11, and 12, 1965 are the days to look for K7UGT which will be operating from the famous old west city of Virginia City, Nevada. The Nevada Amateur Radio Society is sponsoring the rare county expedition to the old Comstock Lode area in Storey County. A special QSL will be sent to those who contact the group. Operation will be on 75-, 40-, 20-, 15-, 6-, and 2-meter s.s.b. QSL address: P.O. Box 37, Virginia City, Nevada. For further information write P.O. Box 212, Sparks, Nevada.

Increased Selectivity for 3-Kc.-Bandwidth Receivers

An Outboard Crystal-Filter Unit for C.W. Reception

BY DON M. WHERRY,* W6EUM

This unit provides nominal selectivity down to 200 cycles with good skirt characteristics. Insertion of the selective channel, which may remain connected permanently without effect on normal operation of the receiver, requires only two simple connections to the undisturbed receiver circuitry. Although described here as an accessory for HR-20 mobile receivers, the same principles may be applied to other types.

SINCE phone (either a.m. or s.s.b.) is the mode associated with mobile operation almost exclusively, the selectivity of most mobile receivers (or the receiving sections of mobile transceivers) will be found inadequate for c.w. reception if the mobile receiver has to double as the fixed-station receiver, as it does in my case. My mobile receiver is the Heath HR-20,[1] having a nominal selectivity of 3 kc. at 6 db. down, 10 kc. at 60 db. For home-station c.w. use, I have built an outboard crystal-filter unit which improves the selectivity to approximately 200 cycles at 6 db., and 500 cycles at 20 db. The same general method may be applied to other receivers which do not have the desired selectivity.

Fig. 1 shows the circuit of the adapter. The input signal is taken from the 3-Mc. i.f. of the HR-20. The 3-Mc. signal is fed to a decoupling amplifier (6BZ6) and thence to a 6BE6 converter which translates to 446 kc. The conversion oscillator operates on the low-frequency side of the 3-Mc. input signal. The 446-kc. signal is passed through two half-lattice crystal filters in cascade, and thence to a product detector using another 6BE6, and a stage of audio using a 6C4. The audio signal is fed back into the receiver at the grid of the audio output stage, in parallel with the normal receiver signal. This arrangement permits the receiver's normal channel to be used by simply turning down the audio gain control in the outboard unit, and turning up the audio gain control in the receiver. The sharp channel is introduced by reversing the process.

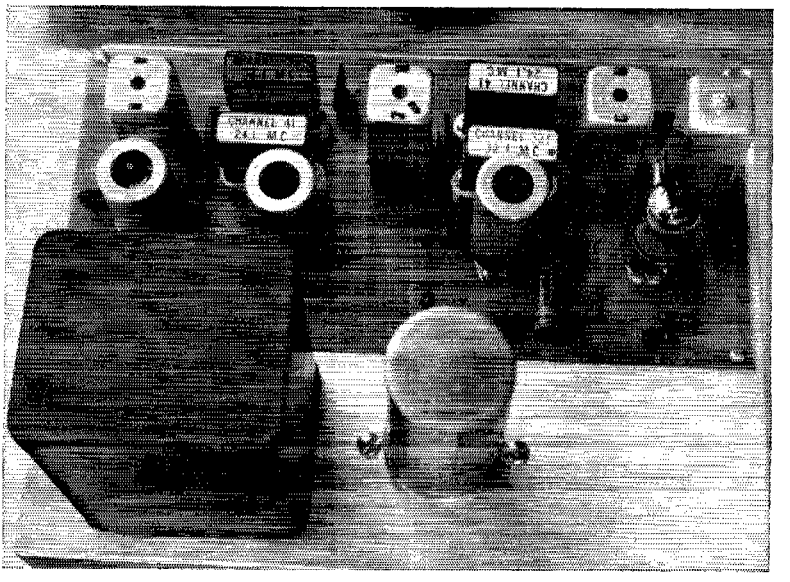
A simple power supply is included.

Construction

The outboard unit is constructed on a 5 × 9-inch aluminum chassis. I used an etched circuit board for all components except those in the power supply. Conventional constructional technique may be substituted, of course. The general

* 2121 Grandview Drive, Camarillo, Calif.

[1] "Recent Equipment," *QST*, March, 1964.



Top view of the selective outboard unit. Components are identified in the text.

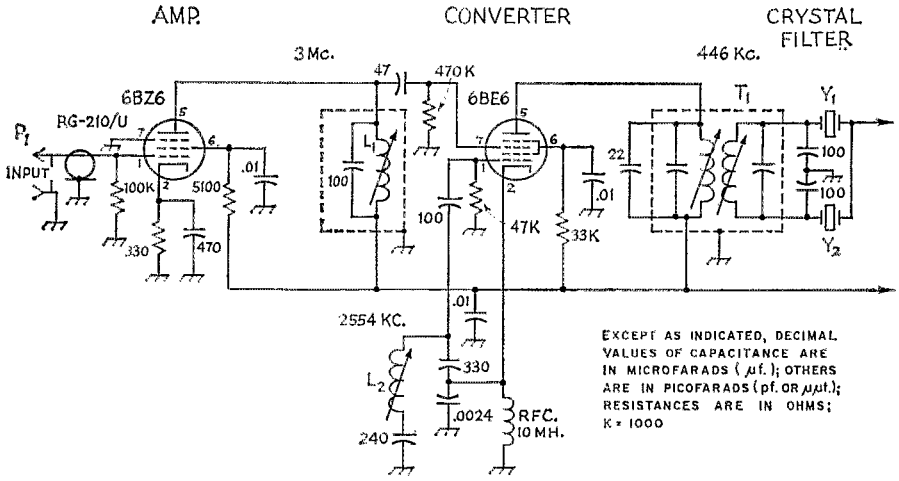


Fig. 1—Circuit of the outboard c.w. crystal filter. Fixed capacitors of less than 0.005-μf. value should be silver mica or NP0 ceramic; others may be disk ceramic, except where polarity markings indicate electrolytic. Fixed resistors are ½ watt.

C_1—Miniature variable (Johnson 160-107).
CR_1—Silicon diode, 80 p.i.v., 50-ma. (1N3196).
L_1, L_2—24–35-μh. slug-tuned coil (Miller 4508, or equivalent).

layout is shown in the photograph. From right to left are L_1, the 6BZ6, T_1; Y_1, Y_2 and the 6BE6 converter; T_2; Y_3, Y_4 and the 6BE6 product detector; L_3 and the 6C4. L_2 is mounted below deck. The shielding of L_1 and L_3 is probably not necessary, although the shield cans provide a topside mounting for these two slug-tuned coils. The power transformer and triple-section filter capacitor are in the foreground.

In my case, it was necessary to shunt the primaries of T_1 and T_2 with 22-pf. external capacitors to permit adjustment to 446 kc. This may not be necessary with other types of i.f. transformers, or perhaps different values may be required. The fixed capacitors in the oscillator of the outboard unit should have zero temperature coefficient. If this oscillator has noticeable frequency drift, the signal can easily walk right through the passband of the sharp i.f. filter.

Receiver Connections

The input connection for the outboard unit is taken from the plate of the second 3-Mc. i.f. amplifier by connecting a small capacitor at Terminal 5 on Terminal Strip *J* in the HR-20 through a length of RG-210/U (13.5 pf. per foot) coax cable to a phono jack mounted on the rear apron of the HR-20 chassis. The coupling capacitance should be only as large as necessary to produce a satisfactory output signal level; a few picofarads will usually be sufficient. The same type of cable is used to make a direct connection from the grid terminal (Pin 7) of the 6BE6 audio output tube in the HR-20 to a second phono jack at the rear of the chassis. Sections of RG-210/U are also used to connect P_1 and P_2 to the outboard unit. These sections of coax cable should be as short as possible, especially the two sections carrying the 3-Mc. signal to the input of the outboard unit.

Adjustment

Connect a pair of headphones to P_2 (or plug P_2 only into the receiver, turn the receiver on, and turn the receiver audio gain down). Turn on the power supply and turn up the audio gain control of the outboard unit. Couple a signal generator set to 446 kc. through a capacitor to the No. 3 grid of the 6BE6 product detector. Adjust L_3 for zero beat with C_1 set at mid-capacitance. Then set C_1 for a desired beat note.

Disconnect the 47-pf. capacitor from L_1, and the 100-pf. capacitor from L_2. Feed the 446-kc. signal through the 47-pf. capacitor to the No. 3 grid of the 6BE6 converter (Pin 7). Adjust T_1 and T_2 for maximum audio output, attenuating the generator signal as necessary to avoid overloading. Return all connections to normal.

Now feed a 3-Mc. signal through a capacitor to P_1. Adjust L_2 to obtain the same beat note as before, and adjust L_1 for maximum audio output. Plug P_1 into the receiver, tune in a

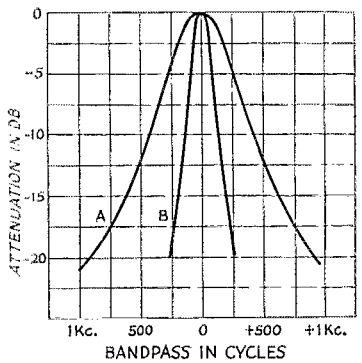
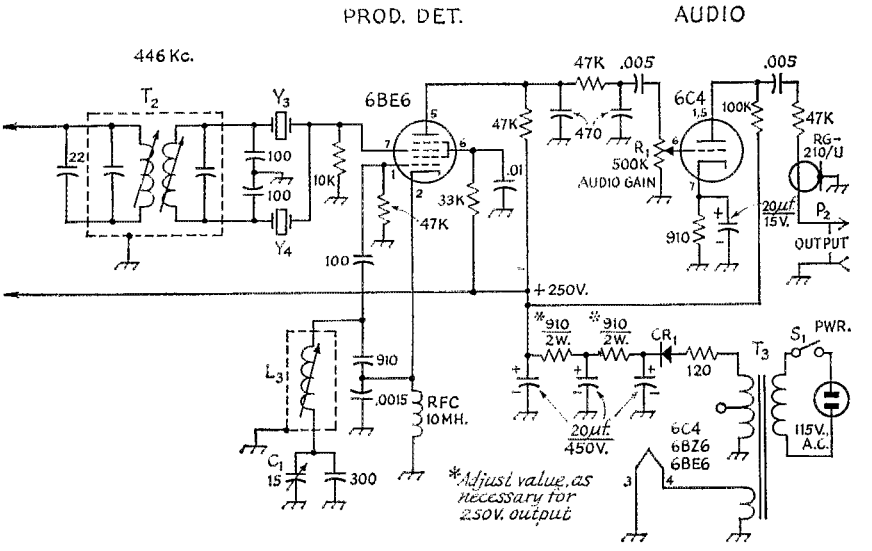


Fig. 2—Selectivity curves of the outboard unit. Curve A is for a single crystal section, Curve B for the two-section filter.



L_3—450–800-μh. slug-tuned coil (Miller 4412, or equiv.)
P_1, P_2—Phono plug.
R_1—Audio-taper control.
S_1—S.p.s.t. toggle switch.
T_1, T_2—455-kc. i.f. transformer adj. to 446 kc.
T_3—Power transformer: 250 volts, r.m.s., 25 ma.; 6.3 volts 2 amp. (Stancor PS-8416, or equivalent).
Y_1, Y_3—446.3 kc. (FT-241A, Channel 41, surplus).
Y_2, Y_4—445.8 kc. (FT-241A, Channel 321, surplus, Texas Crystals).

signal and touch up all adjustments. Slight readjustment of T_1 and T_2 may be needed to obtain the desired selectivity characteristic. Incorrect adjustment of T_1 and T_2 will result in varying degrees of a double-hump characteristic, instead of the single-hump characteristic shown in Fig. 2.

Variations

Curve B of Fig. 2 shows the selectivity characteristic with the two-section crystal filter. If this is considered too sharp, one of the crystal sections can be omitted, in which case the selectivity characteristic will be as shown in Curve A of Fig. 2. Another possibility is to include both filter sections and, when maximum selectivity is not desired, remove the crystals from one section, and plug a shorting strap into one of the empty crystal sockets (it doesn't make any difference which one). This will give a selectivity characteristic intermediate to Curves A and B.

The 6BZ6 preamplifier can be omitted if simplicity is of prime importance. In this case, P_1 would be connected into the circuit at the 47-pf. coupling capacitor to the 6BE6 converter. However, omission of the amplifier requires tighter coupling to the 3-Mc. amplifier in the HR-20, resulting in more detuning of the latter.

If the receiver has a 455-kc. i.f., both the 6BZ6 amplifier and the 6BE6 converter will not be needed. In such a case, crystals either side of 455-kc. would be used, and T_1 loosely coupled to the last i.f. stage in the receiver. Also, with the 455-kc. i.f., the product detector and audio amplifier could be eliminated by feeding the crystal-filter output back into the receiver at the input to the receiver's detector. However, this would mean sacrificing the simple method described for changing between normal and high-selectivity channels. QST

FAMILY MEMBERSHIP

For families with two or more amateurs, ARRL By-Laws provide that, after one individual has become a Full Member of the League at the regular dues rate ($5 in the U.S.), additional amateur members of that family may join the League for a special dues rate of $1, with all rights and privileges except the receipt of additional copies of *QST*. Our correspondence indicates some misunderstanding of this arrangement. Please note.

1) All participants in the Family Membership plan must be Full Members — i.e., holders of amateur license. Unlicensed persons do not qualify.

2) There must be an immediate family relationship — i.e., husband or wife, brother or sister, father or mother, son or daughter.

3) The rate for the initial membership is the standard $5 ($5.25 in Canada). The rate for additional amateur members of the family is $1 — not $2 as many seem to believe.

4) All Family Memberships must be concurrent — i.e., expire in the same month.

So if you are part of a ham family, slip in an extra dollar for each other ham in your clan next time you renew your League membership.

Over-All Design Considerations for RTTY Demodulators

Methods and System-Component Requirements

BY IRVIN M. HOFF* K8DKC

THE general requirements for reception of RTTY signals were discussed in broad terms in the preceding article,[1] and a number of demodulator configurations were described in block-circuit form. It is now time to look at the individual sections of these circuits more closely, to see what performance characteristics are needed for optimum use of the incoming RTTY signal, particularly with reference to the advanced-type demodulator, the block diagram of which is repeated here in Fig. 1.

These performance characteristics are determined by the nature of the signal, along with the noise and interference that is inevitably associated with it in amateur work. For example, the bandwidth of the RTTY signal is a major factor, so it is necessary first to look at this aspect.

Keying Bandwidth

A constant carrier with no modulation (such as a key-down c.w. signal) is basically a single frequency. It has no bandwidth, since a single frequency is not a band. But as soon as the c.w. key is activated, this no longer is true. The signal now becomes pulse-modulated, and the bandwidth is closely related to the speed with which the keying is done; high-speed c.w. is a wider signal than slow-speed c.w.

Ordinary c.w. consists of on-off pulses, constituting a form of amplitude-modulated (a.m.) transmission. If the pulses are essentially square-wave, the modulation theoretically has an infinite number of harmonics, all odd multiples of the basic keying rate. It can be shown mathematically and practically that as far as 60-w.p.m. RTTY is concerned, this *basic* keying rate is 22.5 c.p.s. Since the keyed signal has sidebands on either side of the carrier, the total bandwidth of the basic keying rate becomes 45 c.p.s.

* 1733 West Huron River Drive, Ann Arbor, Michigan 48103.

[1] Hoff, "Receiving Radioteletype," *QST*, March, 1965.

This is No. 1 of the RTTY series by K8DKC. To give you a general picture of the principles and problems of RTTY reception, the article takes a more detailed look at the demodulator arrangements presented in March QST. Practical circuits will be described later in the series.

Post-Detection Filters

The RTTY detection process changes the signal into separate d.c. pulses (usually plus and minus) for mark and space. The rectified audio component is still present in the detector output and so are all types of random noise and beat notes that sneaked through the channel filters and the limiter. Thus a minimum-bandwidth low-pass keying filter following the detector (or detectors) will provide a maximum improvement in the signal-to-noise ratio. A simple *RC* filter, as is used in many amateur demodulators, will effectively eliminate the audio component, but the skirt selectivity is too poor to do a really adequate job. Look at Fig. 2, which compares the skirts of *RC* and *LC* low-pass filters. No attempt is made here to fill in precise figures, but the relative ability to restrict the bandwidth is demonstrated.

Such an *LC* filter would theoretically be designed for a cutoff frequency of 22.5 c.p.s., the basic keying rate, but practical limitations dictate that these filters should be a little wider, about 28 c.p.s. for the types most commonly used.

In a very interesting paper on filters for keyed

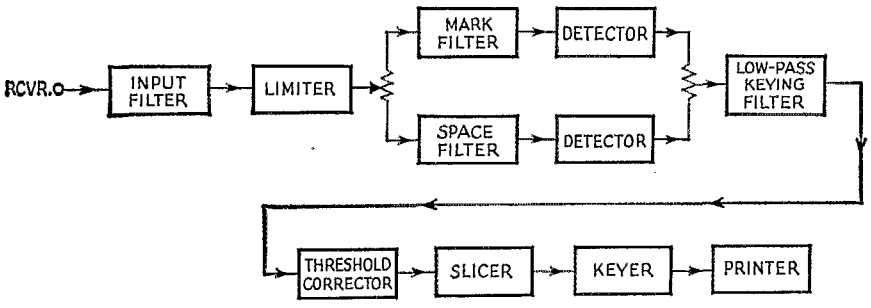


Fig. 1—Block diagram of the advanced-type demodulator. Requirements for individual circuit elements are discussed in the text.

pulses, Dr. Nyquist[2] suggested many years ago that the cosine curve would be an ideal waveform for filter response. Several types of filters approximate this cosine roll-off, but one that is simple, inexpensive and easy to design is the "3-pole Butterworth" type. A newer type of filter, called the "linear phase," is perhaps better from an all-around standpoint, but to do the same job takes more components than the 3-pole Butterworth. An excellent article on the requirements of filters for RTTY has been published by Vic Poor, K3NIO.[3]

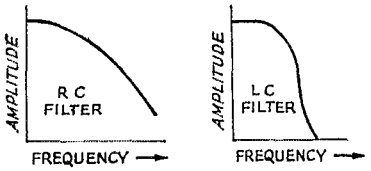


Fig. 2—Comparison of roll-off characteristics of resistance-capacitance and inductance-capacitance low-pass filters.

The Slicer

As explained in the preceding article,[1] the "slicer" in the advanced demodulator circuit, Fig. 1, is designed to swing between saturation (heavy conduction) and complete cutoff with a relatively small variation in the input-signal amplitude. The range of the input-voltage variation which continues to operate the slicer satisfactorily is called the "dynamic range" of the slicer stage. In a demodulator such as shown in Fig. 1, the limiter keeps these voltage changes from varying to any great extent (drift, of course, will cause *some* change). Consequently, the dynamic range of a demodulator using limiters need not be very great — perhaps 20 db. is more than adequate. However, if the demodulator is to be used to copy many different shifts other than 850 c.p.s., and no provisions are made to change the filter response accordingly, additional dynamic range is needed. This is discussed later in connection with linear discriminators.

Since the printer requires on-off d.c. pulses, the ability of the slicer to change quickly from complete conduction to complete cutoff has a direct influence on the ability of the printer to copy correctly. The slicer then becomes a high-performance type of circuit, and it is customary to use well-regulated voltage for its operation.

Mark and Space Filters

Since the transmitted f.s.k. signal is a form of frequency modulation, we can treat it as f.m. in the demodulator. It should be pointed out at this time that the signal can be handled either as f.m., as we are about to describe, or, with different techniques, as an a.m. signal where no limiters are used. These latter a.m. techniques are rather new to amateurs and little has been published concerning them until recently.[4]

[2] Nyquist, "Certain Topics in Telegraphic Transmission Theory," *A.I.E.E. Transactions*, Vol. 47, April, 1928.
[3] Poor, "Filters for RTTY," *RTTY Bulletin*, May, 1964.
[4] See Footnote 7 and accompanying text.

If the signal is strong enough to "capture" the limiter used in f.m. demodulators, the limiter output is essentially of constant amplitude. If the mark and space signals introduced to the demodulator from the receiver are of equal voltage, rather narrow pre-limiter filters could be used without introducing prohibitive distortion due to timing error from the rise time of the narrow filters. However, in this unlikely case, there would really be little reason for using a limiter in the first place.

When mark and space are unequal, which is usually the case, then the limiter causes problems with narrow filters. If minimum-bandwidth filters (approximately 55–60 c.p.s. for 3-pole Butterworth types) are used, the timing error because of the relative levels into the limiter becomes prohibitive if one of the two signals fades to an appreciable extent with respect to the other, which is often the case.

The answer to this problem is to use filters that are wide enough so that the timing error will be no greater than perhaps 25% under the worst case of fading, in which case the distortion introduced will fall within the ability of the machine to print satisfactorily. K3NIO[3] estimates that pre-limiter filters should be about four times the basic keying rate or, in the case of a 60-w.p.m. system, about 200 c.p.s. This only pertains to the pre-limiter filters.

Two such filters could be used ahead of the limiter as well as behind, as in Fig. 3. The post-limiter filters, however, are not subjected to the limiter's peculiarities, and can have any bandwidth from the minimum up. It is customary to make them fairly broad, to alleviate the critical problem of exact, precise tuning needed with quite narrow systems, as well as to save the expense involved in meeting the more stringent requirements.

When dealing with f.m. systems, optimum operation probably would result from two pre-limiter filters about 200 or so c.p.s. wide each, plus two quite narrow post-limiter filters. However, such a system is rarely if ever used, because of the cost involved, the advent of newer techniques using a.m. principles, and — perhaps the best reason of all — the limitations it imposes for the amateur in particular. These limitations principally are caused by drift and incorrect shift (problems the ordinary RTTY amateur has yet to concern himself about adequately).

Instead of using two pre-limiter filters, it is more customary to use a single filter of perhaps 1.0 kc. or so width. This filter allows any frequency falling within its limits to reach the limiter, in which case various shifts other than 850 can be satisfactorily received. Such a filter has the further advantage of being much cheaper than the two previously described, as well.

We can point out that many f.m. demodulators use *no* pre-limiter filter, but in this case receiver hum plus nearby signals that the i.f. of the receiver may not be narrow enough to eliminate will cause degradation of the desired signal. This results because the limiter accepts the entire

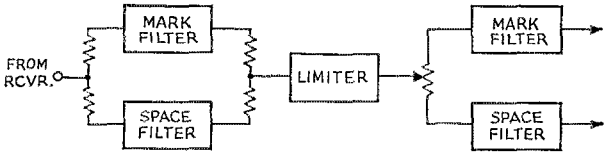


Fig. 3—Pre-limiter and post-limiter filters. The combination provides higher performance than one set of filters alone, in either position.

output of the receiver indiscriminately. Consequently, some form of pre-limiter filtering — usually a band-pass filter — should be used for best results.

The channel filters following the limiter can be either narrow or broad. This depends on several factors, such as cost, the range of shift the unit is expected to copy and, not to be overlooked, the type of indicator to be used to tune the demodulator. The better the filter with respect to skirt selectivity, the easier it will be to get a sharply-defined tuning pattern with most indicators. Continuing our airplane analogy, a fighter plane is more expensive, more complex, and requires greater operating skill than, say, a small family plane. For its purpose, its performance will be unmatched, but for the average circumstance its limitations would dictate another type unit. So goes our analogy.

Thus few amateur f.m. demodulators use either pre-limiter or post-limiter channel filters. They normally use a pre-limiter band-pass filter of 1.0 kc. or so bandwidth, and a simple but very effective post-limiter circuit called a "linear discriminator," which is discussed a little later. This linear discriminator can easily be constructed for under $5.

The Limiter

We have mentioned that the limiter puts out a signal of constant amplitude. This is not to say that the limiter can in any way separate the signal from the noise that may be passed along with it by the receiver. As is well known, the strongest signal presented to a limiter "captures" it. As long as this strongest signal is the desired one, all is well. But if that signal fades momentarily into the noise, the output of the limiter is then that of random noise — which the limiter tries to elevate to the same level at which the signal *had* been. However, if the mark and space filters following the limiter are of equal bandwidth, the output of the low-pass filter following the detectors will be only a fraction of the voltage level during normal peak-signal output. This is because the positive noise output from the mark detector will tend to offset and equalize the negative output from the space detector, since on noise both outputs are present simultaneously. The low-frequency cutoff of the low-pass filter tends further to eliminate peak noise variations.

When an interfering signal stronger than the desired one is presented to the limiter (perhaps a nearby c.w. station is heard in the receiver output) the limiter is captured by this stronger signal and it tends to suppress the desired signal. Thus an interfering stronger signal that gets into the f.m. demodulator ruins all reception. This signal can possibly be "notched out" in the receiver and then normal reception continues.

If the desired signal is stronger than any others on the frequency it will effectively suppress those other weaker signals and good copy results, even though interfering signals may be audible in the receiver output. Thus the limiter capture effect can be either good or bad, depending on the strength of the desired signal in relation to other signals and noise.

The Linear Discriminator

A linear discriminator (a good f.m. term, but it need not be confusing) puts out equal plus-and-minus voltages as one goes farther on each side of a center frequency at which the output is zero. Fig. 4 is a very simple diagram of a typical circuit.

If the mark and space filters are made pretty broad and have simple construction giving wide skirt selectivity, the output voltage with respect to frequency might look something like Fig. 5. The discriminator curve in this figure can be considered to be linear if the voltage changes rather uniformly as you go farther to the left or right of the center frequency, which would be zero output volts.

If the peak linear response for an 850-c.p.s. shift is ±50 volts, the voltage for 170-c.p.s. shift should be ±10 volts. If the dynamic range of the slicer is such that the stage will continue to operate normally on less than ±10 volts, this system offers the ability to copy a wide range of shifts without changing filters. In fact, if the dynamic range of the slicer stage is great enough, shifts of only a few cycles could be copied, provided the equipment did not drift and a suitable means of tuning the receiver were employed. With such a system we have successfully copied 4-c.p.s. shift, but this is of no practical concern.

It should be realized that with a discriminator characteristic such as that shown in Fig. 5 the maximum signal-to-noise ratio exists when the shift is 850 c.p.s. However, as long as the incoming signal is stronger than the noise level this is of no importance. Some advanced demodulators offer methods that copy incoming signals automatically when no operator is present, and these systems are usually based on 850-c.p.s. shift.

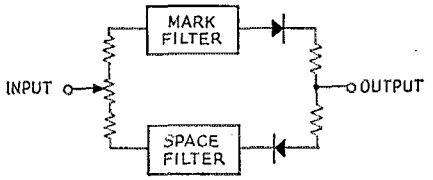


Fig. 4—Simple discriminator circuit in elementary form.

For best linear-discriminator circuits, very low-Q coils are used. These provide broad peak response and, at the same time, the slope of their skirt selectivity is so gentle that they make ideal filters for this purpose. TV width coils for horizontal oscillator circuits work extremely well for the purpose.

In our airplane analogy, a unit such as is shown in Fig. 1 would correspond to the jet engine fitted with a propeller. It would be quite well-suited for most circumstances except where out-and-out maximum performance was needed.

Maximum signal-to-noise ratio can never be achieved with filters that are 200-250 c.p.s. broad. Of course, with any decent signal strength one does not need *maximum S/N ratio.*

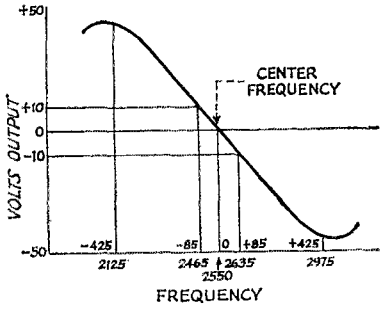


Fig. 5—Linear-discriminator characteristic, showing difference in output voltage with wide (850-cycle) and narrow (170-cycle) frequency shift. This type of demodulator will respond to any shift within the limits of the linear part of the curve, but with reduced output as the frequency shift becomes smaller.

The Limiterless Demodulator

Many unusual things can happen to the f.s.k. RTTY signal on its way from the transmitter to the receiver. One of these phenomena is selective fading. In this instance the mark and space signals fade at independent rates, and it is entirely possible that one of the two tones will fade completely into the noise level for a short time. Simple demodulators cannot always handle this type of circumstance, and many errors result until both the mark and space are again stronger than the noise level. The circuit in Fig. 1 does an excellent job of automatically copying right along, since there is a threshold corrector to take care of this very type of problem. However, the limiter tends to amplify the noise, and without an optimum low-pass filter the threshold corrector might not be able to work properly.

If the limiter is not used, the minimum-bandwidth channel filters of 45 c.p.s. can be used. However, the practical minimum bandwidth for the filter designs normally used would be about 55–60 c.p.s. These, then, *do* offer minimum bandwidth and in certain circumstances (particularly when there is QRM from nearby stations) they offer a radical improvement in copy. However, they also bring up additional problems. For one thing, filters of this type are not easy to make at home, as their commercial price would indicate. At the same time, even the least amount of drift produces quite a bit of distortion from these high-performance filters; small amounts of drift quickly change the output voltage from the filters and the signal can be lost before the receiving operator notices that he should retune. If the shift of the transmitting station is not exactly 850 c.p.s (and it seldom is), such sharp filters just will not work in normal circuits.[5] Finally, one is seldom certain that the receiver is properly tuned. No limiting can be used, and the tuning indicator is only a rough guide. Therefore, the signal could have drifted or just faded. In any event, the tuning ratio of most receivers makes minute corrections of only 10–15 cycles rather difficult.

We mentioned at the beginning of the article that the mark and space frequencies are actually the equivalent of two independent transmitters each putting out the same information.

With no limiter we are now using what is known as "a.m." detection. Because of selective fading, the outputs of the detectors often vary radically from moment to moment, depending on whether mark or space is being received at the time. In f.m. demodulators, this fading is handled by the limiter, but in a.m. units, a special circuit called a "threshold corrector" is used. This circuit essentially provides the following (slicer) stage with voltages that vary uniformly from mark to space. It accomplishes this in a most unique manner, using storage capacitors to provide equalization of the voltages at its output. Thus the slicer receives equal information for both mark and space, although this information may vary in over-all amplitude. For example, at one moment you might have perhaps ±60 volts for mark and space and at another moment you might have only say ±6 volts. It is the job of the threshold corrector to provide this symmetrical output voltage regardless of the independent fading (or absence of one signal completely) at the input. It is this ability that allows the advanced a.m. demodulator to work in such a superior manner under weak signal conditions, particularly where one signal may temporarily fade completely into the noise level for short periods. It is also this feature that allows the a.m. demodulator to give satisfactory copy when deliberately copying only one channel, such as mark-only, during interference.

Several types of threshold correctors have been developed in recent years, but all of these with the exception of one we shall mention in the next paragraph have had associated problems which make their use in amateur demodulators (where machine-speed sending is seldom used) unsatisfactory. Even on machine speed, they all offer certain little-known disadvantages which would require a separate article to cover adequately.[7]

A recent U.S. patent[6] contains a circuit that

[5] *Unless a clever system of "heterodyning" is used, as in* a few of the most advanced circuits. These heterodyne oscillators would only appeal to the most enthusiastic and capable amateurs, and even many of these do not favor them.

[6] No. 2,999,925, assigned to Page Communications Engineers, Inc.

overcomes all the disadvantages of previous threshold correctors in such an ingenious way that it rather obsoletes those earlier efforts. This circuit, called a "decision threshold computer" ("DTC"), automatically keeps the decision point presented to the slicer at the correct point on the waveform.[7] The DTC circuit finally makes a.m. detection superior to the best f.m. demodulators, in a majority of instances. However, the DTC also can be used in conjunction with a good f.m. demodulator, and will improve its performance similarly. Thus it can be said that any type of converter not using the DTC is not getting the maximum performance as we now know it. In a subsequent article we will present the first demodulator offered to amateurs that uses this basic circuit.

Since the output of a.m. detectors can vary quite wildly with no limiting, the dynamic range of this type of unit must be exceptional. A minimum of 40 db. is required, and more would be better. It would be difficult to obtain even 40 db. with typical transistor circuits, but vacuum-tube circuits can still offer in excess of 60 db. dynamic range. As a result, transistor circuits offer marginal performance with a.m. detectors unless designed by experts who know circuit design exceptionally well.

Since many other phenomena exist in radio propagation, such as flutter fading and backscatter, to name two, advanced enthusiasts are still experimenting with a.m. *vs.* f.m. concepts. So far, it appears that if the DTC is incorporated in both types, the f.m. unit will be quite satisfactory in a majority of instances. There is a lot of overlapping, but one thing seems evident — a "good" demodulator should offer the possibility of having both types of reception available. The a.m. type is far superior to the f.m. type if strong nearby stations become a problem. On the other hand, the f.m. type will allow the greatest latitude in off-shift copy and drift for normal use where the signal strength is moderate or better, and where little interference exists. F.M. types also adapt readily to automatic copy where the operator can leave the room and yet continue to get satisfactroy results.

Filters for the a.m. type can be anything from minimum (55-60 cycles) bandwidth to something more broad. For normal amateur use, a bandwidth of around 150 cycles would probably offer the most advantage a majority of the time. Filters of this type are easier to build and less costly than the more narrow ones.

Summary

Trying to explain adequately the various types of demodulators in current use, from the most simple to the most complex, in a reasonable amount of space is, of course, difficult. In general, we hope we have shown that the most simple units do work, particularly on v.h.f. where the requirements usually are not stringent. But h.f. is a different story, and here the higher-performance types are needed. In the past, f.m. units have neither offered minimum-bandwidth low-pass filters nor suitable threshold correctors. While developing the a.m. types in recent years it was found these same principles, when applied to f.m. units also, were of distinct advantage. Thus the optimum present-day demodulator would include facilities for both f.m. and a.m. detection.

With this basic description of demodulator principles, the reader should be in a position to understand to some extent the manner in which RTTY signals are handled.

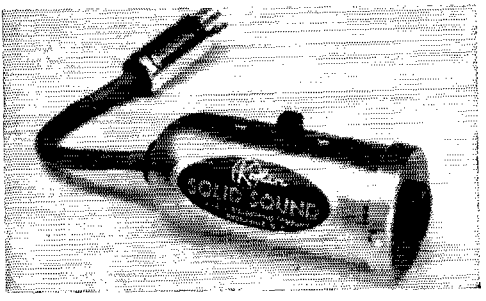
We discussed only types using the audio output of the receiver. In passing we should mention that many military types use i.f. connections to the receiver. However, many receivers do not offer the specific i.f. values needed, and in any case, this type offers certain other difficulties to the average enthusiast — for instance, trying to make a channel filter of only 100 c.p.s. bandwidth at 455 kc. is neither simple nor inexpensive.

Many military demodulators have become available through MARS organizations and surplus facilities. Again, one must admit they do work, but they fall short of the criteria expressed in this article in many ways.

(The fifth article in this series will appear in a subsequent issue. — *Editor.*) QST

[7] For those interested in a description of the DTC circuit and how it works, the writer has a paper in the *RTTY Bulletin* for December 1964, and an earlier description was presented by Vic Poor, K3NIO, in the January 1964 issue of the same publication.

• *New Apparatus*



Kolin Microphone Preamplifier

If you are shy on microphone voltage in the mobile rig, or if you want to save a stage of audio in that miniature portable or field day rig, the Kolin Solid Sound microphone amplifier will give you an extra 15 db. voltage gain at high impedances for ceramic, crystal, dynamic or controlled-reluctance microphones. The transistor amplifier, built inside the 3½ × 1½-inch capsule, is operated by an internal 9-volt battery, although the unit may be powered by the associated equipment if desired. To install the device, the original plug is removed from the microphone cable and is replaced by a new one furnished with the unit. The original plug is then connected to the end of the 4-inch output cable of the Solid Sound. There's an ON-OFF slide switch on the unit that kills the amplifier and gives straight-through (no gain) operation. The Solid Sound is manufactured by the Kolin Engineering Co., Box 357, Bronxville, New York.

— *W1CUT*

What ARRL Means to Me

BY GEORGE HATHERELL,* K6LK

During its 50th anniversary year of 1964, the League conducted a Golden Anniversary Essay Contest on the subject which titles this article. Oldtimer K6LK's entry won honorable mention. Subsequent issues will carry other winning essays.

MANY years ago I worked for a tough old so-and-so with a steel-trap mind and some millions of dollars he had accumulated through the years. We were talking about ham radio and I told him that I could talk to hams all around the world. He seemed impressed — at least, I thought he did. Then he said he wouldn't want to talk to them if they were right there with us. That brought the conversation to a close, but it did make me think. After all, this old boy flew airplanes in the days when they were made of bamboo and wire and he drove racing automobiles. I could have brought this up but thought better of it.

Amateur radio is a scientific hobby and it happens to be the one that appeals to us. Whether it is a better hobby than flying aeroplanes that are apt to come apart in mid-air is a matter of opinion. I think it is and I consider the ARRL a vital part of it.

I belong to the League for two basic reasons: First, the League is a technical society composed of individuals who have reached a certain proficiency in a combined art-science field. When I have the qualifications I have always felt it a privilege to belong to the national organization representing the group. It takes a considerable effort to become an amateur and it takes a deal more effort to become a fine operator. The League campaigns constantly for better equipment, better procedure and better operating techniques. These things deserve my support.

Second, I don't think there would be any radio amateurs today without the League. For my own protection and for the protection of all other amateurs, I feel membership to be a must. The people we employ at headquarters are charged with the responsibility of representing us before the FCC and the world regulating agency. They should speak for as large a number of us as possible.

I consider *QST* and the program of activities set up by our headquarters staff to be strictly a bonus. And what a bonus it is! All eighty thousand of us share in this. We have the construction articles and departments which make up *QST* to browse among, code practice when we want it, contest opportunities, field day activities and conventions. The program is possible for one reason alone: we are tremendously efficient. The announcement of a contest guarantees the expenditure of some half-million man hours of effort in the very medium that carried the announcement — communication. In this way we are unique.

It took me a good many years to separate the headquarters staff from the ARRL. This is not easy to do. We eighty thousand are the ARRL. We employ the headquarters staff to take care of our programs. It is true that the staff are members of the ARRL as we are, but as members they must vote for a director in the same way the rest of us do. We read *QST* and it is the staff that puts each issue together. But all that has to do with policy in *QST* is dictated by the Board of Directors. It takes a considerable while to reach a point where this can be kept always in mind.

I am resigned to the conclusion that the Board of Directors is better able to analyze a situation pertaining to our welfare than I am as an individual. I am sure the Board is always going to act in my best interest. How do I know this? When I fly, I have the same feeling about the pilot. If we fly through a mountain, he goes through first. Just so, our directors are hams as I am, and they can't do anything bad for me that doesn't affect them, too. I don't always agree with the Board actions and from what I have read in *QST* neither does the staff, but they don't question the Board's position as governing body and neither do I.

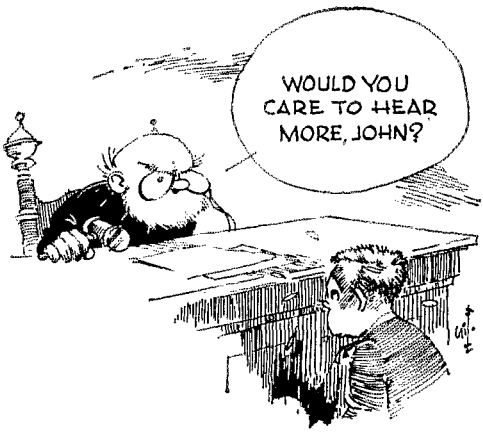
Every amateur owes something to our hobby. There couldn't be one single amateur: there have to be at least two and each would owe support to the other to stay active. Each of us is duty-bound to support all of the others. The ARRL is our organization for mutual support and service

(*Continued on page 160*)

* 10160 Maude Ave., Sunland, Calif.

K6LK (ex-6CX, W6DLS) at his station (L.A. *Herald-Examiner* photo)

Your Code is Showing



BY J. T. MARTIN * K4RVG

THE COURT of Public Opinion is now in session, Judge U. R. Neighbors presiding. First case, People vs. John Q. Ham.

"Mr. Ham, approach the bench," said the judge. "You are charged with violating the Amateur's Code."

"Yes, Your Honor, but I can explain."

"Well, you may try, John. I believe there are six parts to your code. Let's take them one at a time, shall we? The first one states that 'the Amateur is Gentlemanly'. What can you say to that, John?"

"Now, sir, you have to remember that this code was written before the bands became so crowded. Everyone who works forty meters these days knows it's every man for himself. Why, if you considered others' pleasure, you would never make a single QSO," explained Ham, warming up to the case.

The old judge smiled knowingly. "I'll have to sympathize with you to some degree, John, but I'm afraid you need more patience in this area. Now let's go on to number two: 'the Amateur is Loyal'."

"Ah, yes," said Ham. "I belong to the League and I sent them a couple of bucks for the building fund. Oh, I'm loyal, all right!"

"What about those letters you wrote them? They weren't exactly complimentary, it seems."

John Q. dropped his chin to his chest and spoke in an almost inaudible voice. "Well, Judge, to tell you the truth, I wrote those letters before I got all the facts. You know all the stuff you hear on the bands these days."

"I suppose all of us leap before we look sometimes," the judge admitted, "but let's pursue this further. Number three states that the Amateur is Progressive. Are *you* progressive, John?"

John squirmed uneasily at this point. He had been anticipating this question and had failed to find a suitable answer. His station consisted of a homebrew 807 rig with a multiple switching arrangement which he had been using since his Novice days, and an old receiver which was badly in need of calibration. Then there were those troublesome Tennessee Valley Indian problems.

"Judge, I'd like to pass on this one," he smiled sheepishly.

"Very well," the judge agreed, "let's proceed. The next one says the Amateur is Friendly."

John beamed at this one. "If there is one thing I am, it's friendly, Judge. Why, I speak to everyone. Even to total strangers."

"I'm afraid you have missed the point here John," scowled the judge. "I would like to read a few excerpts from your record:

'1) Insists on sending at thirty-five words per minute in spite of repeated requests to slow down. This despite the fact that ability to copy is fifteen words per minute.

'2) Advises those who ask for advice to buy a *Handbook*.

'3) Refused to discuss TVI and BCI with neighbors.'

"Would you care to hear more, John?"

John had heard quite enough, and was perfectly willing to take up the next point. The Amateur is Balanced.

"Now don't tell me I'm not balanced, Judge," he sputtered. "I paint the house regularly, keep the lawn mowed, I never miss a day's work, I belong to the PTA and all the clubs in the community . . ."

"Just a moment, John," the judge interrupted. "How about the money you spent on that new motorcycle when your little girl needed braces on her teeth? How many times have you quit hamming long enough to take the family to a movie?"

John was stunned. There was certainly more to the Amateur's Code than he had thought. He had completely ignored the things the judge had mentioned. Then he remembered the sixth and last part, "the Amateur is Patriotic."

"No one can say I'm not patriotic, Judge," John exclaimed hopefully. "Why, I'm a veteran of two wars, and my station, such as it is, is always at the service of my country. And I always fly the flag on legal holidays!"

"I suppose we have to accept that, John," Judge Neighbors conceded. "No one can question your patriotism, but you would do well to check yourself on the other five parts of the code occasionally.

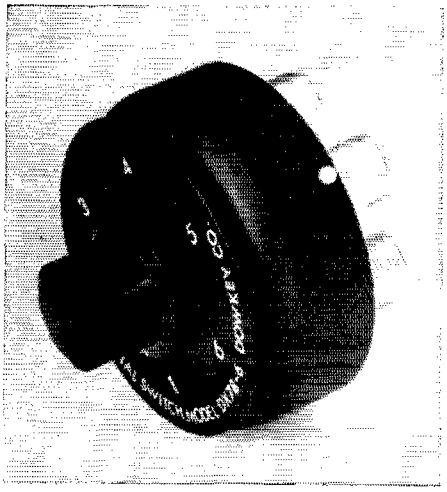
"Your case is set aside for the time being, John, but the Court of Public Opinion will want to take another look at your record in a few years Keep this in mind. Court adjourned." QST

* Beaver Dam, Kentucky.

• New Apparatus

Dow DK78 Coax Switches

THE photograph shows one of the new series of coax switches made by Dow-Key, Thief River Falls, Minnesota. Designed for r.f. switching at 50 ohms, the switches have a rating of 1000 watts up to 500 Mc., with an s.w.r.



of less than 1.05 to 1 at 150 Mc. Isolation is rated greater than 50 db. at 500 Mc. and 80 db. at 30 Mc. Four different switching arrangements are available in the series; the DK78-2, s.p.s.t.; the DK78-3, s.p.3-position; the DK78-6, s.p.6-position; and the DK78-T, a transfer-crossover switch (could be used to switch a v.h.f. converter in and out of a receiver/converter setup). All of the switches come with SO-239 connectors but are available with BNC, TNC, N, or C connectors on special order.

An escutcheon plate comes with the switch and it also is used as a template for drilling mounting holes. Two holes are required, 5/16 inch for the center shaft, and 5/32 inch for a locating pin. The switch measures 3 inches in diameter and is 1⅛ inches deep. Weight: 10 oz.

Nitrogen Foam Coaxial Cable

PERHAPS you've been hearing about a new "foam" coaxial cable with extra low-loss at v.h.f. One of the suppliers of this cable, W9ZSO, Communications Equipment Co., 518 State St., La Crosse, Wisc., has supplied us with some details which we are passing along for your information.

The cable has a velocity factor of 75 per cent and has a characteristic impedance of 50 ohms. Insulation is nitrogen foam Polyethlene covered with an outer jacket of non-contaminating polyethlene. The foam dielectric contains about 50 per cent nitrogen in a closed-cell foam structure. The copper shield-braid density is 85 to 90 per cent and the outside diameter of the cable runs about .407 inch. Typical attenuation figures range from .83 db. per hundred feet at 30 Mc. to 2.02 db. at 150 Mc. — *W1CUT*

• Technical Correspondence

MORE ON K6YRQ's FREQUENCY COUNTER

Technical Editor, *QST*:

Since my article on the binary counter, "Low-Cost Precision Frequency Measurement," appeared in *QST* for January, I have had a great many calls for help. Apparently, I took a few too many short cuts which, although they worked well for me, are giving other fellows a bit of trouble.

A slightly-revised circuit for the time-base circuit for the time-base standard, which should provide more reliable operation, is shown here in Fig. 1. The changes consist of a revised coupling circuit between the two 6AS6 dividers, and a different pick-off point for the time-base output driving the gate flip-flop. In the original circuit, output was

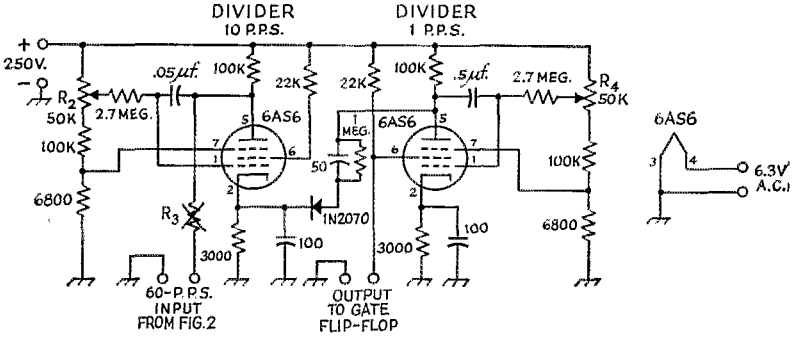


Fig. 1—Revised divider circuit for K6YRQ's frequency counter. A diode and 1-megohm resistor have been added to the coupling line between the two stages, and output is taken from the screen of the 1-p.p.s. divider, rather than from the cathode. R_3 should be removed if the 60-p.p.s. generator described here is used in preference to the high-voltage a.c. input suggested in the original article. Except as indicated, capacitances are in pf., and resistances are in ohms. Fixed capacitors of decimal value are paper; others are mica or NPO ceramic. Fixed resistors are ½ watt. R_2 and R_4 are linear controls.

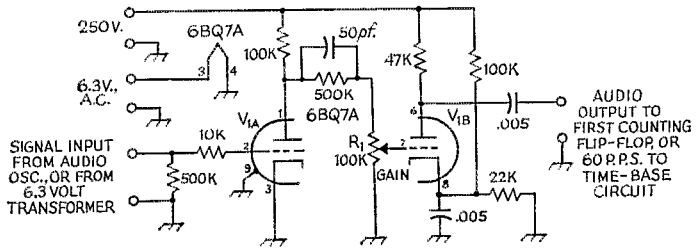


Fig. 2—This circuit, as shown, is suitable for a "squaring" amplifier to be used between the audio oscillator and first counting flip-flop of K6YRQ's frequency-measuring system. The circuit may also be used as a 60-p.p.s. generator to drive the 10-p.p.s. stage in the time base, by substituting a fixed resistor for R_1, and feeding a 6.3-volt filament transformer in at the input terminals. This supplants the high-voltage drive suggested in the original article. Except as indicated, capacitances are in $\mu f.$; resistances are in ohms (K = 1000). Capacitors are mica or NPO ceramic. Fixed resistors are ½ watt. R_1 is a linear control.

taken from the cathode of the 1-p.p.s. divider and, in some cases, the gate flip-flop drive has proved to be marginal. In Fig. 1, the output is now taken from the screen which provides a larger driving voltage.

Several of those interested in the counter have asked for the circuit of the 60-p.p.s. generator mentioned in the first photo caption of the article. The circuit is shown here in Fig. 2. This circuit is driven by a 6.3-volt filament transformer. This transformer may be the one that is used as heater supply for the unit. When this circuit is used to drive the 10-p.p.s. divider, resistor R_3, shown in the original time-base circuit, should be omitted, as indicated here in Fig. 1.

In describing the preliminary adjustment, the article may have implied to some readers that the 6AS6 divider circuit "runs free." The time base is a "one-shot" circuit and must be driven. Therefore, when the 1-p.p.s. divider is disconnected from the 10-p.p.s. divider for adjustment to slightly less than 1 p.p.s., as described in the article, its input must, instead, be connected to the 60-p.p.s. generator.

The article also mentioned that the first counting flip-flop requires a fairly husky driving signal, and the possible need for a "squaring amplifier" between the audio oscillator and this flip-flop. I have found that the circuit of Fig. 2 is suitable for this purpose also. It requires a driving voltage of 5 to 10 volts r.m.s. from the audio oscillator.

Some have questioned the use of the 60-cycle powerline frequency as a standard. Hewlett-Packard's Model 521A industrial counter, which uses this standard, has an accuracy rating of "typically" 0.1 per cent. However, I have compared this counter, side by side, with a 524D counter. With 100 kc. fed to both, the difference is ordinarily of the order of only 3 or 4 cycles. Of course, my public-utility line may be more accurate than those in some localities.

For those who have requested a good reference on counters, I have suggested the maintenance manual for the H-P 521A, which is available from Hewlett-Packard, Page Mill Road, Palo Alto, Calif., for $5.00 — *W. S. Skeen, K6YRQ, 165 South Palomar Drive, Redwood City, Calif.*

LOSSES IN COAX

Tech Editor, *QST:*

Unnecessary emphasis is sometimes placed on the advantages of a low standing-wave ratio in coaxial transmission lines when used for the high-frequency amateur bands, 3.5 to 30 Mc.

Losses in coaxial lines are of two types:

1) Radiation loss resulting from undesirable coupling to the transmitting antenna. This will be the same in any given installation regardless of the s.w.r. on the line.

2) Power loss due to the heating of the conductor or dielectric. This loss is affected by the standing-wave ratio.

A change of one decibel is barely detectable by the human ear, thus any transmission-line loss that results in a reduction of 1 db. or less is of little practical consequence. Such a loss is roughly equivalent to reducing power from 1 kw. to 800 watts. The difference may or may not show up on an S meter but is barely noticeable by ear at the receiving end.

Consider an average installation, a dipole type of antenna (including multiple dipoles, trap dipoles and multiband dipoles) fed by 33 feet of RG-59/U coaxial cable, adequate for input powers up to something over 500 watts. The following table shows, by amateur bands, losses incurred with an s.w.r. of 3 to 1, which is 50 per cent of full-scale reading on a good s.w.r. bridge, and the highest s.w.r. calibration on many meters. For other types of coaxial cable and other line lengths, refer to the figures in Chapter 13 of the ARRL *Handbook*.

Band (Mc.)	*Line-Length Loss*	*S.W.R. Loss*	*Total Loss*
3.5	0.18 db.	0.12 db.	0.3 db.
7	0.27 db.	0.16 db.	0.43 db.
14	0.4 db.	0.25 db.	0.65 db.
21	0.5 db.	0.27 db.	0.77 db.
28	0.6 db.	0.32 db.	0.92 db.

It is apparent that under the conditions stated an s.w.r. of 3 to 1 is entirely acceptable and at the receiving end no change can be detected by ear as compared with a flat line with an s.w.r. of 1 to 1.

But there is more: Consider the highest s.w.r. that can be tolerated in the same line for each band while still keeping the total loss at or below 1 db., and the following startling results are observed. As many s.w.r. meters are not calibrated above 3 to 1, the percentage of full-scale meter reading (assuming a meter having linear response) for a 33-foot line is indicated as well as the s.w.r.

Band (Mc.)	S.W.R.	Per Cent Full-Scale Reading	Total Loss
3.5	10/1	82	0.83 db.
7	8/1	80	0.97 db.
14	6/1	72	1.00 db.
21	4/1	60	0.95 db.
28	3½/1	55	1.00 db.

Losses due to high s.w.r. increase rapidly as one gets into the v.h.f., u.h.f., or s.h.f. bands, but those operating on the h.f. bands can stop worrying because they cannot get an s.w.r. close to unity on all bands, frequently the case when multiband dipoles are used. — *G. L. Countryman, W4JA, 75 East Bay St., Charleston, South Carolina 29401.*

FEEDBACK ON SKY TEMPERATURE

Technical Editor, *QST:*

Your proofreaders are apparently more adept at detecting misspelled words than mangled mathematics. In my letter published in the March issue of *QST* (page 68) the expression

$$3000° \cdot \frac{3 \cdot 20}{\pi \cdot (10)^2} = 600°$$

has come out as

$$3000°. \frac{3.20}{2.(10)^2} = 600°.$$

Without the pi and with the centered dots for multiplication replaced by decimal points, what was

(Continued on page 162)

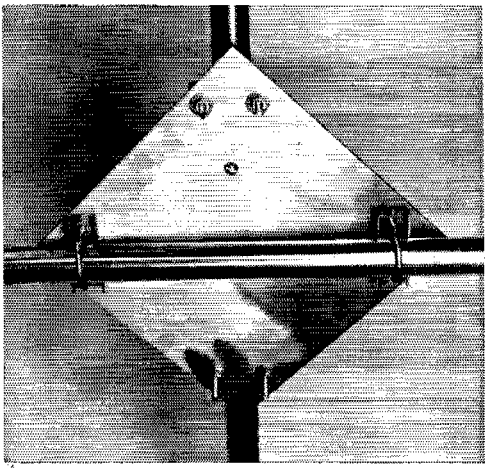
• New Apparatus

Quad Antenna Components

The growth of interest in Quad antennas during the last few years has naturally led to an increase in the number of commercially available components or complete kits. Here are the names of some of the Quad kit manufacturers and a brief rundown on some of their products. Space doesn't permit our going into all of the sizes, weights, heights, turning radii, accessories and performance data. It is suggested that any specific questions concerning these quad products be directed to the manufacturers.

Skylane Quads

Skylane has complete pre-drilled 2 or 3-element 3-band quads with either bamboo or fiber glass arms. One of the features of the Skylane quads is the center plate shown in the photograph. It's a ¼-inch aluminum plate, 10-inches square. The boom and mast from the rotor are fastened to the plate with U-bolts and saddles. Quad accessories are also available as separate items. These include boom hardwood inserts, spiders, alkyd resin enamel for treating bamboo, and even the wire and reflector coils. Skylane Products, 406 Bon Air Dr., Temple Terrace, Florida.

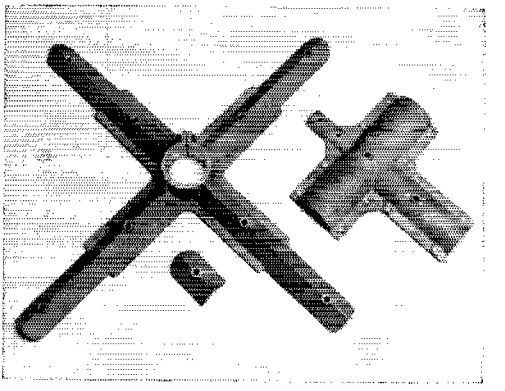


Unadilla Quad Antenna

The Unadilla Quad kit is a complete pre-tuned three-band (10, 15, and 20-meter) quad. Quad arms are made of imported Korean bamboo with ¼-inch wall thickness. The compression clamps that hold the bamboo spreaders to the spiders are made of stainless steel. The boom is 2-inch Dural and is 8-feet long. The two spiders are made of cast aluminum. The quad is designed to be fed with a single 52-ohm coaxial feedline. Photographs of the antenna were not available at the time of this write-up. Unadilla Radiation Products, Unadilla, New York.

U. S. Fiberglass Super-Quad Kit

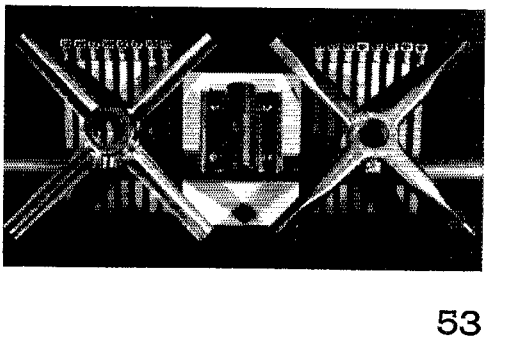
The only thing you have to furnish on your own in this kit is the boom and mast. In addition to the "X" mount and the boom-to-mast mount shown in the photograph, the kit contains 8 fiber glass arms. The "X" mounts are die cast and made to fit a 2-inch boom and 1½-inch o.d. mast. The kit is manufactured by U.S. Fiberglass Co., 5101 N.W. 36th Ave., Miami, Florida.



Cubex Fiberglas Quad Kit

The photograph shows some of the parts included in the Cubex Quad Foundation Kit. Only a section of one of the eight 13-foot fiber glass arms is shown in the photograph. The two cast aluminum standard spiders fit a 2-inch o.d. boom. Also shown are 16 Wraplock spreader-arm clamps for attaching the arms to the spiders. A boom-to-mast coupler, for 2-inch mast to 2-inch boom, is also included.

Cubex also has other quad components available separately: Bamboo arms, special heat-treated alloy spiders, and matched-wire elements for 10, 15, and 20 meter quads. Cubex Co., P.O. Box 732, Altadena, California. — *W1CUT*



Correspondence From Members-

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

TAX OR FEE

¶ Congratulations on your editorial in the February 1965 *QST* on license fees. I believe the League's position on the fee matter has been very sensible all along. The latest editorial also is a sane and practical approach to the matter.

Because of the way the money is handled by the Federal government, why don't you refer to the fees as "Federal radio taxes" instead of "license fees" in *QST* in the future? Maybe this would alert more of the unwitting radio fraternity, both amateur and professional, to what is really happening. — *K9KTL.*

OOTC

¶ The membership of the Old Old Timers Club appreciated very much the publicity which was given our Club in the December 1964 issue of *QST* on page 53. There were several items in the article which had changed since Cline wrote the article in 1963. These items have given us no end of trouble and I would greatly appreciate it if you could correct the article.

The first item which was wrong was about *Spark-Gap Times* being free to members. It is $2.50 per year on a donation basis. For instance, if a member can pay $2.50, we would like for him to do so; if he cannot *afford* the $2.50, we will send the journal to him and no questions asked. Many new members when they get an invoice for $2.50 cite your article in *QST*, saying it was free to members, and get angry.

The second item that was wrong (and which no one had any control over) was listing Earl Williams, W2EG, 507 Wayside Road, Neptune, New Jersey, as Secretary-Treasurer. Earl became a silent key in October 1964. The new Secretary-Treasurer is Eunice Thompson, W1MPP, Christian Hill Road, Lovell, Maine. Mail is still going to Earl's address in Neptune and they must be referring to the *QST* article.

The third item that might be added to is the item about the *Bluebook of Amateur Wireless.* This book costs the members $3.00. It costs around $7.50 to produce it, however it is sold to members for $3.00.

The fourth item which I should like to add is about our representative in South America. He is Augusto E. Osorio, LU2AO, Acoyte 443, Buenos Aires, Argentina. All applications for membership by South American amateurs should be sent through him for approval. He will forward them promptly to the OOTC in the U. S. — *W4MF, President OOTC*

NOVICE SIGNALS

¶ Concerning the article of WN4VSY "A Sign of the Times" I am in partial agreement. He as a Novice, said that the Novice bands should be cleared up, and I strongly agree. The mess the Novice bands are in today speaks for itself. The bands are not being put to their fullest use, plus the operating habits are way below what they should be. 15 meters lies unused like a vast waste land; 80 meters isn't much better either. This is all true and should not be contested. If you think differently, just listen to the Novice bands and prove what I say is true.

Now as far as his statement saying that 25% of the present Novice are operating illegally, this is pure hearsay. I know a good many Novice operators, who from my viewpoint do not operate illegally. He also goes on to say that any Novice who puts out a good signal is not all honest. I know a Novice with a 20 watt homebrew rig who has worked half of his WAS. Also I've read that under favorable conditions that with a small percentage of the allowed 75 watts Novices have worked around the world. I, myself, have worked 11 states, Midway Island, and one section of Canada so far with my 65–75 watts.

I think Novices should use correct operating procedure, make use of the bands available, and stick to the limitations of their license. If all of these rules were observed the Novice bands would be a lot better off. — *WN6MPP.*

TEEN NEWS

¶ As I read your magazine, I become more and more interested in the teenage group and our part in ham radio. I wonder if a teen-age column such as has been suggested in your letters from members, would be at all possible.

I have been active in a net here in Minnesota. I was net control and it consisted almost entirely of teenagers. As we became known requests have come in from other teenagers that the net be extended to 20 meters and it covers the entire U. S. I know the guys and gals here in Minnesota would be for such a column, supported by a net exclusively for the teen-age set. I would appreciate the League's opinion on this. — *W1OCLE*

(Whether or not a regular column develops, *QST* would be glad at any time to have good, clear pictures of teen-age ham stations and activities for publication in future issues. Please include descriptive data, both personal interests and station set-up. — *Editor*)

UAR

¶ Knowing my own building talents, I'm sure that for most *QST* construction projects that if I tried 'em I'd get fouled up. However, the many articles by Lewis McCoy (Novice Gallon et al) give me hope. Why not publish all his projects in a volume like Understanding Amateur Radio Part II. It would be a run-away best seller. — *W1AYTFII*

(The construction portions of *Understanding Amateur Radio* are themselves largely drawn from McCoy articles. — *Editor*)

NO CALLS HEARD

¶ I know that you've mentioned this in *QST* many times, but somehow it just doesn't get through to your readers. I'm talking about the concept that a good operator listens and listens and listens before he tries to work DX.

I have frequently heard some sad examples of how not to work DX. Just to mention an example, of what I mean, I heard the following calls within one kc. and within one minute of each other: QRZ QRZ QRZ de 3A2 — 3A2 — de 3A2 — k CQ DX CQ DX CQ DX de WA8 — WA8 CQ CQ CQ CQ CQ de YU2 — YU2 — YU2 — CQ CQ CQ CQ CQ DX CQ DX de WA4 — WA4 — WA4 — k.

Now it is a bit unusual to hear all this within one kc. on 40 meters all at one time, but it is there to be heard. I pity the WA8 and the WA4, they probably gave up without hearing anything and simply said "Boy, the QRM is bad tonight." — *K3RDT*

QTH HR

¶ I would like to see the hams not only give their call letters when CQing but also the name of their town. Many times there are stations who have traffic for some town and if the name of the town were given along with the call letters it would certainly open up a lot of possibilities. Many times people are looking for Lincoln, Nebr., but they may not know any of the station calls from there but when along with my call I also repeat the town, then they call me. Also when QSOing if the ham gives the name of his city there may be fellows looking for an opening into a town for which they have traffic but do not want to break in to find out — but with a little listening and hearing the name of the town mentioned they could "break." — *WØBFV*

WIN OR LOSE

¶ I am a lousy card player, but if I decide I want to play, do you suppose the experts will simplify the games — back off on a rule or two, so it won't be so difficult? After all, I want to indulge in a friendly sort of way, but right now it seems too complicated, and these card sharks are after blood.

This seems to be the thinking of a lot of newer hams or would-be hams when they suggest that instead of tightening up on the licensing procedure the FCC should let down the bars so they won't have to know so much about the technical side of amateur radio.

Which is real silly, when you think about it, because a radio ham is one who is interested in radio from a scientific standpoint, isn't he, and therefore just gobbles up all the theory he can find?

A good ham wants to know all about it just because he wants to know all about it — not because the FCC is jamming it down his throat. This is the thing he enjoys. Take the brains and the know-how out of ham radio and what do you have? Citizens band? — *WØLJO*

THE E.C.E. SYSTEM

¶ As we all know, there are many different forms of communications being utilized by the amateur radio fraternity today. Some of the ones which I have tried over the years have included amplitude modulation (a.m.), interrupted continuous wave (i.c.w.), frequency modulation (f.m.), and single sideband (s.s.b.). Of course, there are many other forms with such abbreviations as RTTY, f.s.k., etc. And then there are the many different bands of frequencies assigned to the amateur service.

However, each method and each band has some peculiarity, some advantage, and also some disadvantage. Due to some of these adverse conditions, I have been recently using another time-tried and proven method of communication which is known to be approximately 99 and 9/10% efficient. This is what I call the *Enclosed Carrier Envelope* method or e.c.e. system. See the diagram in Fig. 1.

Properly utilized, e.c.e. is relatively inexpensive and can handle all sorts of information applied to it, even including photographs. For those not too well acquainted with so called homebrew construction, the following directions apply: Using a piece of heavy white (or colored) paper, copy the diagram exactly to the dimensions shown in Fig. 1. Cut on

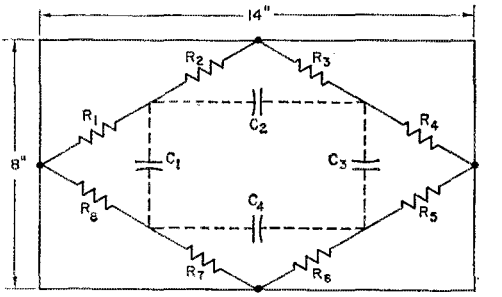


Fig. 1—Diagram of the Enclosed Carrier Envelope System. Values for R_1 through R_8 are not critical except that the total value must equal the sum of all resistors. The values for C_1 through C_4 must be the same for the entire circuit.

resistor circuit lines and then fold on capacitor lines. Application of a good grade of adhesive in proper places will complete the project. Place the necessary communication inside and with the proper address and a new 5¢ stamp on the outside, this message will get thru even under the most adverse conditions.

K1LGB

LONG E

¶ Thanks for the very informative (and long overdue!) article on RTTY by OM K8DKC. His remark in the Jan. issue that the Morse letter "E" is 4 dot spaces long possibly explains some of the c.w. I have been hearing lately, Hi. — *K4UYY*

WHAT'S THE MATTER WITH TECHNICIANS?

¶ On Field Day during the summer before last, I was asked by a young General Class boy, "Are you a Technician or a ham?" He wasn't acting too big for his britches, or trying to be smart-aleck, he had simply asked me a question which appeared in his mind on the basis of his experiences and his thinking. I replied that I thought I was both, and the lad blushed, realizing his faux-pas. My comments here are not based on that single incident either. I have observed the same time of thinking among a great many General Class hams over the past several years.

It appears to me that a great many Generals look upon the Tech license holder as some sort of compromised ham, or second-class member of the fraternity. The fact that Techs are required to have the same technical knowledge as Generals, and indeed must take the identical written exam, seems to bother them not one whit. Oddly enough, those few

Extra Class men and Old Timers I have met seem to express a genuine interest in v.h.f., and the work of Techs. Why is this?

Techs either cannot or do not choose to develop code proficiency, and some of us are trying but have not accomplished it so far. But, my point is simply that Techs are hams, as good a bunch of hams on the average, as any General group.

Take Field Day for an example. My own radio club group made some dandy plans for the low bands, strung dipoles from pine trees, had all sorts of rigs ready, including a complete Collins layout, on the line, warmed up and straining at the leash when the whistle blew. All of it was low band equipment. As late as one hour before starting time there was nothing, I repeat *nothing* lined up for 6 meters or 2 meters and up.

At the eleventh hour, a Tech took off for the nearest town borrowed a G-50 and came dashing back to the site. Yours truly rummaged in the car trunk and came up with 50 ft. of co-ax, and another Tech came roaring into the site with a yagi and a pole. We made it 30 minutes late, but we nailed down several hundred contacts on 6 meters, and thereby contributed a very respectable handful of points to our club totals during the exercise.

Why didn't the head men of our Field Day committee make some plans for v.h.f.? Because, quote, the only things up there are just Techs, unquote. Just Techs indeed; Some of the finest stations on the air in my town are 6 meter and 2 meter v.h.f. outfits complete with sideband, RTTY, a.m., c.w. and antenna systems far superior to most low band stations. The going is much tougher on 6 and 2 meters than from 10 down. We don't have daily DX, only sporadics, inversions and an occasional summer skip opening to accumulate our confirmed states worked. We almost never have short skip of a couple of hundred miles or so, but we still rack up the states and the countries. Some of our ground wave work is absolutely phenomenal.

Possibly the distaste among the "mighty" Generals comes as a result of the fact that a sizeable number of Techs are ex-CBers, or for that matter, current CBers. If so, friend Generals, take another look. If the ex-CBers were interested enough and capable enough to get themselves self-educated to the point of successfully passing the General Class written exam, they certainly are not the ones who "play" with the C.B. frequencies. They have properly chased their hobby instincts up to 6 and 2 where they should be. If they still use C.B. it is because they have a need for communications like these.

Another thing comes to mind. Low-band men seem to think nothing of crowding out a 200-watt signal with a full gallon. "Burning a hole" I believe it is called. If you doubt it, tune in the 40-meter c.w. band any evening and listen. Even the heterodynes have heterodynes. Then try 6 meter, even during a band opening, if you can. I say "if" because I have noted a widespread lack of v.h.f. equipment in the shacks of Generals. It seems to be some sort of forgotten wasteland as far as most of them are concerned. But find a receiver, friend General, for six and listen. You will find a surprising amount of courtesy. Perhaps because good contacts are so rare, six meter men go out of their way to avoid clobbering the other guys.

Shucks, us Techs live on our v.h.f. bands, and we like to keep a clean house.

So, all of you great mass of hamdom, put away your monocles and stop sighting us in along the bridge of your noses. We are hams, fellows, a peculiar breed of hams perhaps, but 100% hot for the hobby and the public service aspects as well.

Not all of us are dedicated v.h.f. men. We are here because we must be. No 13 wpm c.w., no low bands, so we take our phones up to 6 and 2. However, what we are not, for the most part, is c.w. men. Some of us can't, some of us won't, pound brass, but all of us are solid amateur radio enthusiasts and are as "hammy" as the best of them.

So come up to 6 and 2 and join us. We've got lots of kc/s up there to QSO in, and room for lots more. But, when you come, come as a fellow ham not a mighty General out slumming; *and* bring your manners, boys, bring your manners. — *WA5BTO*

MODEL HAM?

¶ I am much amused by the "pro and con" screams which were aroused by K4KXR's article. I am sure he had his tongue in his cheek when he expressed his opinion about "home-brew" vs "factory built" ham gear. Something like pulling a cat's tail to see whether she will ignore it, or turn around and scratch you.

After 60 years (very educating, and a wonderful indoor hobby for a 74-year-old (young-minded) guy) of amateur radio I would like to make a statement.

In my opinion it matters nothing if a fellow buys factory-built gear of highest quality or wears out a pair of shoes trying to procure components from supply houses to concoct a "home-brew." I do both! The important considerations are:

1. Does he comply with all written, printed or generally adopted "procedure" which is the mark of a courteous operator.

2. Does he make every effort to acquire an understanding of how and why the gear operates. Can he do intelligent "trouble shooting" so that he can keep his gear in top-notch operating condition.

3. Does he know and obey the FCC regulations.

4. And, does he support the ARRL and turn a deaf ear and a closed eye to all rabble-rousers and false prophets!

5. Does he cast his ballot when ARRL sends one to him. — *K2DZ*

I'M RIGHT!

¶ Re the Correspondence from Members" column (. . . and columns and columns and columns!), pp. 68–71, January, 1965 issue of *QST*.

Collectively, these letters represent some of the best stuff to appear in *QST*, since I read the last article by Larson E. Rapp, WIOU. Many of these letters seem to fall into what semanticists term "two-valued orientation" — there are *only* two sides to any question: my point of view and your completely goofed-up point of view!

ARRL seemed to gain their objectives, however, as stated when the original article was published; you *did* stimulate a discussion! By the way, how many letters did you receive asking to cancel *QST* subscriptions? — *KH6FMF*

(Surprisingly, none! — *Editor*)

MY FREQUENCY

¶ I'm glad to see that ARRL is taking a "hard look" at contests. I certainly hope you decide to abolish the infernal things.

The only time during the week that I can get on the air is from 7 to 9 P.M. on Saturdays. It seems like every Saturday those fool contestors are thicker than flies on *my frequency*. Some of them suggest that I change frequency, but the fellow that built my transmitter tuned it up on 3835 kc. and I know

better than to try to change it. I tried it once, and that big glass thing up in the top got so red, I got scared and pulled the plug out of the wall until I could get my friend back to retune the rig.

Here's hoping you get rid of contests, so I can have some QSOs. — *W4DVT*

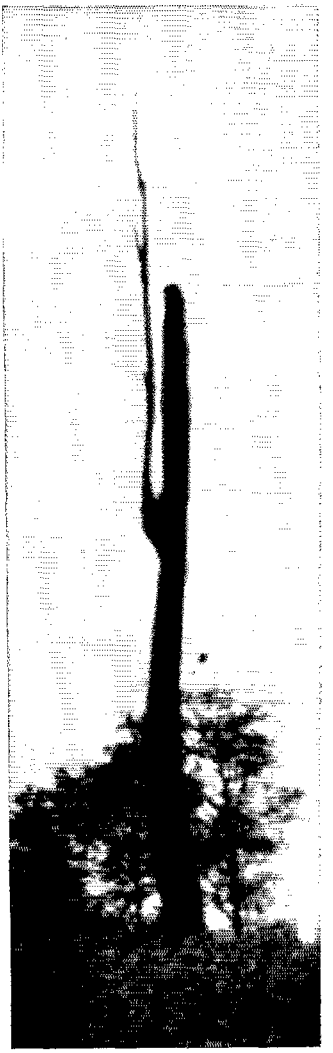
WHY DO SOME HAVE TO BE DIFFERENT?

¶ If you're not a fone man, I insist on you reading this. Just take your receiver's tuning knob and tune around the amateur c.w. bands. Now if you said that you heard ten hams going over 65 w.p.m. I would say that you were crazy. Let's try that again, only tune the "speedster" into a good 1-kc. note. Of course we can't copy him, he is slower than we can type!

The point that I am trying to get at is that our amateur bands are becoming a rat-race. Some just have to be different from the "Operator of the Month." Why go 73 w.p.m. on dits and only 14 on dahs? I am sure that if you went to an FCC license house and if they-just-happened-to have a speed key there because the hand key was broken, you "be differents" wouldn't send like you do today. Why? Because the examiner knows what good code is and so do decent amateurs, so don't be kidding yourself. I'm not against speed keys, I am just against the way in which some people send with them.

So I am in strong approval with what W2PTM said about having a new award for the "Lid of the Month" I think that if people see their call in the column, that they might settle down. — *W4BQT*

Strays



W6ZRJ sends us this picture, snapped by XYL K6BGM, which he claims shows the original Wouff Hong silhouetted against the northern California sky. Dunno—looks like a plain old tree to us.

25 Years Ago this month

April 1940

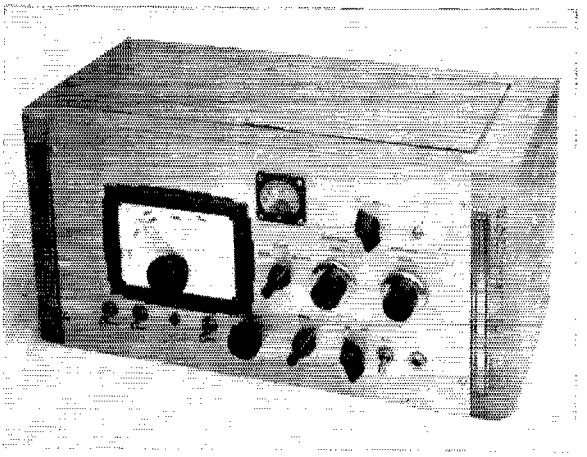
. . . The April cover showed a profile of John Huntoon, W1LVQ, taking his turn at a new and complicated looking gadget, one of the first amateur electronic keyers. Harry Beecher, W2ILE, described the unit in this issue. The article, "Electronic Keying", even described how to make an electronic-keyer actuator from some wooden blocks, brass screws, and a jack-switch . . . By Goodman, W1JPE (now W1DX) wound up a series of articles on f.m. with a write-up on a wide-band i.f. amplifier . . . Ed Tilton, W1HDQ, wasn't stuck on the very highs in those days. His article "160 to 2½ in One Transmitter", described a medium-power seven-band final and driver . . . Other technical articles included "A Battery Transceiver for 112 Mc.", by Vern Chambers, W1JEQ. "Improving the Flying Skywire" by Dana Griffin, W2AOE, gave the details of an all-wind kite; all wind was defined by the author as anything between a "breath of air" and a wind of gale force. "A Hundred-Dollar Half-Kilowatt", an economical c.w. transmitter using a push-pull parallel final amplifier, was treated by J. Osborne, W1DWI; F. Jacobs, W2BSL, described a "56-Mc. Crystal-Controlled Transceiver."

. . . The "New Transmitting Tubes" column reported on a new u.h.f. triode, the HY-75.

. . . "What The League is Doing" column noted that the FCC reported to Congress that amateur station licenses increased during the year from 49,911 to 53,558. Compare this to the 263,589 station licenses in force today!

. . . An interesting and amusing exchange of letters between By Goodman and Hugh L. Walker, W8ENF, on the subject of "Balloon-Supported Antennas" appeared in this issue.

. . . The April 1940 issue also contained a revolutionary development in the field of transmitter design, by J. K. Bach, W4CCE. The formidable title was, "Application of Transverse Phase-Shifts to Amplifier Design Problems Involving Fortuitous Feedback Paths". It's a shame that the editor thought it necessary to include a note at the end of the article stating that "for some occult reason, revolutionary developments of this type are frequently — in fact, almost invariably — disclosed in the month of April." This observation, of course, wouldn't be necessary in this modern day when amateurs are much more sophisticated. QST



Identifying the controls, from the lower left to right, standby, spot and tune switches, the drive control, R_1, grid tuning, grid band-switch, A.C. switch, and the key jack. At the upper right hand side are the amplifier band-switch, plate tuning and loading controls. As pointed out in the text, any enclosure that will hold the parts is suitable. The old Bud cabinet shown here was repainted with a can of gray lacquer spray.

35 Watts Input, 80 and 40, Crystal or V.F.O.

A Small Package for The Novice or Field-Day Group

BY LEWIS G. McCOY,* W1ICP

Here is a crystal-controlled rig for the Novice or VFO for the General, a 35-watt package that is ideal for Field Day groups. If you ever operated Field Day and tried to reduce power for the 30-watt multiplier, using one of the 150-watt type rigs, you'll quickly realize that this transmitter is just the thing for your club.

WE get many requests from members for a low-power transmitter design, in a small package for use on vacation excursions or for Field-Day operations. The rig shown in Fig. 1 and the photographs is just such a unit. Comparatively light in weight and small in size, the transmitter is easy to build and get working. Crystal control is provided for the Novice, and when he moves up to General it is an easy matter to switch over to v.f.o. operation.

The rig is a two-band job, covering 80- and 40-meter c.w. Limiting the transmitter to these two bands eliminates a lot of problems in construction. Clean cathode keying can be obtained very simply, and layout of components is not as critical as it is when the higher-frequency bands are added. The transmitter could be classed as a "junk-box" rig, because most of the parts, including tubes, can be scrounged from an old TV set.

Having been on many Field-Day operations, it always seemed slightly ridiculous to us to have to work over a 150-watt rig to get it down to the 30-watt-multiplier level. Such a setup is usually difficult to adjust and, more likely than not, inefficient. The transmitter described here works at full efficiency at the 30-watt level, so it should be attractive as a club project for those groups interested in Field-Day equipment.

Circuit Details

The oscillator, a 6DC6, is used in the grid-plate-type circuit when operated crystal-controlled, and in the Colpitts circuit for v.f.o. operation (Fig. 1). The grid side of the tube tuned to 160 meters with v.f.o., and the plate side to 80 meters. However, for crystal operation, 80 meter crystals are used for both 80- and 40-meter output.

V_2, the buffer/multiplier, is a 6AQ5 with its plate tuned to either 80 or 40 meters by the combination of L_3C_3. Cathode bias is used on the buffer, and can be adjusted by R_1 to provide the correct amount of drive to the amplifier tube.

The amplifier is a 6DQ6B, and its tank circuit is a pi network designed to work into 50- to 70-ohm loads. C_5 is the plate tuning capacitor and C_6 the loading capacitor. To facilitate tuning up without full input, the screen of V_3 can be grounded via S_4.

The cathodes of V_1 and V_3 are keyed and while some purists may frown on cathode keying, in the writer's opinion the keying in this rig could be considered good to excellent. If the higher-frequency bands were used no doubt a more exotic keying circuit would have to be used. However, the system used here is simple and we think you'll agree that it is adequate. For

* Technical Assistant, *QST*.

spotting purposes, the cathode of V_1 can be grounded separately via S_1 and, if desired, the switch can be left closed, thereby keying only the amplifier stage.

The power supply utilizes silicon rectifiers (the 33-cent surplus variety) in the full-wave center-tap circuit. Two regulator tubes, V_4 and V_5, provide regulated 250 volts for the oscillator plate and 150 volts for the oscillator and amplifier screens.

Metering is accomplished with a 0-1 ma. milliameter connected as a voltmeter and switched by S_5 across appropriate shunts. The amplifier grid and plate currents are metered, with full-scale readings of 10 ma. and 200 ma., respectively. In addition, a relative-output meter position is provided for tune-up purposes. The r.f. voltage is taken from a voltage divider across the amplifier output and rectified by CR_5.

Getting The Parts

As we said earlier, many of the parts can be scrounged from an old TV set. In fact, if you don't mind a little extra weight in the rig, an old TV power transformer would be ideal, because most TV transformers will have the same, or close to the same, output voltages as the commercial unit specified in Fig. 1.

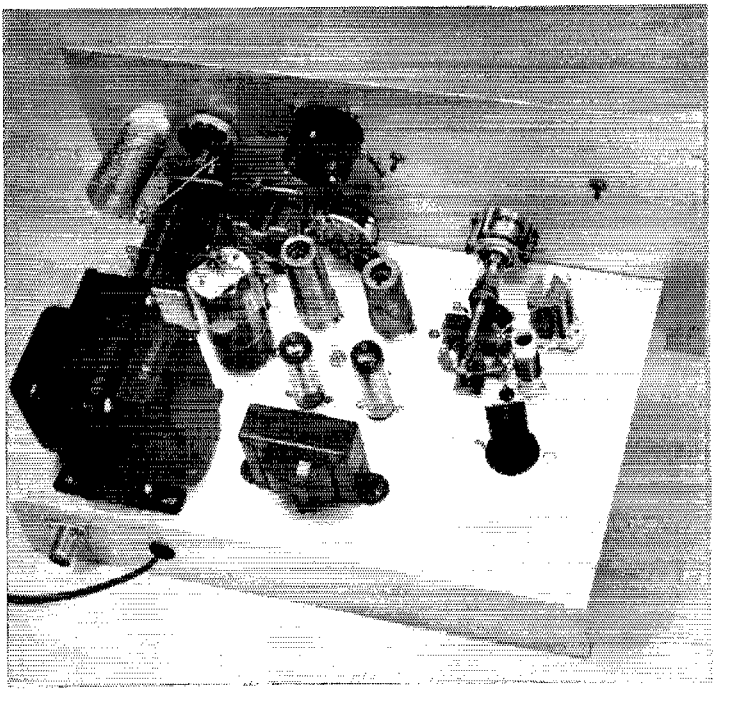
Some builders would rather buy all new parts, but obtaining them can sometimes be a real shopping problem. Often it is necessary to buy from several sources, because not all dealers carry all brands of components. However, in this case we made sure that all of the parts specified, with two exceptions, were in *one* mail-order catalog (Walter Ashe Radio). The exceptions are the power transformer and the v.f.o. dial drive. The power transformer is a Knight, supplied by Allied Radio, and the dial drive a Jackson Brothers type 6-36, available from Arrow Electronics.

In several places in the transmitter we tried parts other than those specified in Fig. 1. For example, V_2 is a 6AQ5 but by making the appropriate socket changes we tried a 6AU6 and a 6CB6. Both tubes worked very well, so if you don't have a 6AQ5 it is permissible to substitute. The same is true of the amplifier tube. Those tried included a 6BQ6GTB/6CU6 and a 6CD6GA. Also, the power-supply choke, L_5, can be anything from 1.5 to 15 henrys with a minimum current rating of about 25 ma. The TV chokes usually run 1.5 to 3 henrys with a high current rating, so one of these could be used.

Construction Details

The transmitter is housed in a Bud cabinet, $8 \times 8 \times 16\frac{1}{2}$-inches. We had an old one so we gave it a new coat of paint and used it. The chassis, also Bud, is designed to fit the cabinet and measures $2 \times 8 \times 12\frac{1}{2}$-inches. However, any chassis or cabinet that will hold the parts can be used.

The v.f.o. components, L_1, C_1, and C_2, are mounted above chassis. These parts should be mounted firmly to the top of the chassis to prevent any wobble in the v.f.o. note. By the same token, the leads brought down from the v.f.o. components are No. 14 solid wire. This same size wire is used for the connection from the grid of V_1 to the octal socket which is used as a crystal socket and jumper point to connect the v.f.o. The holes in an octal socket are spaced just right for the FT-243 crystal holders. The



The v.f.o. components are grouped at the right front in this view. Just to the rear of the v.f.o coil is the crystal-v.f.o. socket. At the upper left are the components that make up the final-amplifier tank circuit. The pi-network tank coil is mounted on an insulator which is fastened to the front panel.

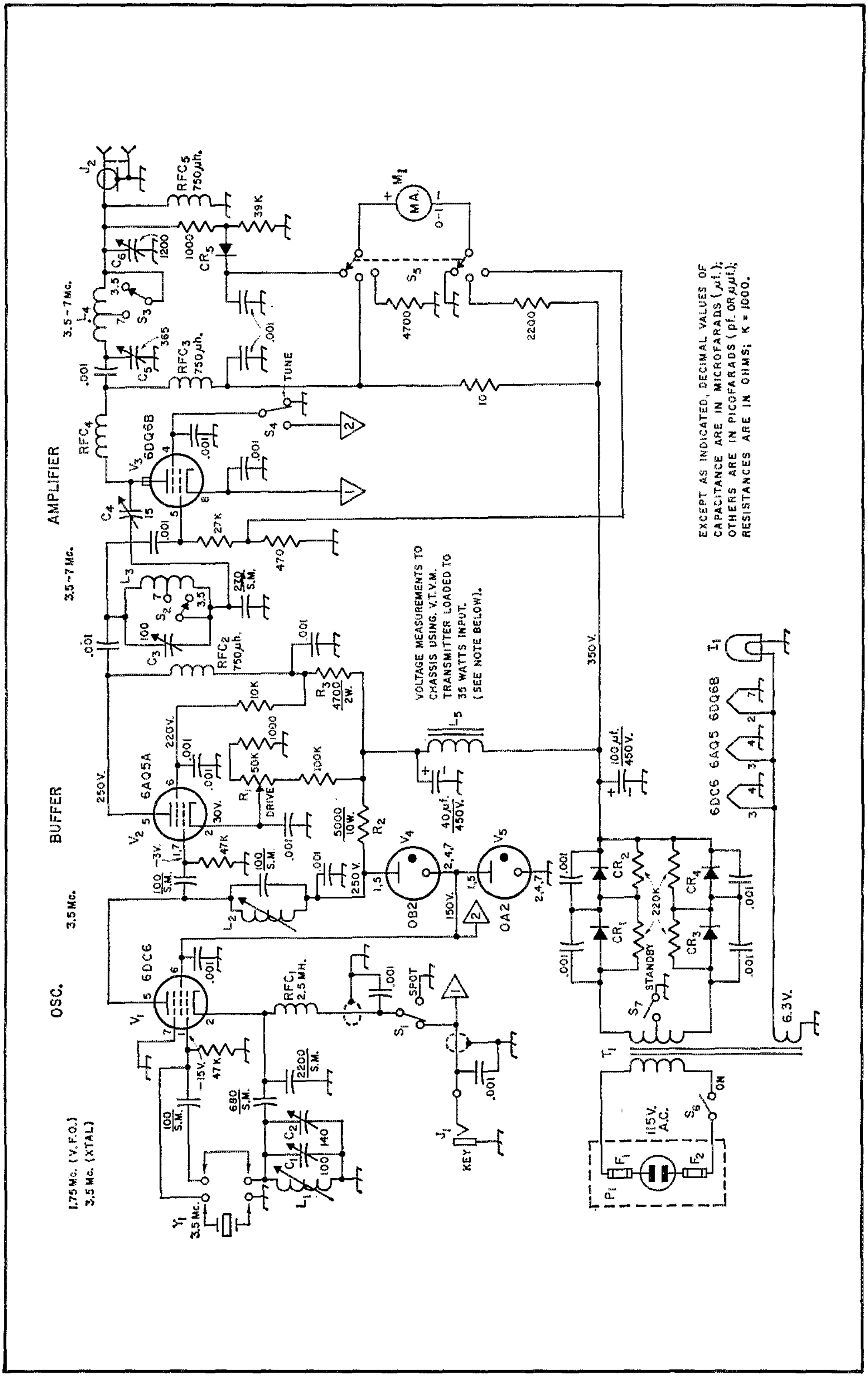

OSC.
BUFFER
AMPLIFIER
6DC6
6AQ5A
6DQ6B
OB2
OA2
KEY
TUNE
SPOT
STANDBY
DRIVE
115V. A.C.
6.3V.
350V.
VOLTAGE MEASUREMENTS TO CHASSIS USING V.T.V.M. TRANSMITTER LOADED TO 35 WATTS INPUT. (SEE NOTE BELOW).
EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μf.); OTHERS ARE IN PICOFARADS (pf. OR μμf.); RESISTANCES ARE IN OHMS; K = 1000.

Fig. 1—Circuit diagram of the 35-watter transmitter. Except as indicated, resistors are ½-watt. Capacitors marked with polarity are electrolytic, S.M. = silver mica, other capacitors are disk ceramic.

When using crystal control, the voltage on Pin 1 of V_1 will depend on the setting of R_1. With a voltage of —3 volts on Pin 1 of V_2 the grid current of the final amplifier will be approximately 1.5 ma., the recommended value.

All voltages shown on the above circuit diagram are based on a power transformer fitting the specifications shown for T_1. A transformer with different specifications will of course produce different results. In such a case, R_2 should be changed as described in the text and a value for R_3 that will provide 250 volts on the plate of V_2.

C_1—100-pf. midget variable (Hammarlund MC-100, Bud MC-1855).
C_2—140-pf. midget variable (Hammarlund APC-140-B, or APC-140).
C_3—100-pf. midget variable (Hammarlund APC-100-B).
C_4—15-pf. midget variable (Hammarlund APC-15).
C_5—365-pf. midget variable, t.r.f. type (Miller type 2111).
C_6—365-pf. per section, three-section midget variable, three stators connected in parallel, T.R.F. type Miller type 2113).
CR_1, CR_2, CR_3, CR_4, CR_5—Silicon rectifier 600 volts p.i.v., 750 Ma. (Barry Electronics 600/750).
F_1, F_2—2-amp., Slo-Blo, type 8AG or AGX.
I_1—6.3-volt, 150 ma. dial lamp.
J_1—Key jack, open-circuit type.
J_2—Coax chassis receptacle, type SO-239.
L_1-L_4—See coil table.
L_5—Low-voltage-supply choke, see text.
M_1—0-1 ma. milliameter.
P_1—A.c. line plug, fuse-in-plug type.
R_1—50,000-ohm control, ½-watt.
R_2—5000-ohm, 10-watts.
R_3—4700-ohm, 2-watts.
RFC_1—2.5-mh. r.f. choke (Millen 34300-2500, National R-50).
RFC_2, RFC_3, RFC_5—750-uh. r.f. choke (Millen 34300-750, National R-33).
RFC_4—7 turns No. 20 enameled or plastic-covered close-wound on any 1-watt resistor over 1000 ohms. The resistor only serves as a coil form.
S_1, S_4—S.p.d.t. toggle switch.
S_2, S_3—Single-pole, five-position wafer switch, two positions used (Mallory 3215J or 172C).
S_5—Two-pole, five-position wafer switch, three positions used (Mallory 4M2215 or 1315L).
S_6, S_7—S.p.s.t. toggle switch.
T_1—Power transformer, 540 volts center tapped, 120 ma., 6.3 volts, 3.5 amps., 5 volts, 3 amps. 5 volt winding not used (Knight 61G466).

shorting jumper for v.f.o. operation can be made up from a Millen 300-ohm line plug, or if you have an unused FT-243 crystal holder its pins can be connected together for use as a jumper.

The turns on L_1 are close spaced and the wire should be tightly wound on the form. We sprayed the coil with acrylic spray to really "set" the turns firmly; any similar lacquer or coil dope can be used. Looseness in the turns could cause the v.f.o. to be unstable.

In looking at the bottom view you may be confused by the potentiometer (R_1) mounted near the center of the front panel. There is a single pole switch mounted on its back that isn't connected to anything. We had already mounted an a.c. switch on the panel and later found a 50,000-ohm, ½-watt control in an old TV set. This control had the switch on the back so we didn't bother to remove it. If you should find the same type you can use the switch section to turn on your a.c.

In order to use the capacitive-bridge neutralizing circuit in the amplifier the rotor and shaft of C_3 must both be insulated from the chassis. When mounting the capacitor to the panel be sure that the rotor doesn't short to chassis ground. C_4, the neutralizing capacitor, can be mounted on a standard terminal tie strip, the stator arms on the rear of the capacitor being soldered directly to the tie points.

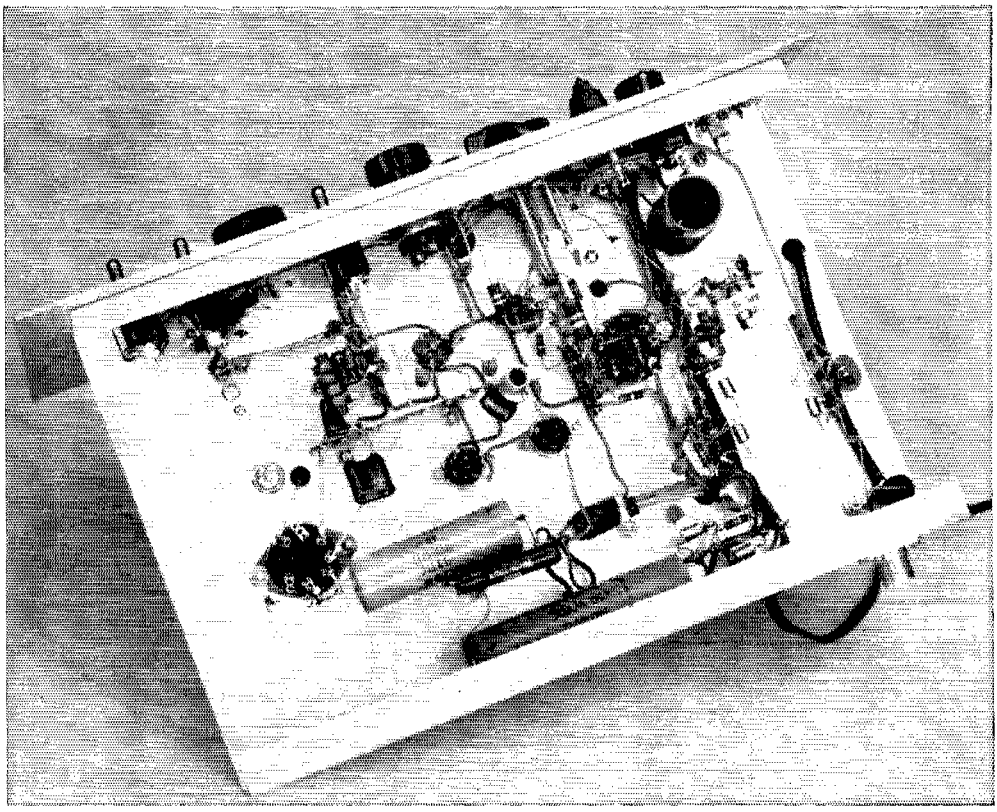
On top the chassis, the pi-network coil, L_4, is mounted on the front panel. The coil support bars were glued to an isolantite stand-off, 1½ inches long. Duco cement was used for this purpose. In order to connect the 40-meter tap to L_4 it is necessary to push the adjoining turns in towards the center of coil; otherwise the tap might short to them. In Fig. 1, C_6 is shown as a single capacitor, but actually is a three-section job. The three stators should be connected together to provide a total capacitance of approximately 1200 pf.

If you use a transformer with different voltages than those specified in Fig. 1 it may be necessary to change the voltage-regulator dropping resistor, R_2. In that case get a 10,000-ohm, 10-watt adjustable resistor. Connect one side and the resistor tap to the power supply and the other end of the resistor to pins 1 or 5 of V_4. When the rig is completed the tap on R_2 should be adjusted so the two regulator tubes stay ignited whether the key is open or closed.

Tune Up and Adjustment

After the rig is wired, and the wiring carefully checked, you are ready to tune it up. The first step is to make sure the oscillator is working. S_4 should be switched so that the amplifier tube screen is grounded for these first tests. Use an 80-meter crystal for either 80- or 40-meter operation. Plug a key into J_1. Turn on the power but leave S_7 in the standby (off) position while the rig warms up.

The simplest way to check the oscillator is



The power supply diodes, CR_1-CR_4 and their associated resistors and capacitors are mounted on tie points, near the right-hand side of the chassis in this view. At the far right of the chassis is the terminal strip that holds the components for the r.f. output network that feeds to M_1.

Near the front on the right hand side is the neutralizing capacitor and the amplifier-grid coil. Just in front and to the left of the coil is the grid-coil bandswitch and on its left, the grid-tuning capacitor. The components for the oscillator circuit are mounted on tie points grouped around the oscillator tube socket, near the front center in this view.

with a receiver tuned to the crystal frequency. Close S_7 and the key and then find the signal in the receiver. If you cannot find the signal, indicating that the oscillator isn't working, check your wiring for errors. The oscillator plate voltage should be 250 volts and the screen voltage 150.

To adjust the v.f.o., tune your receiver to either 1750 kc. or 3500 kc. C_1 is the capacitor that is tuned by the v.f.o. dial knob, and this capacitor should now be set at maximum capacitance (plates fully meshed) and the slug in L_1 disengaged from the coil (screwed up to the stop at the coil-form mounting hole). Slowly tune C_2 through its range to the point where you hear the signal at 3500 kc. Now tune C_1 through 180 degrees and check the frequency coverage. Our aim was to get maximum bandspread with the dial covering the c.w. portion of 80 meters, 3500- to 3800 kc. With the slug in L_1 completely disengaged you'll probably have less than 300 kc. spread. If desired, you can leave the coil and C_2 at its present setting, and calibrate the v.f.o. dial. If you want the 300 kc. spread, move the slug in L_1 so that the end of it starts to enter the coil area, say $\frac{1}{8}$ inch. Reset C_2 so that the signal falls at 3500 kc. with C_1 fully meshed, and then check the range of C_1 again. The more you engage the slug in the coil, the more frequency range you'll have.

After the v.f.o. frequency range is adjusted, switch M_1 to read amplifier grid current. Leave the amplifier screen grounded and tune C_3 for maximum grid current. The arm of R_1, the drive control, should be at the end of the control that connects to the 1000-ohm resistor.

Once you get a grid current reading, set the v.f.o. to 3650 kc. and adjust the slug in L_2 for maximum grid reading. Once the slug is set for maximum on this frequency it doesn't need to be changed again. You should get as much as 5 ma. of grid current showing on the meter when L_2 and C_3 are tuned on the nose.

Neutralizing

To neutralize the amplifier, first ground the screen and *turn off the power*. Then unsolder the plus-B lead from the power-supply side of RFC_3. Make sure that the power is off before unsoldering the lead; you can get a dangerous shock if

you happen to get across the voltages in this or, for that matter, any transmitter or receiver.

Neutralizing is made easiest if you use an absorption wavemeter such as described in the *Radio Amateur's Handbook*[1]. Couple the wavemeter to the pi network coil, L_4, and adjust the grid tuning capacitor, C_3, and the plate tuning for maximum indication on the wavemeter. Next, adjust C_4 to the point where the *least* indication is shown on the wavemeter. You'll find that the wavemeter indication will go through a dip as C_4 is tuned. Once you get the setting of C_4 that gives the least indication of r.f. in L_4, with both the grid and plate circuits resonated, the amplifier is neutralized. You can then reconnect the plus B lead (with power *off*) and the rig is ready for use.

Final-Amplifier Tuning

Connect a dummy load to the output terminal, J_2. A 25- or 50-watt lamp can be used for this purpose, but a regular 50-ohm dummy load is preferable, if you have one. Adjust the drive control for an amplifier grid current of about 2 ma. (A sweep tube of the type used in this rig works best with about 1 to 1½ ma. of grid drive with the amplifier fully loaded.) Next, switch the meter to read plate current, set C_6 to maximum capacitance, switch S_4 so that voltage is connected to the screen, and then close the key. Tune C_5 for a dip in plate current and your dummy load, if a lamp, should start to light.

Tune-up procedure with a pi network consists of gradually reducing the loading capacitance (turning C_6 towards minimum capacitance) while constantly retuning the plate capacitor for a dip, until you reach the point where the plate current is about 100 ma., in this case, indicating that the amplifier is loaded. With the transformer specified in Fig. 1, the plate voltage when the amplifier is loaded to 100 ma. is approximately 350 volts, or about 35 watts input.

You can also tune up by using the output-indicator position of the meter. We found that, with a 50-ohm dummy load, 35 watts input gave a reading of about half scale on the meter. Keep in mind that the output-meter reading is purely relative — the meter will show you when you have maximum output, but not how much.

Checking the Keying

If this is your first rig you should know something about checking the keying of your transmitter. True, you can put it on the air and ask the ham at the other end for a critical report. Unfortunately, many hams are too polite and don't want to hurt your feelings — or even worse, they don't know what to listen for, so you may wind up with a good report when actually your signal leaves much to be desired.

First, there are key clicks. These fall into two classes, one a click that is actually on the transmitted signal, and the other, a local r.f. click caused by sparking at the key contacts. This type of click is not transmitted more than a few feet but it definitely will foul up your checking when listening with your own receiver. You cannot tell by listening which type of click you have, and in order to check, you must get rid of the r.f. click first. This is usually quite simple. Connect a capacitor, .001 to .01 μf., directly across the key contacts at the key. This should eliminate the r.f. click.

Next, remove the antenna from the receiver and reduce the r.f. gain control so that the receiver isn't overloaded by your transmitter signal. You'll need a dummy load on the rig, preferably one of the 50-ohm non-inductive types. Make a string of dots or dashes and tune to either side of the signal. The signal should be clean, and if you detect clicks across the band you'll have to take steps to prevent them.

Several things can cause clicks. Improper neutralization of the final amplifier or a v.h.f. parasitic are two possible causes of key clicks. Test for these if clicks show up. Then, assuming the amplifier is properly neutralized and has no parasities, the signal can be shaped to prevent clicks. Make slow dashes and listen to the "make", the point where the signal comes on, and to the "break", the instant it goes off. By careful listening, you should be able to determine whether the click is from what is known as a "hard" make or break.

Fig. 2 shows the shaping circuit for a cathode-keyed amplifier. This circuit, when used with the proper value components, can soften the make or break. If desired, it can be incorporated into the amplifier. The shaping of the signal is determined by the values used at C_7 and L_6. The amount of capacitance used at C_7 determines the break; more capacitance makes it softer. Likewise, the greater the inductance at L_6, the softer the make.

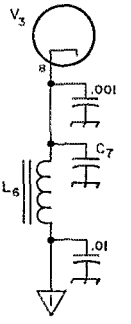


Fig. 2—Circuit details for shaping cathode keying. For the shaping to be effective, only amplifier keying should be used.

The range of values for C_7 can be from 0.1 to 4 μf. and for L_6 from a fraction of a henry to several henrys. You can acquire a supply of capacitors from old radio or TV sets and usually a few chokes from the same source. The power supply chokes from a TV set usually run 1 to 3 henrys. We found that a sufficient range of make and break shaping could be obtained using an assortment of capacitors and a 2-hy. TV choke.

[1] Measurements Chapter *The Radio Amateur's Handbook*.

The other problem in keying is chirp. Chirp is a change in pitch of the keyed signal from the instant the key is closed until the signal "settles down." A common cause of chirp is a change in the oscillator plate and screen voltages from "off" to full "on." In this rig, both the plate and screen voltages are regulated, so the voltages stay constant.

You can easily detect chirp by listening to the signal. Tune the receiver near zero beat, as the change in pitch is more pronounced with a low-pitched beat note.

Of course, any change in oscillator frequency when the oscillator is keyed is magnified as the frequency is multiplied. For example, suppose the oscillator shifts 25 cycles on 160 meters. When we run the signal through multiplier stages, say to reach 20 meters, we have multiplied the shift by eight times, or 200 cycles. A 200-cycle shift is much more apparent than a 25-cycle one. Many experienced amateurs are aware that a transmitter can sound good on 80 and 40 but the chirp becomes objectionabel on 20, 15 and 10.

This transmitter only goes as high as 40 meters and in addition, uses voltage regulation on the oscillator, so chirp is not a problem. For additional information on keying and keying circuits, the ARRL *Radio Amateur's Handbook* is recommended.

As we said earlier, this little transmitter should be ideal for Field Day use. For the Novice, or for that matter the General Class ham who thinks that 30 watts or so isn't enough power to do the job, let us reassure that you can have a lot of fun with low power.

What can you do with 30 watts? W1ECH of our staff put the rig on the air one weekend, about a total of four hours operating time. Using an 80-meter half-wave antenna, about 30 feet high, he knocked off all 10 call areas in the U.S., 18 states, and 4 countries including two English stations on 80 meters. One slightly humorous note: he worked W2FTX who gave Gary a 599 report and Gary sent him a 589. Only thing is, Gary thought he was running low power but it turned out that W2FTX was using an all-transistor rig running 100 *milliwatts* input! Don't ever think that 30-watts input isn't high power! QST

Coil Table

L_1—40 turns of No. 26, enameled, close-wound on ½-inch diameter ceramic slug-tuned form. (Form is Millen type 69046).

L_2—Slug-tuned coil, 14.8-to 31.0 μh. (Miller 4407).

L_3—36 turns of No. 22 enameled, close-wound on 1-inch diameter form. 40-meter tap is 12 turns from the hot end of the coil. (Millen coil form, No. 45000).

L_4—30 turns No. 20, 16 turns per inch, 1-inch diam., 40-meter tap 16 turns from C_5 end of coil (B&W *Miniductor* 3015, *Illumitronic* Air Dux 816T).

Strays

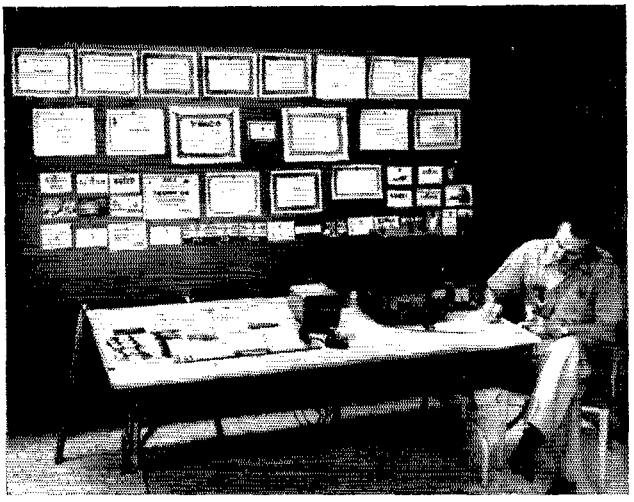
FEEDBACK

In Fig. 2 of the "Telematch" (February), the caption should show that P_1 and P_2 are connected by a Dow-Key DKF-2 connector.

An error appeared in the "Silent Keys" column of the January 1965 issue of *QST*. The call of Louis Aherne should have read W2DCA. Also, in "Silent Keys" for February 1965, the call of Norman H. Doughty should be VE7AMC.

—•••—

WA9GZH would like to hear from former members of OSS who served in the CBI theater.



In early October the Los Angeles Activities Club of the Shell Oil Co. presented its 1964 Hobby Show. WA6ZCQ set up a ham station and was one of the feature attractions. Here he is shown at the display table, which he dressed up with QSLs from his own collection and some certificates and literature from ARRL Hq.

Some Notes on Ground Systems for 160 Meters

Getting a good ground system for a quarter-wave antenna isn't easy, when the job has to be done on an ordinary city lot. The experience of W1TX should be helpful to others seeking an answer to installing an effective radiating system on 160 meters.

BECAUSE of the wavelength dimensions, practical considerations make the grounded antenna the rule on the 160-meter band. Thus a natural question arises — what constitutes an effective grounding system for that band in an average amateur location? The question was settled years ago for an ideal installation [1] and the results are briefly summarized in the *Antenna Book* [2]: The grounding system should consist of 120 radials at least a half wavelength long, spaced uniformly around the circle like spokes in a wheel. But who among us has the space or facilities to put in such a monster? What to do when everything has to fit into an ordinary city lot?

Roy Fosberg, W1TX, faced this problem and decided to see what he could do about it. His setup is typical of the average, although the details of what can be done will naturally vary from one spot to another. Experiments and measurements were carried out over a period of about a year and a half, with results that have been interesting and beneficial, although in some respects a little hard to account for. The following information is offered not in the thought that duplication is either possible or necessarily optimum, but rather to indicate trends that should offer guidance to those who want to make their 160-meter antenna systems as effective as possible.

The physical layout at W1TX is shown in plan in Fig. 1. The grounding system consists of both driven rods and radials, the arrangement being dictated by the availability of space plus actual observation of the effect of adding rods and radials successively. The antenna itself, an inverted L a quarter wavelength long over-all, remained

[1] Brown, Lewis and Epstein, "Ground Systems as a Factor in Antenna Efficiency," *Proceedings of the I.R.E.*, June, 1937.

[2] *The ARRL Antenna Book*, Chapter 2.

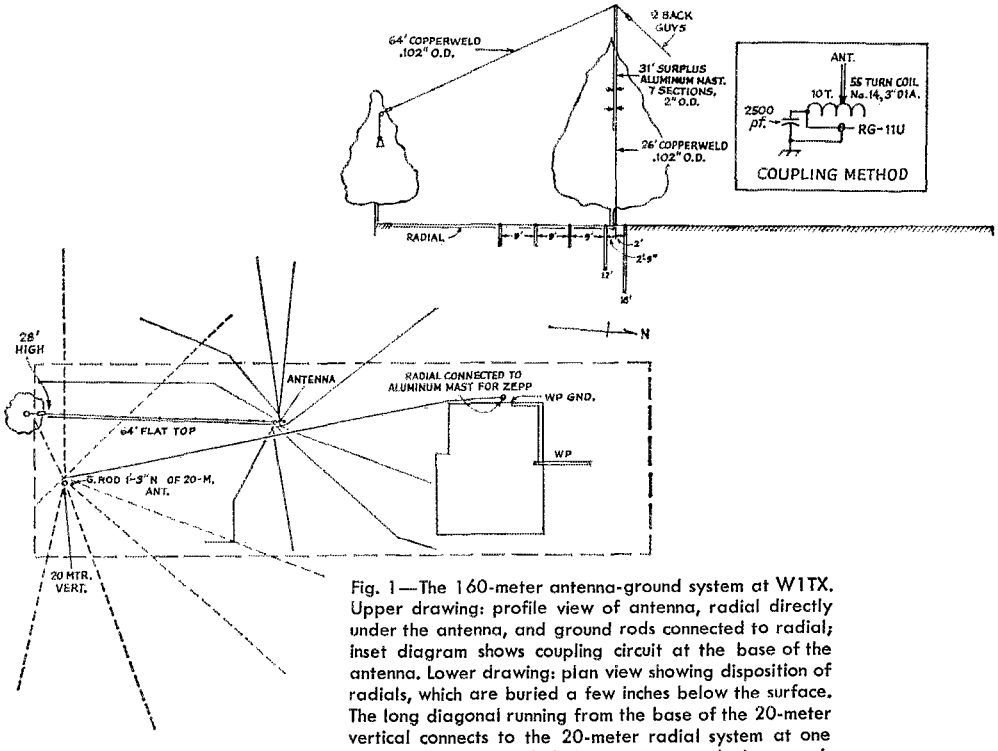


Fig. 1—The 160-meter antenna-ground system at W1TX. Upper drawing: profile view of antenna, radial directly under the antenna, and ground rods connected to radial; inset diagram shows coupling circuit at the base of the antenna. Lower drawing: plan view showing disposition of radials, which are buried a few inches below the surface. The long diagonal running from the base of the 20-meter vertical connects to the 20-meter radial system at one end and to the grounded aluminum mast at the house end. It is also tied into the 160-meter radial system where it crosses the radial running in the "5-o'clock" direction.

the same throughout the tests, so it can be assumed that any change in the ground system that resulted in an increase in the r.f. current at the base of the antenna, for the same d.c. plate input to the final, improved the radiating efficiency.[3] Antenna current therefore was used as the criterion. Because of the length of time over which the tests were conducted, the several r.f. meters used were periodically checked for calibration. As W1TX is associated with the local power company and has access to the necessary equipment, the 60-cycle ground resistance for various configurations also was measured.

Ground Resistance vs. *Ground-Rod Depth*

It is not to be expected that the r.f. resistance of a ground rod will follow the same pattern as the 60-cycle a.c. resistance, when the depth of the rod is increased, because radio-frequency currents do not penetrate the earth as deeply as do 60-cycle currents. However, for moderate depths it is probable that the trend is the same in both cases. The following table is typical of 60-cycle resistance *vs.* depth, using a ⅝-inch diameter sectional galvanized steel rod:

Depth, ft.	*A.C. Res., ohms*
2	400
4	325
6	175
8	70
10	47
12	40
14	37.5
16	36
18	29

The soil was dry when these measurements were made. Similar measurements after a rain showed values of the order of ⅓ less resistance at depths of 10 feet or more. The difference between dry and wet was more marked at the shallow depths, being of the order of four times as high, dry, at 4-foot depth.

Increasing the number of ground rods with spacings as shown in Fig. 1 caused the total 60-cycle resistance to decrease, as would be expected. This also was generally true of the r.f. resistance, as indicated by the change in antenna current, but there were exceptions.

Hints on Ground Systems

As result of the series of tests, which are not reported here in detail, W1TX offers the following conclusions:

"1. With a bit of meticulous planning, a 160-meter antenna system can be installed on a 50- by 160-foot lot to give a good account of itself. In my case, with a quarter-wave inverted-L antenna and a ground system of four radials and five ground rods, 80 QSOs with foreign stations were made with 50 watts input during the 1962–1963 winter period. These included VP8, VK and ZL.

"2. One to five ground *rods* of the sizes and locations shown in Fig. 1 installed in the plane of the antenna ranged from 80 percent higher efficiency for one rod to 19 percent higher for five rods, as compared with the corresponding number of *radials*.

"3. It appears that from about eight units (rods or radials) upwards, radials are slightly more efficient than rods.

"4. If radials are to be used, at least twelve are recommended as well worth the effort of installation. Beyond twelve, the improvement *per radial* is small. (Scrap No. 12 or No. 14 house wire from which the insulation has been stripped makes a relatively inexpensive radial ground system.)

"5. If ground rods are to be used they should be connected to the ground system one at a time and their effectiveness checked. Rods in some locations were found to be of no benefit, and some actually were detrimental

[3] This was confirmed by field-strength measurements made at distances of several wavelengths from the antenna. The relationship between antenna current and field strength was linear. The field-strength meter was calibrated against a standard signal generator.

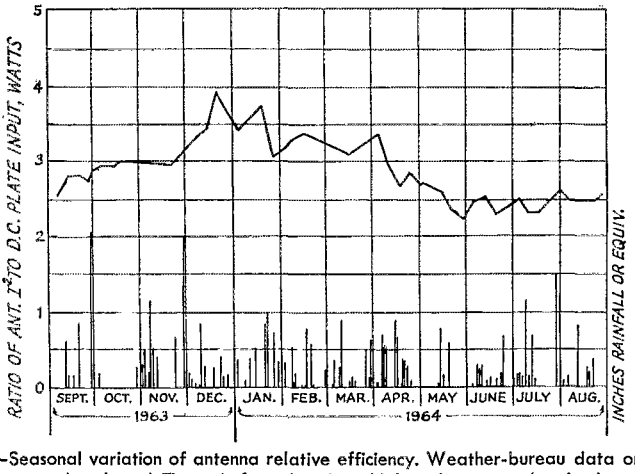


Fig. 2—Seasonal variation of antenna relative efficiency. Weather-bureau data on precipitation are also plotted. The ratio from the winter high to the summer low is almost 3 db.

to the effectiveness of the ground system.

"6. Ground rods are recommended to be a minimum of 10 feet long. Six-foot, ⅝-inch diameter threaded galvanized sectional rods coupled together as driven make ideal 12- or 18-foot rods which can be driven rather simply with a 10-pound hammer."

Seasonal Variations

Early in the experimental work it was found that the ground resistance, as indicated by the relative radiating efficiency, varied over a period of time. (Relative radiating efficiency is defined here as the ratio of the square of the antenna current to the d.c. input to the final stage.) The state of soil moisture offered a possible reason for this, so after the final ground/radial system shown in Fig. 1 had been arrived at, the system was left alone and the efficiency was checked at regular intervals. These measurements were continued over a year — from the beginning of September 1963 to the end of August 1964.

The results are shown in Fig. 2. Precipitation data obtained from the local weather bureau are plotted on the same graph. If there is any correlation between efficiency and equivalent rainfall it is certainly not readily discernible. The efficiency definitely was highest during the cold season and was low throughout the summer. The same behavior had been observed earlier, and was the reason for running the tests over a complete year without changing the antenna system. No tie-in has been observed between the actual wetness of the ground and the antenna efficiency.

It may be, of course, that this behavior is associated with some pecularity of the local soil. New England soil has notoriously poor conductivity, and it has long been accepted that the northeast section of the country is poor ground-wave territory in the broadcast band. If the conductivity drops very low in the winter, when such moisture as there is in the crust is usually frozen, it may be that the rod/radial system tends to act like a counterpoise rather than as a ground. Under such circumstances the losses could be lower than in summer, when the earth dielectric has high-enough conductance to make it lossy. This is only speculation, however, and it would be interesting to see what similar measurements made in other sections of the country would show. QST

"Nothin' On"

BY JOHN G. TROSTER,* W6ISQ

CLICK, click, click, snap, snap.

"Cq cq cq cq cq cq cq . . . cq cq cq cq cq . . . cq cq cq cq . . . cq cq cq . . . cq cq de de W6ISQ W6ISQ W6ISQ W6ISQ k k."

"Cqcqcqcqcqcq . . . cqcqcqcqcq . . . cqcqcqcqcqcq . . . cqcqcqcqcq . . . cqcqcqcqcqcqcq . . . cqcqdedew6isqw6isqw6isqkk."

"CQCQCQCQCQ . . . CQCQCQCQCQCQ . . . CQCQCQCQCQCQ . . . CQCQCQCQCQ . . . CQCQCQCQ . . . CQCQDEDEW6ISQW6ISQW6ISQW6ISQKK."

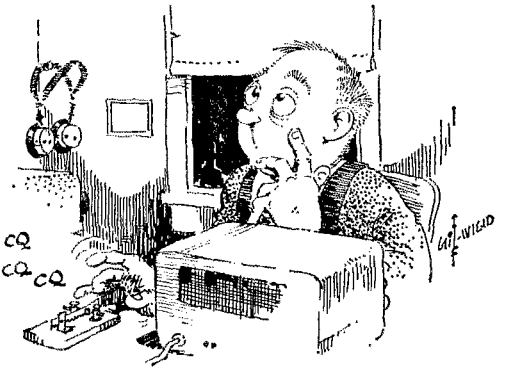
"C q c q c q c q c q . . . c q c q c q . . . c q c q c q c q . . . c q c q c q . . . c q c q d e d e W 6 I S Q W 6 I S Q W 6 I S Q K."

"C Q C Q C Q C Q . . . C Q C Q C Q . . C Q C Q C Q C Q . . . C Q C Q C Q C Q . . . C Q C Q D E D E W 6 I S Q W 6 I S Q W 6 I S Q k."

"Cq cq cq cq cq . . . cqcqcqcqcqcq . . . cq cq cq cq cq cq . . . cqcqcqcqcqcqcqcqcq . . . cq cq cq cq cq cq . . . . cqcqcqcqcqcqdedeW6ISQW6ISQW6ISQW6ISQKK."

"CQCQCQCQCQCQCQCQ . . . CQCQCQCQCQCQ CQ . . . c q c q c q c q c q . . . cqcqcqcqcqcqcq . . . . c q c q c q c q . . . CQCQCQCQCQCQ . . . c q c q c q . . . cq cq cq cq cq cq . . . cq cqcqcqcqcqcq . . . C Q C Q C Q C Q C Q . . . c q c q c q c q . . . CQ CQ . . . cqcqcqcqcqdede W6ISQ W 6 I S Q W 6 I S Q k."

"C Q C Q C Q C Q C Q . . . C Q C Q C Q . . . C Q C Q C Q . . . C Q C Q C Q . . . C Q C Q C Q C Q . . . C Q C Q C Q . . . CQCQCQCQCQ . . . C Q C Q C Q C Q D E W 6 I S Q W 6 I S Q W 6 I S Q K K."



"Cqcqcqcqcqcq . . . C Q C Q C Q C Q . . . cq cq cq cq . . . CQ CQ CQ CQ CQ . . . c q c q c q c q . . . CQCQCQCQCQCQCQ . . . cq cq cq cq . . . c q c q c q c q . . . CQCQCQCQ CQCQCQ . . . c q c q c q . . . cqcqcqcqdede w6isqw6isqw6isqk."

"C q c q c q . . . C Q C Q C Q . . . c q c q c q . . . C Q C Q C Q C Q C Q . . . cq cq cq cq . . . CQ CQ CQ CQ CQ . . . cqcqcqcqcqcq . . . CQCQCQCQCQCQCQCQDEDEW6ISQW6ISQ W 6 I S Q W 6 I S Q W 6 I S Q w 6 i s q W 6 I S Q w 6 i s q . . p s e p s e pse pse kkkk."

"&%#$ %&#"

Snap, snap, click, click, click.

"I thought you were going to work your radio tonight."

"Naaaaahhhh — nothin' on." QST

4U1ITU Calling

BY WERNER WOLTER,* DL1YJ

Werner Wolter, DL1YJ, the editor of *4U1ITU Calling*.

A FAMILIAR signal on the DX bands, particularly on 14-Mc. sideband, is that of 4U1ITU, headquarters station of the International Amateur Radio Club, located on the top floor of the building housing the International Telecommunications Union in Geneva, Switzerland. It is a unique station, because it is the world's *only* international radio station and because of the opportunity it has of demonstrating amateur radio to telecommunications delegates visiting ITU Headquarters.

4U1ITU has been on the air since June 10, 1962, and since that time has made some 60,000 contacts all over the world. A list of the amateurs who have operated at 4U1ITU reads like an international who's who in amateur radio. Besides the hams on the staff of ITU, who spend as much of their off-duty time as possible at 4U1ITU, there has been a steady stream of operators from all over the world. Some of these hams have been delegates to special conferences at ITU, others have been tourists passing through Geneva, still others have been businessmen on regular trips through Europe. The International Amateur Radio Club offers a personal invitation to *you* to stop in and operate 4U1ITU if you have the opportunity to visit Geneva.

The International Amateur Radio Club

What is this IARC that we have heard so much about during the last couple of years?

Whenever a few hams live near each other, or work with each other, they tend to form a club. So it was at ITU headquarters. There were a number of enthusiastic hams on the staff, and because the ITU staff is drawn from many countries there were many prefixes represented. Thus, because of the international flavor of the membership, and because of the Geneva location, it was only natural that the name chosen should be the International Amateur Radio Club.

Patrons of the IARC are U Thant, Secretary General of the United Nations; Gerald C. Gross (HB91A, W3GG), Secretary General of the International Telecommunications Union; and G. A. Wettstein, Director General of the Swiss PTT. John Gayer, HB9AEQ, became the first president of IARC and is now honorary president. Miroslav Joachim, OK1WI, was chosen vice president and is now 1965 president; Ted Robinson, F8RU, secretary; and Heinz Robig, HB9QC, treasurer.

In its *Rules*, the IARC set forth its purposes:

a) to further, through amateur radio, international friendship and understanding.
b) to encourage the proper use of the frequency bands, and also goodwill and good manners on the air.
c) to cooperate with radio amateurs and their associations.
d) to manage and operate the IARC transmitting and receiving station 4U1ITU, and
e) to share experiences with amateurs and telecommunication experts visiting ITU headquarters and in this way, to further contribute to the development of communications.

To implement these noble purposes, one of the first goals of the new Club was to activate its station, 4U1ITU. Through the generosity of manufacturers in Europe and the United States, many items of amateur radio equipment were donated. No less important, through the courtesy of the ITU itself, space was provided on the top floor of the new ITU headquarters building for a club room and the erection of antennas was permitted on the roof, some six stories above ground level. At noon, Greenwich, on June 10, 1962, 4U1ITU went on the air for the first time. It has been active ever since, and a contact with 4U1ITU is a widely sought experience on the ham bands, counting towards DXCC.

* Editor, *4U1ITU Calling*; Publicity Officer, IARC

IARC Conventions

Since the founding of IARC, it has held two conventions in Geneva, with a third scheduled for this coming September. In keeping with the international flavor of IARC, these conventions have been attended by amatuurs from all over the world and have been a means for implementing another of IARC's purposes — the furthering of international friendship and understanding.

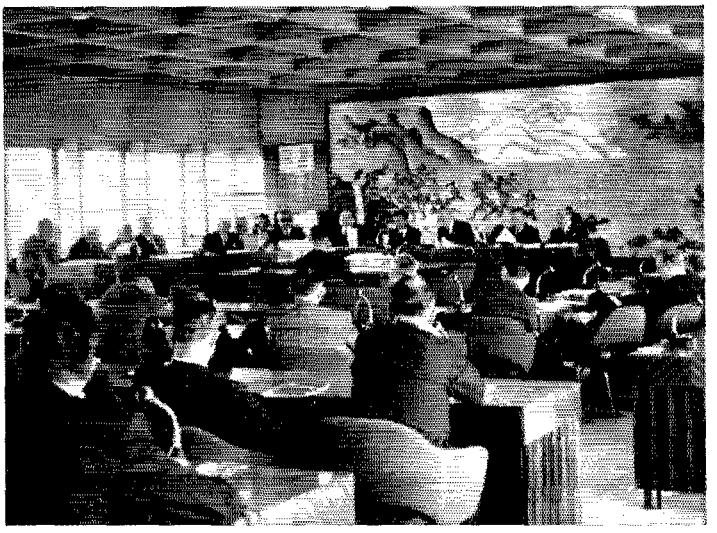
This year's IARC convention will be held on September 17, 18 and 19 in Geneva, and the Club would like to hear at an early date from anyone who plans to attend. This will be a particularly important period in international communications, for at the same time the International Telecommunications Union will be holding its Centenary Plenipotentiary Conference (which as now planned will be in session from September 14 to November 12). Numerous telecommunications dignitaries from the 124 member countries of the ITU will be on hand for the "plenipot" in Montreux, Switzerland, and many of them will take the opportunity to come over to Geneva for the weekend convention of the IARC.

Special Operation of 4U1ITU in May

One hundred years ago, in May of 1865, the representatives of twenty European countries met in Paris and signed a Convention setting up what was then the International Telegraph Union, in order to provide for common rules for the telegraph systems in Europe. The first radio conference was held in Berlin in 1906, and in the combined radio and telegraph conference held in Madrid in 1932 the organization changed its name and nature to the International Telecommunication Union. As the ITU traces its origins back to the original telegraph conference held in Paris in 1865, it is celebrating its centenary *this* year. The ITU Centenary reminds all hams that they too are part of the community of the Union. Hams are the blood-brothers of the propagation research engineer in Tokyo, the antenna specialist in Los Angeles, the radio astronomer in Sverdlovsk — and the radio operator on a tramp steamer a week out of Melbourne as well. The amateur and the professional see one another's faults close-up, like members of a family, but we are still members of the one family just the same. In any family, something comes up now and then that reminds the quarreling partisans of their common identity, and this year for us all, it is the hundred years of the ITU. Our common ancestors are the great men who always stand out so clearly at a distance of generations. Faraday and Maxwell; Hertz, Poppy and Marconi; Pupin, de Forest, and the rest.

There will be special centenary ceremonies at the Plenipotentiary Conference in Montreux, taking place in September as already mentioned. The International Amateur Radio Club will celebrate this anniversary by being on the air continuously from 0000 GMT May 16 through 2400 GMT on May 17, to commemorate the actual (May 17) centennial date of the International Telecommunication Union. Five transmitters will be operating simultaneously in different amateur bands. A special Centenary QSL card will be sent to each station worked during this Centennial celebration, and special 4U1ITU operator certificates will be issued to hams who come from anywhere (and everywhere) in the world to operate during this period. Radio amateurs who wish to operate 4U1ITU on either or both days are invited to contact the Station Manager of 4U1ITU, IARC, Geneva 20, Switzerland, *right now!* The station manager is Gunter

Visitors at 4U1ITU have amateur radio explained to them by HB9UD (seated, left rear) who is the Station Manager and OK1FY (standing, right foreground) who is Station Engineer.



The handsome surroundings of an ITU meeting room provide the appropriate setting for one of the IARC Convention formal sessions.

Joraschkewitz, HB9UD, and he'd like to start planning operating schedules as soon as possible.

International Salesmanship

Because of its location, the International Amateur Radio Club has a unique opportunity to demonstrate amateur radio to visitors at the ITU headquarters. Telecommunications delegates who might not have much understanding of what amateur radio is about are personally invited to visit 4U1ITU and participate in some of the international conversations. IARC members are able to demonstrate that amateur radio forms a national resource of trained operators and technicians, and many a delegate leaves the 4U1ITU shack with a much better appreciation of the amateur radio service.

You can participate in IARC activity by joining the IARC and helping to support it. *Membership is open to anyone anywhere in the world.* The yearly membership dues of $5 for amateurs includes a membership certificate, a membership lapel pin, quarterly news letters, and the annual issue of the Club's magazine *4U1ITU Calling*[1] It publicizes international amateur radio and is aimed not only at hams but also at Administrations, delegates, and others in different walks of life.

Amateur Radio Is International

The spirit and nature of amateur radio have made it international from the beginning. Amateurs have not only kept pace with changing times, but often have been in advance. Amateur radio is no longer a hobby. It is an institution of understanding and education. Amateur radio will go ahead into the scientific and leisure age to contribute knowledge, increasing the degree of scientific thinking and stimulating many to learn on their own.

After 50 years of pioneer work, amateur radio can now make a great contribution to the efforts of the United Nations and ITU technical cooperation programs. There is a great interest in new countries to learn amateur radio and what goes on in the world. Many amatuurs now have the opportunity to pass on their knowledge and to really help their less fortunate brethern. Innumerable visitors to 4U1ITU have left understanding and admiring amateur radio enthusiasts, and recognizing that amateur radio is a potent force for developing enthusiasm for telecommunications in their countries. IARC sells amateur radio under the slogan, "Young radio amateur today — telecommunication engineer tomorrow." Our task is crystal clear. Radio amateurs must cooperate with young countries struggling to gain the fruits of scientific and technical progress. Assistance is required to help organize amateur radio clubs in new nations. The policy of new nations towards amateur radio will reflect the ideas of these clubs and the good will shown by the whole world. There are strong moral reasons why those of us who have been fortunate should help those who have been less fortunate.

We all live today in one world. QST

[1] Four-color international coverage. Single copies available from IARC at $1.00 (or equivalent).

FEEDBACK

To the list of distinguished amateurs shown on page 46 of February *QST* as new Fellows of the Institute of Electrical and Electronic Engineers, may be added the name of D. Gerald A. Rooselot, W8HSF, of Birmingham, Michigan, a vice president of Bendix. (*Via W4UDC/W6YCO*).

Some HW-12 Modifications

Added Conveniences for Heath Single-Band Transceivers

BY J. ALAN BIGGS,* W3ZP

The modifications described here provide an s.w.r. indicator, crystal control, reduction of front-end overloading when using a large antenna, and improved audio-frequency response.

OVER the considerable period I've been using a Heath HW-12 80-meter transceiver, I've made several modifications which may be of interest to others using units in the HW series. None of these changes involves much work.

S.W.R. Indicator

With the mode switch in the TUNE position, the meter is in an r.f.-voltmeter circuit which indicates relative power output. It takes only a d.p.d.t. slide switch, a piece of RG-58/U coaxial cable, and a short length of Formvar-coated wire to convert to a Monimatch circuit which will monitor the s.w.r. on the transmission line without sacrificing the relative-power-output indication.

A 27½-inch length of RG-58/U is prepared as shown in Fig. 1A. The outer insulating jacket is removed, exposing the braided outer conductor. The braid is unraveled a distance of 3½ inches from one end, and 1¼ inches from the other end, and the braid twisted into a pigtail. The inner insulation is cut back at each end to expose ½ inch of the inner conductor.

The No. 24 Formvar wire is cut to a length of 22 inches and is carefully fed in between the braid and insulation of the coax for a distance of 18 inches between the points indicated in the sketch.

Now form the coax into a coil of 3 turns, about 2 inches in diameter; hold it in this shape with tape. Check with an ohmmeter to make sure that there is no short between the Formvar wire and the braid.

Fig. 1B shows the schematic of the Monimatch, and Fig. 1C shows where it is connected into the HW-12 circuitry. Resistors R_{61} and R_{62}, the diode CR_{60} and the capacitor C_{69} should be removed, as indicated by the dotted outlines. The diode and capacitor will be used again, but the two resistors will not. Remove the wire connected to Terminal 5 on the antenna relay, leaving Hole C open. The holes indicated by C and D should be drilled out to 1/16 inch. A ¼-inch hole should be drilled at B, alongside the coil L_4. Switch S_1 is mounted in the upper left-hand corner of the panel, above the final-amplifier tuning control. (See Fig. 3.) Capacitor C_{69} and the diode should be connected in series, and then connected between the switch and a grounding lug at the nearest switch mounting screw. Be sure that you have the diode polarized correctly. At the junction between the diode and capacitor, connect a piece of insulated hookup wire and solder it at A in Fig. 1C. Connect R_1 from the switch to a grounding lug under the other switch mounting screw. Connect the ends of the Formvar wire to the switch, as indicated, keeping the leads as symmetrical as possible. Connect the short inner-conductor end at C. Ground this end of the braid at D. Feed the long inner-conductor end through the ¼-inch hole B to Ter-

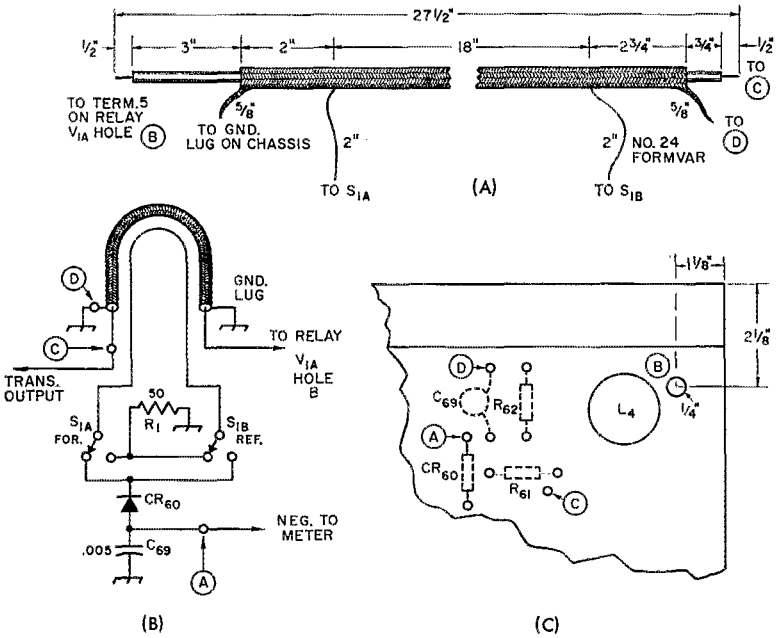


Fig. 1—S.w.r.-indicator connections. A shows how the RG-58/U coax cable should be prepared. B is the schematic, and C (a top-rear view) indicates where the Monimatch is connected into the HW-12 circuitry. Equivalent points in the sketches and diagram are lettered similarly. S_1 is a d.p.d.t. slide switch. R_1 should be selected as described in the text.

* MR No. 2, Doylestown, Penna.

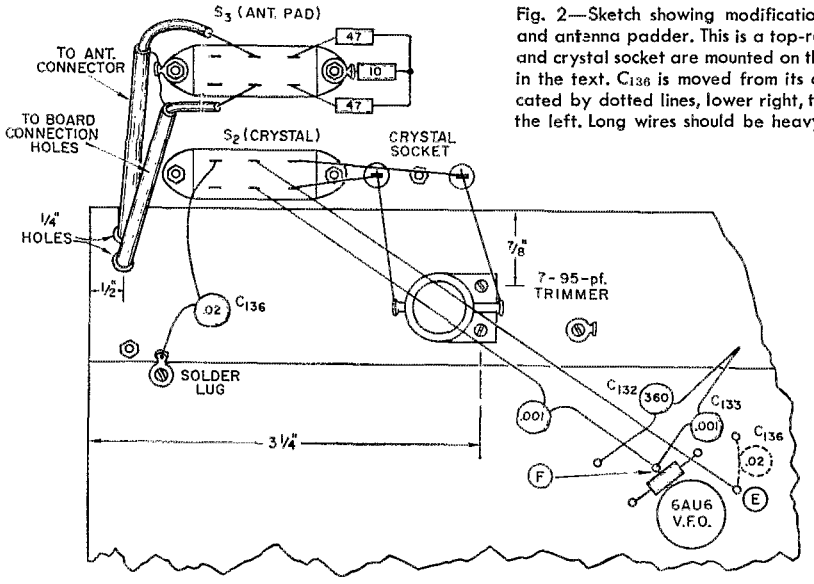


Fig. 2—Sketch showing modifications for crystal control and antenna padder. This is a top-rear view. The switches and crystal socket are mounted on the panel as described in the text. C_{136} is moved from its original position, indicated by dotted lines, lower right, to the new location at the left. Long wires should be heavy enough to be rigid.

minal 5 on the relay. Ground the braid at this end at the lug under the pi-network capacitor.

R_1 should have a value such that the reflected-power indication goes to zero when the transmitter is working into a 50-ohm dummy load. In my case, the value turned out to be 50 ohms, ½ watt. The dummy load I used in making this adjustment consisted of two 100-ohm 2-watt resistors in parallel. This proved to be adequate for the few seconds required to make a check.

You may wonder about the apparent lack of a sensitivity control. This function is provided by the TUNE-LEVEL control at the back of the chassis. The length of the sensing section is quite long compared to that in the usual Monimatch. However, even so, it will probably be impossible to obtain a full-scale forward indication because of the relatively intensitive (1-ma.) meter in the Heath unit. This is of little consequence, however, since it is the null reading that counts in s.w.r. adjustment, and there should be adequate deflection to show when the transmitter is adjusted for maximum output. When the HW-12 is used in a plane with a trailing-wire antenna, the switch is set in the REFLECTED position, and wire is simply let out until the meter goes to zero.

Crystal Control

I find that most of my operating time is spent on one or two specific frequencies where I know I will find my friends. Even with a 100-kc. marker, it is difficult to preset the transceiver to a specific frequency with sufficient accuracy for s.s.b. After discussing the idea of applying crystal control with several others, Jack Brown, W3SHY, came up with a method which is simple to apply, works perfectly, and has the advantage that the tuning dial can be used to pull the crystal frequency slightly to assure on-the-nose accuracy.

In this arrangement, a d.p.d.t. switch connects a crystal from plate to grid of the 6AU6 v.f.o. tube, at the same time disconnecting the 0.02-μf. capacitor C_{136}, which normally grounds the plate for r.f. This change results in a Pierce crystal circuit with which the v.f.o. will lock in when tuned near the crystal frequency. In my case, tuning the v.f.o. circuit will pull the frequency of the crystal minus 200 cycles, or plus 600 cycles, relative to a mid-frequency determined by a ceramic trimmer across the crystal.

The details of this modification are shown in the sketch of Fig. 2. C_{136} is removed and set aside for future use. The terminal of C_{133} near the 6AU6 v.f.o. tube is lifted out of Hole F while the hole is enlarged to 1/16 inch. Then the capacitor lead is replaced in the hole along with one terminal lead of a 0.001-μf. disk capacitor. The other lead of this capacitor is extended, using a piece of No. 18 wire, to S_1, a d.p.d.t. slide switch mounted on the panel below the meter switch. The miniature crystal socket is mounted on the panel to the left of this switch. The ceramic trimmer capacitor is mounted on the chassis apron, below the crystal socket. C_{136} is now connected from the switch to a soldering lug secured by one of the mounting screws of the printed-circuit board. The remaining connections are shown in Fig. 2. The long wire running from Hole E to the switch should also be of No. 18 wire.

After these changes have been made, the crystal is inserted in the socket, and S_1 is placed in the crystal position. The HW-12 is now crystal-controlled for both receiving and transmitting on the same frequency. As mentioned earlier, frequency can be adjusted over a limited range by adjustment of the ceramic trimmer and the HW-12 tuning dial. Placing S_1 in its other position returns the circuit to normal for v.f.o. operation.

When selecting a crystal for a desired output frequency from the HW-12, it should be remem-

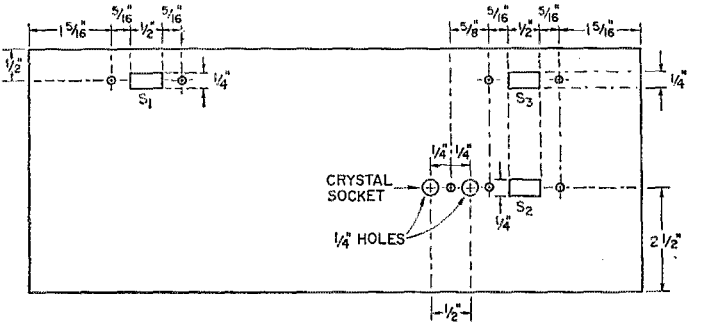


Fig. 3—Sketch showing the location of panel cutouts and screw holes. Unless indicated otherwise, screw holes are clearance for 6-32 screws (No. 28 drill).

bered that the crystal frequency should be the operating frequency minus 2306.7 kc. Most crystal manufacturers can supply crystals ground to specified frequencies. I got mine from Northern Engineering Labs, Burlington, Wisconsin, at $6.00 each. Be sure to specify that the crystals are to work into a 30-pf. load.

Receiver Attenuator

Much of my mobile work is carried on from a plane, where the antenna is the quarter-wave trailing wire mentioned earlier. This antenna is quite large compared to the usual mobile antenna for which the input circuit of the receiving section of the HW-12 is designed. The strong signals picked up on this antenna when flying over well-populated areas often result in cross modulation so severe that reception is practically impossible.

An attenuating pad in the receiver antenna lead is a good solution this problem. To install this pad, the short section of coax running from the receiver-input jack and Holes E and F (Pictorial 13 in the HW-12 instruction book) on the circuit board is removed. A longer length of coax is connected to the jack and dressed around the edge of the chassis to the ¼-inch hole shown closest to the panel in Fig. 2. Another length of coax is run from Holes E and F to the other ¼-inch hole, dressing it around the edge of the chassis, parallel to the first length of coax.

The pad can be cut out by switch S_3 in Fig. 2. This switch is mounted on the panel above the meter, and the padding resistors are soldered to the switch terminals as shown.

This pad provides an attenuation of only 20 db. or so, but it is most helpful in reducing cross modulation by strong signals.

Improving Low-Frequency Audio Response

Many of those using the HW-12 have commented on the apparent "thinness" of the audio quality on both receiving and transmitting. At the suggestion of W2CFT, we tried shifting the carrier-oscillator frequency a couple of hundred cycles closer to the pass band of the crystal filter The result was a pleasant increase in the lower audio frequencies, with no noticeable deterioration in rejection of the unwanted sideband.[1] The frequency shift was accomplished by soldering a capacitor having a value of between 20 and 30 pf. across the carrier crystal-socket terminals. With this modification, it will be noticed that the signal available in the "tune" condition is greater.

Mechanical Operations

The panel should be removed from the unit while the holes are cut and drilled. This can be done by taking off the knobs, and removing the two screws holding the meter switch. Leave the switch hanging on its leads. Remove the leads to the meter, separating them so that they will not become reversed when reconnecting the meter. Then remove the meter.

The drilling dimensions are shown in Fig. 3. The rectangular holes can be drilled out and smoothed up with a small square file. Before replacing the panel, drill the holes required in the chassis. If decals are to be added it will be easier to do them at this time, rather than to wait until after the panel has been remounted. QST

[1] Some caution should be used in this adjustment, since it will tend to reduce carrier suppression if carried too far. — Editor.

Strays

How's this for a sharp looking club station! W8TO, club station of the Columbus Amateur Radio Association, was dedicated in the new Center of Science and Industry last spring. Shown above are K8DJM, station manager; K8HRR, vice president, CARA; and WA8AXB, president, CARA.

Amateur Radio Needs Public Relations!

Suggestions for a Club Program

BY MEL SNYDER,* K3AFW/9

With 700,000 citizens-banders and an unknown number of foreign broadcast stations clamoring for our wavelengths, the mutual attitudes between radio amateurs and the general public are due for serious examination. You and I know that amateur radio has far greater potential for public good than the groups which threaten our privileges — but does anyone else know it?

Whenever a serious case of TVI occurs, whenever a fight over anti-tower ordinances arises — and once a year when Field Day rolls around — amateur radio operators decide that their public image needs boosting.

In the cases of TVI and tower problems, the amateur involved usually relies on "personal calls" upon the complaining TV viewer or local magistrate, and tries to impress these parties with the fact that he's a "good joe." And when Field day comes, the club chairman calls up the local newspaper, gives the editor a few facts, and hopes that a cameraman visits the club site to take a photo of his unshorn comrades twirling a receiver knob.

Public relations, like medicine, must be practiced regularly if it is to be successful. Regular public relations prevents serious misunderstandings in the same manner that regular check-ups catch potentially dangerous illnesses before complications develop.

The most powerful force between amateur radio and the public is the organized club. Each club should designate a member to carry out the group's public relations. This member should be articulate and knowledgeable on amateur radio, and if possible, he should have a journalistic flair. His responsibilities will cover the two important levels of amateur radio — that of the club and the hobby as a whole, and that of his fellow club members as individuals of the community.

* Burson-Marsteller Associates, One East Wacker Drive, Chicago 1, Ill.

First Steps

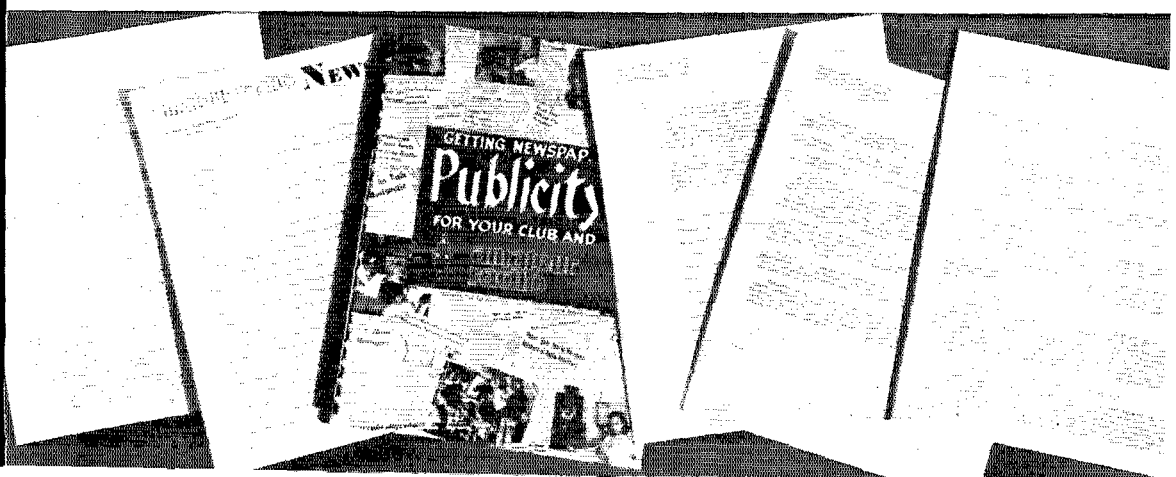
The first step in public relations is developing relations with those of the public who shape opinion. Conduct an open house at a selected club meeting, and invite the editors of local news media to attend in person, or to send a reporter.

Give this special meeting a title that makes it sound worth attending — something like "Inside Amateur Radio — Fifty Years of Service." With every member in his Sunday best, show the press representatives prepared exhibits on the various phases of amateur radio. Perhaps one exhibit could feature a traffic net in operation, another a construction project. Include demonstrations of RTTY, s.s.b. and c.w. — and just to be safe, have a club member at his home station standing by to insure that the first call results in a contact!

Have the club DX hound keep a tape recorder next to his rig for a few weeks before such an open meeting. Then, when the big night comes, you'll be able to thrill your visitors with a well-edited series of phone DX contacts. No matter if the contacts recorded are mere Gs, DLs, or even VEs — just make sure they are perfectly readable when played back.

Now, while the media representatives are really impressed, your public relations "expert" should deliver a ten-minute speech on the service activities of amateur radio in general, and your club in particular. In this brief speech, he should tell how amateur radio is often the only link between remote military bases and the families of soldiers serving there. He should cover the activities of RACES and AREC in general, and describe your club's role in both. In discussing Field Day, he should stress the effort of amateurs to develop proficiency in operating under emergency conditions.

If any material is needed for preparing such a presentation, refer to a file of *QST* for some outstanding examples of amateur service during recent disasters.



Follow Up

Now that you've established relations with the local news media, make use of them. Several days after the meeting, your PR specialist should call up an editor who attended the meeting, and suggest that a three-part series of articles on amateur radio might really interest his readers. Telling him that you'll be able to prepare these stories, without obligation, should result in at least a "Well, I'll take a look at it."

The important thing to keep in mind when preparing such articles is that they must be bright, clear, and readable, with no technical jargon more complicated than an explanation of "CQ." Aunt Maggie should be able to read it through and understand every word! Fire the imagination of the public with the glamorous side of the hobby for the first two articles — tell about Project Oscar, microwave moonbounce, and our service during the Alaskan earthquake. Then, in the last article, explain TVI to your confused fellow citizens, since this is their most common contact with amateur radio.

For each article, have the club photographer shoot several black-and-white photos for illustration, and enlarge each to at least 5 in. by 7 in. These photos need not be artistic — merely clear and well captioned.

The secret of any public relations program is consistency. You must keep local news media *constantly* aware of your activities. Each time a club member receives a major club or national distinction — such as DXCC or an ARRL appointment — prepare a news release along the following lines, and send copies to all local papers and radio stations:

"John Jones, 1454 South St., has been elected a Section Communications Manager of the American Radio Relay League, Vice President F. E. Handy of ARRL has announced."

Then, briefly describe what Jones duties will be, the area of his jurisdiction, and briefly outline his amateur experience. Provide personal data such as occupation, position, family, other activities, etc. For newspapers, include a formal portrait of Jones in a business suit and tie.

News releases should be sent out at least once a month if your publicity program is to be successful. Civil Defense tests, code practice sessions open to the public, and other service activities should be written up in news release form and delivered to newspapers as promptly as possible — if practical, a day or so in advance of the event. The news release, if written clearly, will greatly increase your chance for publicity because the editor won't have to tie up a writer transcribing your information into a story. If you can include a clear, well-captioned photo with the release, you greatly increase the probability of getting into print.

In the PR field, ARRL Hq. has many helps available to members and clubs without charge. Each affiliated club has been sent a copy of a manual, "Getting Newspaper Publicity for Your Club and Amateur Radio." If this has been mislaid, a duplicate will be sent upon request of the secretary or other officer. Other material of interest is (1) a sample speech, for appearance before a local civic club, for example; (2) a sample broadcast script for an amateur radio program; (3) compilations of basic facts and figures about amateur radio for a newspaper reporter, plus a brief summary of amateur radio's history; and (4) "giveaway" brochures and pamphlets for distribution at a public event such as a science fair where the club has an exhibit, or for use as a handout after a talk on ham radio.

In Emergency

So much for establishing contacts and maintaining them. Now, for public relations during an emergency — when the image of amateur radio is at stake:

A violent storm whips through your area, causing great damage and knocking out power lines. One amateur in every club — preferably the PR specialist — should maintain a neat "shack" with emergency power, where press personnel can be invited to see us in our finest hours. This makes excellent newspaper copy — and when the radio stations play their tape recordings of you handling emergency traffic, you'll give the hobby a real boost.

The other kind of emergency is less spectacular, but far more common and dangerous. An elderly matron writes a nasty letter to the local newspaper, scolding an area radio amateur for interfering with her TV. Now, our PR specialist goes into action again — he calls on the editor in person with a concise written explanation of television interference, and the public promise of the club's full cooperation in locating the source of the disturbance.

With these suggestions as guidelines, clubs all over the country can establish the image of amateur radio that will preserve it — the image of a technically competent, service-minded organization of conscientious radio operators. QST

DOMINICAN REPUBLIC RECIPROCITY

The governments of the Dominican Republic and of the United States on February 2, 1965, completed an exchange of notes by which each agree to permit amateurs licensed by the other to operate within its territory.

Amateurs of the United States wishing to operate in the Dominican Republic may inquire by letter in Spanish addressed to:

Senor Director General de Telecommunicaciones

Isabel La Catolica #73,

Santo Domingo, Dominican Republic

HISs coming here apply under the new Subpart G, Part 97 of the FCC rules, as more fully outlined in "Happenings of the Month," page 34.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

WHAT PRICE BPL?

THE denizens of the BPL change from month to month, but the leaders remain pretty much the same month after month and year after year. Some of them expend fantastic amounts of time and energy in reaching this pinnacle of traffic-handling achievement. Back in the late forties we set up a monthly "BPL Honor Roll" in which each BPL'er was given four points for making the list, plus an additional point for each full hundred in his BPL traffic total. The "Honor Roll" for both the year and the entire post-war period was included in QST's BPL column for three straight months.

But alas, in this short time accusations of cheating started to flow thick and fast. The headquarters was asked to step in and make a check on some of the claimed traffic totals and to verify all traffic totals before awarding BPL points. It just wasn't practical for us to do this, so we simply discontinued the Honor Roll listing — just another noble idea to spice up traffic handling which went down the drain because of the inability of either the accusers or the accused (we'll never know which, maybe both) to abide by our traditional traffic-handling "honor system."

"Traffic handling," said *Traffic Topics*, in announcing the dropping of the monthly Honor Roll, "is primarily a service to the public. It can be enhanced and made more interesting by friendly competition, but when the competition ceases to be friendly, we'll abandon it in favor of the service every time. It's up to you, gang." Since then, we have summarized the BPL point standings only once or twice per year.

The 1964 BPL race, just ended, comes also on a note of discord from some of the traffic men who are suspicious that all is not well with the counting methods, if not the honesty, of certain high-placers. We at headquarters have no opinion on the matter, and no choice except to assume, perhaps naively, that all traffickers are basically honest and that totals submitted are honest totals made by the sweat of brows rather than stretches of imagination.

Suppose we are wrong. What can we do about it? Set up a police system? Make every topnotch traffic man send us his message file every month so we can count it?. Start throwing people out of the BPL and disqualifying them for BPL points, medallions, certificates? No, this isn't practical, we don't have the staff for it, and we don't *want* to do it, because if the BPL cannot continue to exist on the honor system, as it always has, then it shouldn't exist at all. When it gets so we start wondering, when we see a high BPL traffic total, whether the guy is a real operator or a cheater, we'll discontinue the BPL altogether.

Now let's get a few things straight regarding the counting of traffic. First of all, we should make it clear that listing of your traffic totals in QST is strictly on the assumption that all such traffic was handled in the amateurs bands *in standard ARRL form*, in accordance with the rules for handling amateur traffic set down in the

Some of the W. Fla. ARPSC gang after a recent meeting about improving Key City operations. Left to right are: K4NMZ (PAM), W4RKH (SCM), *K4s* AKL QOJ BDF, W4ILM, WA4NRP (EC), *K4s* PMO YJW (EC) SOI and W4SRM. (Photo by W4MLE).

operating booklet and on these pages. If you don't handle your traffic that way, it is not eligible to be reported or counted. If you do use non-standard procedure and report your traffic total, then you are obtaining recognition under false pretenses.

We're not talking about errors or ignorance, of course. Everyone makes mistakes, and most of us do things wrong at first until we learn to do it right. We're talking about the amateurs who use non-standard procedure deliberately and knowingly simply because they disagree — they don't like precedences, they don't see any sense in checking a message, they see no reason why they shouldn't send "same," and in many other ways they consider their methods superior to those recommended by ARRL, so they use them. Nothing wrong with this. We respect your right to handle your traffic as you please. But traffic reported to your SCM and counted toward BPL is *only* that traffic handled in standard ARRL form. The rules say so. They have said so for decades.—*WINJM*

BPL Bigwigs

So now we come to a look-see at what happened in the BPL during 1964 and how the all-time points have stacked up through the years. Let's first of all dispose of W3CUL; May heads the 1964 column with 683 BPL points and the all-time (post-WWII) column with 8036 points, the latter so far ahead of her nearest opponent that we'll take bets at any odds you want to name, right now, that nobody will

*National Emergency Coordinator

ever top her. Not far behind her for 1964 was K6BPI. Here are the top ten in both categories (BPL points in parentheses):

1964	*Post-War*
W3CUL (683)	W3CUL (8036)
K6BPI (602)	W7BA (2793)
KØONK (391)	WØSCA (2453)
WØLGG (284)	WØBDR (2357)
W1PEX (233)	K6BPI (2071)
WØBDR (204)	WØLGG (2030)
W7BA (185)	K7NOA (1873)
W3IVS (182)	W6GYH (1618)
W3VR (174)	W9NZZ (1458)
WA9CCP (170)	KØONK (1195)

The following also made over 100 BPL points in 1964 (points in parentheses): K9KZR (156); W3EML (149); W6RSY (147); WA4BMC (134); WB6BBO (134); WB6JUH (133); WA2RUE (132); W6GYH (128); W7DZX (127); W6WPF (122); K1WKK (112); WA2GPT (108); W8UPH (104). Some real traffic-handling talent here!

Seven of the post-war top ten are still actively engaged in traffic and making BPL, six of them in the top ten in *both* lists! Some of the old-timers who previously headed the post-war listing have thus fallen into the top-25 listing. Some of these calls haven't been heard on a traffic circuit for years, but past performance keeps them on the list W3W1Q (1184); W8UPH (1153); W9DO (1121); WØCPI (1099); W9JOZ (1088); W9JUJ (982); W7PGY (950); W1BGD (911); WB6JUH (890); W9IDA (886); W7CZY (885); WØLCX (882); W6CE (815); WØTQD (809); W2RUF (777).

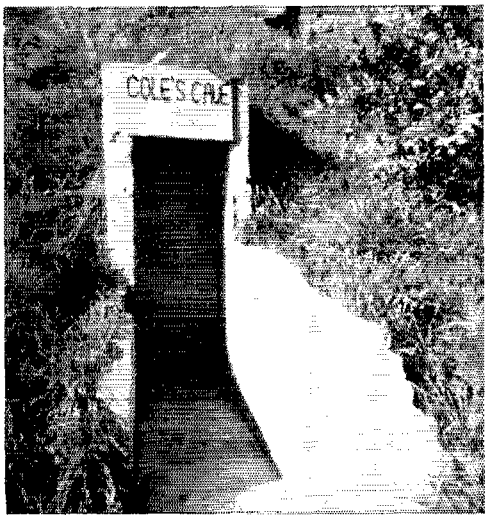
Note that this is a "living" list. It does not contain any Silent Keys (not that we know of, anyway). Some of the venerable old timers and others who have passed on to QRM-free bands have yielded their places to those who are still in the running for the top positions.

—•••—

Speaking of venerable old timers, we think it appropriate to mention here the passing of W9TT. Yes, he is listed in Silent Keys, but Harry deserves a bit more than that. He was a chronic BPL'er, held a number of official ARRL posts including the managership of Trunk Line J and the Ninth Regional Net of NTS after the latter was formed. A vigorous but sincere opponent of NTS, he dropped the latter position after TLJ and 9RN were divorced and became one of the founders of United Trunk Lines. Harry was a traffic-handler of the old school, and we shall miss him greatly.

National Traffic System

The 1964 race for statistical supremacy among NTS region nets found RN5 holding down first place, with RN6 coming in second. Our congratulations to Managers K5IBZ and WB6BBO respectively, and to their fine crews. We think RN6's rise from ninth place in 1963 to its present status deserves special mention and commendation.



The chart herewith shows how each region net placed in each of the five categories used in determining the final standings.

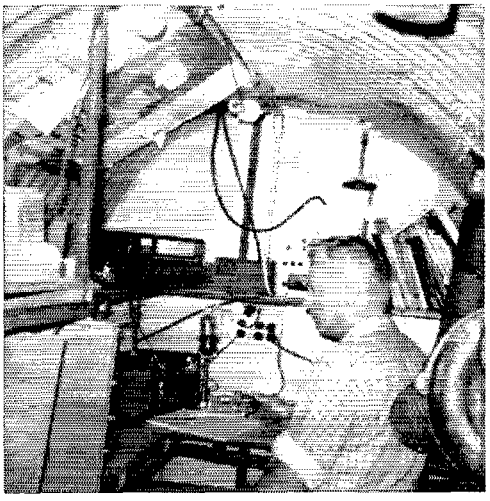
Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Repr.*	*Standing*
RN5	1	1	4	2	3	1
RN6	3	2	3	3	2	2
2RN	4	3	2	6	1	3
9RN	10	7	1	1	4	4
4RN	8	2	6	5	6	5
3RN	2	6	9	8	5	6
TEN	5	5	5	7	12	7
RN7	9	9	8	4	7	8
1RN	7	8	10	10	10	9
8RN	7	10	11	11	9	10
TWN	12	11	7	9	11	11
ECN	11	12	12	12	8	12

We hope those region nets which have improved their standings will feel encouraged, while those whose standings dropped need not feel especially discouraged because this is a purely statistical measurement of performance over a full year's time. Statistics don't always tell the full story, but they *are* a convenient gauge of values capable of being measured. The categories used tend to balance each other — thus a net cannot improve its overall standing by having more sessions alone, because then its rate and average would decrease. Similarly, having more traffic alone will not materially help unless the number of sessions is increased so that the standing will improve in *both* categories. Missing NCS reports are always damaging, because they lower the standing in two categories, sessions and traffic, without helping it in any other.

More on Fallout Shelters

Seems we started something a couple of months ago when we mentioned that we were skeptical that any amateurs owned fallout shelters, much less operated from them. Last month we ran a summary of comments received as of that time (page 44, March *QST*), and this month we have a couple of pictures of "Cole's Cave," the fallout shelter of WA6TOG.

OM Cole says a contractor cut a deep trench in the hill, lowered a corrugated metal pipe twenty feet long and six feet in diameter, leaving enough room at the end for a 6-foot concrete bulkhead. At the other end he built a 6′ × 6½′ × 21′ concrete reinforced storage room, at the outer end of which is a concrete baffle and door. Beyond this is the entry tunnel, leading off at a 45° angle, at the end of which is a door about 4½′ from the main opening. The door is laminated plywood 2½″ thick. Bunks for 6–8 people are welded in place inside the pipe, with radio gear and operating position at the rear where pipes lead up to



Inside and outside WA6TOG's fallout shelter. Details are described in the text. At the left is the entrance. At right, 40 feet or more into the ground, the OM himself relaxes at his operating position.

ground level for coax cables to the antennas. There are three 4" air vents, one filtered, motor or hand operated for drawing air into the shelter, emergency or commercial power, five antennas for operation on 80, 40, 20 or two meters.

This bomb shelter has been in continuous use as a ham shack since he built it three years ago. When things get a bit raucous (six children) around the house he retreats to his shack, shuts the door, and all is peace and quiet. He claims it is cool in summer and, with a small heater, warm in winter.

A letter from W1NWV says the whole idea is built on a misconception — that a fallout shelter is necessary for survival — and that OCD is obsessed with nuclear warfare and ignoring all other kinds and natural disasters as well.

W3URR advises that he has a fallout shelter in his basement, built with the help of W3CMR and costing under $500.00, including supplies. Local civil defense supplied the communications equipment and accessories. W3URR recommends this as a building project for all amateurs. Civil defense can supply all the specs.

And finally, our correspondent of last month who wished to remain anonymous (and still does) says that most people consider these "bomb shelters," which they definitely are not. Most of them are practically useless against blast and over-pressure. He uses a home-brew rig of 100 watts input, and is also equipped for six meters. Feeders go out through porcelain feed-thrus to the center-fed dipole. He lacks proper emergency power and is concerned about antennas being destroyed in any attack, thus making the entire installation useless.

January reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	31	1399	.837	45.1	98.4
CAN	31	903	.711	29.4	100
PAN	31	984	.777	31.7	98.9
1RN	56	369	.290	6.6	89.6
2RN	62	586	.289	7.9	99.7
3RN	62	490	.289	7.9	92.5
4RN	60	554	.292	9.2	89.8
RN5	62	705	.315	11.3	95.5
RN6	62	810	.620	13.0	96.2
RN7	31	321	.299	10.3	78.2[1]
8RN	62	293	.201	4.7	82.3
9RN	31	313	.461	10.1	99.1[1]
TEN	62	421	.370	6.7	78.5
ECN	30	93	.169	3.1	87.8[1]
TWN	29	209	.299	7.2	72.4[1]
Sections[2]	1542	7231			
TCC Eastern[3]	124	506			
TCC Central[3]	93	631			
TCC Pacific[3]	124	625			
Total	2181	17,443	7.2	EAN	CAN
Record	1974	25,982	12.5	1.039	100

[1] Representation based on one or less sessions per day.

[2] Section nets reporting (53): GBN (Ont.); NYC-LI VHF, NLI, NYC-LI Phone, NLS (NYC-LI); NCN (early), NCN (late), NCSSBN, NCCW, THEN (N.C.); NCN, SCN (Calif.); BEN, ILN (Ill.); MSPN (noon), MSPN (eve.), MSN, MJN (Minn.); AENB, AENT, AENP (morn.), AENP (eve.), AENR, AENM, AENO, AENH (Ala.); OZK (Ark.); PTTN, EPA (Penn.); OSN (Ore.); QFN, WFPN (Fla.); OSSBN (Ohio); VSAM, VSBN, VSBN (early), VSN (Va.); TSSBN, TPN, TN, ETPN, (Tenn.); OQN (Ont.-Que.); NJPN (N.J.); MTN (Man.); RISPN, RIN (R.I.); SCEN (S.C.); MDD (Md.-D.C.-Del.); WSBN (Wisc.); BUN (Utah); NTTN (Tex.); Wolverine Net (Mich.).

[3] TCC functions not counted as net sessions.

The old sessions record bit the dust this month, but traffic is down from last year. Net sessions must be quite monotonous now after the thrills of long skip, foreign QRM and the like. Congrats to RN5 on toping the field in the statistical race for 1964. It would appear that everything is moving west including most of the traffic (?).

K1WJD comments that shortly after his saying how reasonable conditions have been, we get hit with January. W9DYG sez CAN is going great-guns, but traffic is way down. CAN certificates went to: WA4LCH, *K4s* DZM VFY, *W5s* JWL QMJ, *WA5s* AVO CBL HNN, K9YNL, *WA9s* AKE BWY IZR, *WØs* OHJ WYJ CRW, WAØDOU. WB6JUH is trying to get a PAN bulletin together. 1RN certificates went to *W1s* BGD ZFM, *K1s* BGI STM TMK USD UZG YMS, WA1CRK. WA2GQZ sez now that condx are starting to improve, 2RN is back on an even keel. 3RN's second session was really clobbered by bad condx, and outsiders who were able to QNB were a big help. K51BZ comments that RN5's representation is improving slowly, but could be better. RN6 certificates went to: W4CJD/7, *W6s* ADB AGR AIT EOT FD GYH HC QAE RSY SHY VNQ WPF YBV YKS, *WA6s* VPN WTX WNG, *WB6s* BBO FPQ JGA JUH, *W7s* SHY WST/6, K7SFN. K7JHA reports Mont. representation is up considerably. W8CHT sez that condx were so bad at times that 8RN had to hold three separate late sessions at the same time. He is also planning another bulletin for the gang. W9QLW comments that 9RN's worst problem was RTTY QRM. TEN now has two Man. reps and another S. Dak., both very welcome additions.

Transcontinental Corps: W3EML's report shows that Stations B and K are still being hard hit by condx. W5PPE has issued TCC certificates to W4ZJY and WA9AUM. W7DZX sez that all skeds are set up in the Pacific Area, but a few counterparts in the Eastern and Central are still missing.

January report:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	124	90.3	1576	506
Central	93	91.4	1262	631
Pacific	124	86.3	1250	625
Summary	341	89.1	4088	1762

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EMG NJM, W2GVH, K2SIL, *WA2s* BLV WLN, WB2HWB, *W3s* EML NEM, *K3s* FHR MVO, W4DVT, K4VDL, WA4PDS, *W3s* CHT ELW, *K8s* KMQ TIG. Central Area (W5PPE, Dir.) — W4OGG, WA4AVM, *W5s* IQH PPE, WA5CBL, *W9s* CXY DYG JOZ VZY, *WA9s* AUM BWY, *WØOHJ*, KØGSY, WAØAOY. Pacific Area (W7DZX, Dir.) — *W6s* AGR EOT HC VQN, K6DYX, WA6BRG, WB6JUH, *W7s* DZX GMC WST.

Net reports:

Net	Sessions	Check-ins	Traffic
North American SSB	26	406	175
Interstate SSB	31	1401	316
7290	40	1165	408
20 Meter SSB	20	849	1036
EASN	32	131	90
CNEN	26	647	3
HBN	31	489	498
MFN	64	625	964

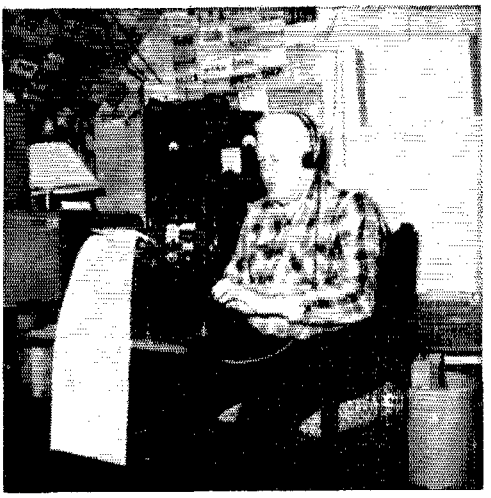
West Coast Floods

The second disastrous flood in ten years swept through several river watersheds in Northern California during Christmas week. The emergencies caused by the flood and the almost total disruption of surface travel throughout the Coast Range were projected right into January when a second crest from the continuous rains caused the rivers again to rise to the flood level.

A stationary low pressure area over Puget Sound caused a series of tropical storm fronts to drop heavy amounts of rain on Northern California. The rains started on Dec. 19 and by Dec. 22 the situation was serious. The Sonoma County Disaster Office activated the radio amateurs in the county. Guerneville in the resort area on the Russian River, was the expected disaster area, and WA6CTS and WB6CKT were sent into the area to provide emergency communications. They remained until the flood crest had passed. Twenty-five other amateurs also participated in this phase of the emergency.

From reports received, flooding along the Eel River seemed to be the worst. Emergency nets were set up, on both phone and c.w., for emergency and health and welfare traffic. WB6HJW took the job of being NCS on one of the phone nets for an average of 16 hours per day from Dec. 22 to Jan. 1. Being ideally located, he did quite a bit of relaying when conditions were poor.

The Navy played a major role in the rescue operation. For the most part they used amateur radio as their means of



Recognize this OG? He's Bill Overbeck, W3EML, Eastern TCC Director. Bill is shown here doing the thing he likes best, handling traffic, and he handles loads of it. As if the TCC Directorship isn't enough to keep him busy, Bill is also manager of EPA Net, holds RM and ORS appointments and several TCC skeds of his own. He is also CP-30 and A-1 Op.

communication on land. K7ROP, a chief radioman from the *USS Bennington*, came ashore and set up a circuit to the carrier to handle some of the traffic load. W8AKE was the call of the amateur station on the ship. The link operated on a 24-hour-per-day basis until Dec. 30.

As soon as weather conditions permitted, K6NCG moved two portable stations from Treasure Island to the disaster area. One operated from Eureka and the other inland on the Trinity River. K4ZFF/6, WA6URU and WA6VME operated 24 hours a day as long as band conditions permitted.

When flood waters subsided, a new emergency developed in the form of heavy snows. The U. S. Air Force flew cargo planes into Eureka and calls for aid came via amateur radio from the various small settlements in the mountains including the Yourok Indian Reservation.

NCN and RN6 found traffic light enough so no addition to the already beefed-up liaison was required. They conducted regular sessions, and took most of the Christmas traffic load away from the phone nets that were in emergency session. They were, however, prepared to go into emergency session should the need arise.

As is often the case with a large emergency, many smaller ones (as to the area covered and the number of people involved) are overshadowed. On Dec. 24, VE7ANP heard a QRRR from K6BMB. Copy was rough, so VE7ANP called VE7BDJ, and between them they were able to clear the traffic. A woman with a broken leg needed medical assistance and the only way to reach her was by helicopter. VE7BDJ called the Air Sea Rescue Section of the RCAF and requested assistance. RACF in turn called the U. S. Air Force which made the rescue.

W6YKS had this comment to make about the whole operation, "The organization of the hams was much better this time than during the tidal wave earlier this year in Crescent City. Everybody seemed to sense that something was going to happen, I think, because about two days before the actual high water hit the area, the fellows were digging the mobile and portable rigs out of the closets and cranking up the generators."

The flooding extended into Washington and Oregon, but we have received only one report on the operation in Oregon. W7DEM, EC of Josephene Co., reports that AREC members operated from Red Cross temporary headquarters, 2-meters being the link between the Red Cross station and c.d. headquarters. Several fixed stations acted as relays when mobile signals were hard to copy at the R.C. station.

Diary of the AREC

A paper manufacturing company located in Ocean Falls, B. C., wanted rain for plant power and pulp production. Well, they got it, and along with it a serious flood and landslide. At 2200 PST, Jan. 13, the slide came crashing down on the town, knocking out all power and communication facilities and killing seven residents. First news of the slide reached the outside world through VE7BPU who was able to contact W7BAX in Seattle, Wash. Conditions were poor and it took about forty minutes to get the message through even with VE7US's help. *VE7s* ALW US and W7BAX struggled with traffic until about 0700 PST when VE7AOI took over and W7BAX shut down. Other stations known to have participated were: *VE7s* AJO BJO CB OM PO. — *VE7FB, SCM B. C.*

—•••—

Disaster hit the city of Wichita, Kansas, at 0931 CST on Jan. 16, when a KC-135 jet tanker loaded with fuel crashed in a heavily populated section of the city, killing 30 persons including the plane's crew.

On the scene shortly after the accident occurred were members of the American Red Cross and the ARC Amateur Communications Group. The communications group worked with the various agencies on the scene and assisted with the maintenance of communications into and out of the area. These operators were ably assisted by many others in surrounding areas and states who stood by through the long hours to keep the frequencies clear and to pass traffic. Many health and welfare and urgent local messages were handled. A total of 80 amateurs took part in this operation. *WØALA, SCM Kansas.*

—•••—

On Jan. 28, WA4LMD handled emergency traffic from CE3QB. Seems a 15-year-old boy was suffering from a rare muscular disease affecting his throat. CE3QB had made several contacts in South American countries in an effort to locate the drug needed but to no avail. WA4LMD was able to find a source of the drug and arrangements were made by commercial and military aircraft to have it transported. — *WA4LMD.*

—•••—

We made a boo-boo in the March *QST* article about the NCEFs. The 40-meter phone part-time frequency should have been 7250, not 7225 kc. The segment guard-band would then become 7247–7253 kc. Sorry, we just don't understand how this happened!

—•••—

Oops, we goofed. The picture on page 69, Feb. *QST* is of the Madison Co., Ind. c.d. van.

(*Continued on page 158*)

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

FULL TIME

3550	7100	50,550
3875	29,640	145,350

PART TIME

7250	14,225	21,400
14,050	21,050	28,100

Full time frequencies are for use 24 hours per day but only for emergency and traffic calling purposes. No transmissions for *any* purpose (except calling for emergency help) the first five minutes of each hour.

Part time frequencies are for traffic calling and general amateur use except in an FCC-requested or FCC-declared emergency, at which times they become *full time* frequencies.

This is a voluntary amateur program, designed to show what we can do without FCC regulation. Its success will require us all to work together. Any amateur wishing to assist is invited to use ARRL notification cards to be sent to stations not observing the rules.

Full details on this program are included in an article in the March issue of *QST*, page 60.

The Death—or Survival—of Amateur Radio

BY STUART D. COWAN,* W1RST

W1RST wrote this article in 1959, but never got around to mailing it to QST. In early 1965 he dusted it off, and discovered that he had anticipated the ARRL Program. It was timely in 1959 — it is timely now.

THE mushroom-like growth of amateur radio in the U. S. during the last 25 years, from 46,000 amateurs in 1934 to 185,000 in 1959, plus major changes in the state of the art, have created serious problems which threaten the future of amateur radio. These problems deserve the attention of thoughtful amateurs *now* so that we can take action which will help to insure the future of the amateur service.

What are the principal problems?

(1) The lack of technical competence by a constantly growing number of amateurs and, what is worse, the lack of inquiring minds that want to learn, is a matter for deep concern. One well-known company which manufactures amateur equipment says that half its service calls (at $6 an hour) result from our fraternity's inability to spot a bad tube and replace it. A far cry from the days of Ross Hull and Jim Lamb. Today, the last refuge of the technically competent ham is often v.h.f. or RTTY.

(2) One result of this lack of interest in technical matters is the ever-increasing use of factory-built amateur equipment, even by Novices and new General Class amateurs. It is rare today to work a ham who has built any substantial part of his station with his own brain and hands.

We are breeding a new generation of "amateurs" who buy stations which they simply plug into the wall socket — like a refrigerator. And too often the equipment creates havoc on the air (particularly on s.s.b.) because it is improperly adjusted.

(3) The amateurs' once proud list of technical contributions to the art has been expanded very little in the past 20 years. The last major frontiers seem to be on the very high and super high frequencies and in helping to prove out the range and efficiency of low-power single sideband equipment.

(4) The old standards of courtesy, intelligence and consideration in operating practices show signs of being swept away. It was inevitable, of course, that the flood of new operators would create extra problems in this area, but some of today's practices almost defy believability — and they are not confined to the newcomers.

The FCC has become involved in some cases of inconsiderate operating and may become involved in others. If the FCC, with the severe demands on its time, must get involved in internecine disputes, the future of the amateur service is not bright. Here are some of the practices that go on:

(a) Failing to listen on a frequency before testing or operating. Important traffic to an overseas station regarding a seriously ill woman was broken up by a W9 testing with an s.s.b. signal 15 kc. broad who never bothered to listen first on his frequency.

(b) Use of c.w. for rag chewing on top of overseas s.s.b. stations handling morale traffic. While c.w. is allowed on any frequency where phone is permitted, common courtesy and good practice dictate that c.w. not be used in certain frequency areas. There's plenty of room elsewhere for c.w.

(c) Intentional interference. It seems incredible but there are cases of intentional QRM by one amateur on another's frequency. This usually results from hard feelings built up when one amateur tells another something he does not like to hear — such as that he has splatter 10 kc. above and below his s.s.b. frequency, and to please check his transmitter tuning. While the vast majority appreciate an honest report, a few oddballs resent them.

(d) Poor quality s.s.b. signals which cover the bands with splatter and destroy the contacts of others, and to a lesser extent, overmodulated a.m. signals. S.s.b. splatter is an increasingly serious problem which must be dealt with by self-policing, not resort to the FCC. What should we do about it?

(e) Criticizing on the air the operating of other amateurs. They may deserve everything you say, but remember that many people are listening in. Avoid on-the-air criticism. Talk to the other amateur on the telephone, in person, or write a letter.

(5) A surprising number of amateurs enjoy poor public relations with their neighbors due to BCI or TVI and make little effort to rectify matters. This harms all amateur radio.

Interference problems can be licked, completely. Thoughtful amateurs stay off the air during popular TV hours until the interference is eliminated, regardless of who is right. Telling the person he has an "old fashioned" TV set won't improve things. Read the excellent article, *The Amateur and Public Relations*, by H. H. Richman, W4CIZ, in the May 1959 *QST*.

A Plan of Action

If these five "problem areas" threaten the future of amateur radio, what can each of us *do* to help preserve our important hobby?

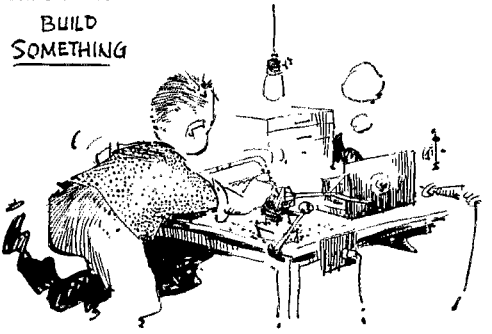
First, we must subscribe to the basic principle that each one of us must do *something* — no matter how small or seemingly unimportant —

* United Research, Inc., 1730 Cambridge St., Cambridge, Mass. 02138

to help amateur radio *earn its keep*. We cannot retain our priceless frequencies by simply gossiping on our bands like a bunch of old women over the back fence and burying our heads in the sand to avoid unpleasant issues. Here are some things we can do:

(1) *Increase technical competence.* We can increase our technical interest and knowledge by reading, studying, learning. *QST*, *The Radio Amateur's Handbook*, the other ARRL technical publications, *CQ*, *CQ's* technical publications, and the *Radio Handbook* are good sources. Let's read about things we don't understand, think about them, ask questions. Let's *learn*.

(2) *Build equipment.* There are valid reasons for the popularity of factory-built amateur equipment: increasingly complex techniques, notably s.s.b., make it difficult to build certain equipment; the hectic pace of modern living has left many of us insufficient time to build our gear; you can buy commercial equipment almost as cheaply as you can build it, and it has a better resale value.



There is no doubt that factory-built gear fills an important need and is here to stay. But there *is* equipment which most of us can find time to build — amplifiers, power supplies, test equipment, portable rigs, etc. Besides, building equipment can be fun and it's a relaxing change of pace from most jobs. Some are finding new pleasure in building tiny flea-powered rigs using transistors and working DX with them — including some jaded hams of 30 years' standing. Try it!

(3) *Technical contributions.* This is a tough but important and satisfying area. As already stated, the last technical frontier seems to be on the extremely high frequencies where the hams are still making significant contributions. If you want to help justify amateur radio via the technical route, go v.h.f. and s.h.f.

(4) *Be a good operator.* This is a long and difficult subject to cover properly. The net of it is that all of us should be polite, friendly and helpful to our fellow amateurs. We must consider the other fellow's point of view — there's always the chance he may be right!

Fighting among ourselves can only do grievous harm to amateur radio. We must not drag the FCC into petty amateur disputes. We must stamp out inconsiderate operating practices through self policing.

(5) *Handle traffic.* Whether it is messages via c.w., rtty, s.s.b., or a.m., traffic handling is a major contribution by amateurs.

One of the few true bright spots of ham radio in recent years is the valuable service amateurs are providing through traffic handling with inaccessible places such as Antarctica, Greenland, Okinawa, the floating ice islands, and other faraway spots. Over 100 amateurs received letters of commendation from the National Academy of Sciences, Washington, D. C. for handling important traffic during IGY.

(6) *Get into special and emergency communications.* Amateurs take a big step toward justifying their existence through their work with RACES and Civil Defense, the American Red Cross, and the AREC. Taking part in training drills is as important as the real thing. The amateur's exemplary work in disaster communications is certainly a major reason for preserving his frequency bands.

(7) *Join Armed Forces nets.* Thousands of amateurs, members of MARS, render major services to the Armed Forces by handling MARS traffic with military bases and in other ways. Many hams are regular members of the various reserve forces.

Here is a quick, easy way to rate your own contribution. Check "Yes" or "No" after each question, find your score in table.

	Yes	No
1. Are you trying conscientiously to increase your technical knowledge of radio and electronics?		
2. Have you built some portion of your equipment?		
3. Do you plan to build more of your own amateur equipment in the future?		
4. Are you trying to make technical contributions to the art, no matter how small or insignificant they may seem?		
5. Are you courteous and considerate in your operating practices?		
6. Do you handle a certain amount of message traffic?		
7. Do you take part in disaster communications every time you can?		
8. Are you an active member of RACES, AREC, CAP or other emergency organizations?		
9. Are you a member of MARS?		
10. Are you a member of the reserve of some branch of the Armed Forces?		
11. Do you present amateur radio in a favorable light to your neighbors and others by cooperating to the utmost in BCI and TVI cases — even when you may not have to legally?		
12. Do you participate in ARRL Communications Dept. work as an Official Observer, Official Relay Station, Official Experimental Station, etc.?		

Over 25,000 amateurs served in the Armed Forces in World War II and theirs is a bright chapter in the history of the amateur service.

(8) *Do a good public relations job.* Amateurs have earned a reservoir of goodwill through their work in disasters, traffic handling and other work, only to find that a few thoughtless amateurs are giving ham radio a black eye through failure to cooperate with their neighbors — mostly in TVI cases.

Let's practice the Golden Rule in our relations with our neighbors and not provoke public opinion against amateur radio, as did a letter in *The New York Daily News* on April 21, 1959, complaining about an amateur's thoughtless attitude in a case of TVI. The *Daily News* had a circulation of 2,056,000.

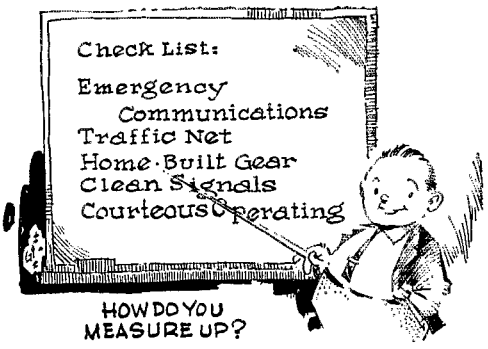
Actions Determine Future

We can justify the valuable frequencies we have been assigned *only* if we operate in "the public interest, convenience and necessity."

The future of amateur radio is being shaped every single day in the year by the *actions* of every amateur radio operator in the United States — whether 10 or 80 years old, man or woman, whether on c.w., a.m., s.s.b., or RTTY, whether janitor, engineer or surgeon.

Idle rag chewing, and chasing WAS and DX certificates, are fun and most of us spend some portion of our time in these pursuits — *but they serve no truly useful purpose in justifying continued occupancy of our priceless frequencies.*

Amateur radio as we know it could perish in the next ten years if enjoyable but basically useless activities crowd out genuine and significant contributions.



How Much are You Helping to Justify the Continued Existence of Amateur Radio?

If each one of us performs only a few *useful acts* on a continuing basis in the area he likes and in which he has proficiency, the cumulative effect of the good work of 250,000 amateurs will be tremendous. Whether you choose to handle traffic, do emergency work, engage in v.h.f. experimentation, participate in MARS, and so on, you will be helping amateur radio to survive in the national interest.

What each one of us *does* today is determining whether the amateur service will die, or survive, in the years ahead. QST

Number of questions to which you answered "Yes"	*Here's the kind of a job you are doing to help justify continuation of amateur radio*
0–2	Poor
3–4	Fair
5–7	Good
8–9	Very good
10–12	Excellent

• Technical Topics

Some Observations with V.H.F. Folded Dipoles

As amateurs concerned primarily with results in terms of signal reports received on the air, we often take equipment and antenna designs on faith. If people come back when we call them, and particularly if the reports are flattering, we conclude that things must be working well. If we have just put up a new antenna we are more likely to judge it on this basis than by any measurements we were able to make on it. This is probably just as well, for most of us are not too well equipped to make definitive measurements, especially on antenna performance.

But now and then, as we try to make measurements on our own, as a cross-check against on-the-air results, we may come across indications that raise a shadow of doubt as to the accuracy of the design information we've been using. This has happened several times in the writer's experience with v.h.f. antennas, and a few times a further investigation has turned up basic discrepancies in methods we (and others) have been using for a long time. Such experiences led to the compilation of v.h.f. antenna information published in a three-part series in *QST* last year.[1] Now another has come to light as we checked out some designs for Yagis for 144, 220 and 432 Mc., to be used in the new ARRL v.h.f. book.

We wanted some low-cost Yagis for the fellow who likes to build his own — as many still do. Many man-hours of experimental work over the years, most of it never written up in any detail, had given us good information on element lengths and spacings. This information is given in table form in the aforementioned book. The work was done with driven element designs that permitted constant adjustment of the impedance match, this being fundamental to any true evaluation of antenna performance. Now we were looking for the best available dipole design that would permit the match to be fixed when the antenna was built. (We still recommend that an adjustable matching device be included in a v.h.f. antenna installation, but some fellows will not go through the detailed work

[1] Tilton, "V.H.F. Antenna Facts and Fallacies, *QST*, January, February and March, 1964.

that adjustments of this kind require.)

The best bet looked like the old familiar folded dipole, with different conductor sizes for the fed and unbroken portions — the so-called "ratio dipole" currently used in many commercial and home-built antennas. So, out came the *Handbook* folded-dipole nomogram[2] and a scratch pad. Meanwhile, we checked the available tubing sizes, and selected some that appeared to have promise. We had ½-inch and ⅜-inch tubing available for the unbroken portion of the dipole, and welding rod of 3/32- and ⅛-inch diameter for the fed portion. We could go to smaller or larger materials if we had to, but these should give us a good start.

Some Experimental Models

Work was started on 432 Mc., for the obvious reason of convenient size, and also because of the lingering suspicion in some v.h.f. circles that "Yagis don't work" above a certain undefined frequency limit. Element lengths and spacings previously worked out in a long series of experiments as giving the best performance possible with 11 elements were used, and several working models were made up using the driven-element combinations possible with the element diameters available. The smaller element was threaded at the ends and bent up at right angles, so as to fasten to the larger element as shown in Fig. 1. This permitted assembling dipoles

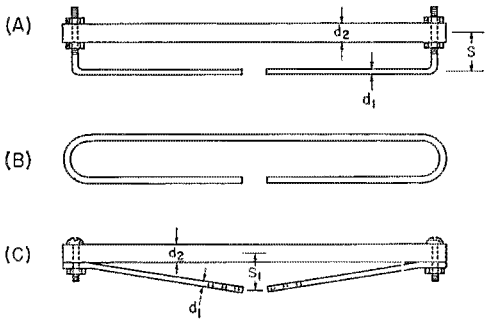


Fig. 1—Various types of folded dipoles used in matching experiments on 144, 220 and 432 Mc.

of all available size combinations, and also adjustment of the center-to-center spacing. These various dimensions are labeled in Fig. 1 in the same way as in the *Handbook* nomogram. The feed system was 50-ohm coax terminated in a half-wave balun, requiring a dipole impedance of 200 ohms.

One bad feature of any fixed matching system is that you have to know (or assume) the feed impedance. This can vary over a wide range, but as good a starting guess as any is 25 ohms.[3] Using this figure, and the step-up information of the folded-dipole nomogram, it appeared that a match should be possible with several combinations of element sizes and spacings that we could make from our available materials.

We were in for a rude awakening when this was actually tried. The closest we could come to an actual impedance match left us with an s.w.r. of more than 2.3 to 1. Any further adjustment in spacing or size change caused the mismatch to increase above this figure. The combinations that looked best on paper resulted in s.w.r. readings of 4 or 5 to 1 in some instances.

[2] *The Radio Amateur's Handbook*, Fig. 14-43 in editions from 1962 to 1965.

[3] Reference 1, *QST*, March, 1964, p. 31.

Next, we went to a dipole of uniform conductor size, bent as shown at B in Fig. 1. This type of dipole has an impedance step-up of 4 times. When installed in our 11-element Yagi it showed an s.w.r. of 2.3, when fed with our coax and balun. This indicated a feed impedance of 87 ohms. Divide this by 4, and you have just under 22 ohms, or close to the expected figure for a long Yagi. That the feed impedance *was* on the low side of 200 ohms, and actually close to the above figure, was double-checked by installing an adjustable Q section at the feed point. With a Q section of 175 ohms, the lowest we could make conveniently, there was still an appreciable mismatch, and it went higher with any increase in spacing of the Q bars.

The antenna was then fed through a universal matching stub consisting of 14-inch lengths of aluminum welding rod spaced about a half inch apart. An adjustable short and sliding taps for connecting the balun were adjusted for zero reflected power. This stub was tried with dipoles A and B of Fig. 1, and in both it was found possible to obtain a perfect match. Furthermore, the stub worked out to be almost exactly a half wavelength long, indicating that the dipole lengths were close to right.

220-Mc. Results

Next, a similar program was carried through on 220 Mc., using a 7-element Yagi on a 6-foot boom. Again, it was impossible to obtain a perfect match, but the mismatch was somewhat lower than on 432 Mc. We were able to get down under 2 to 1 with the optimum 220-Mc. setup using a ratio-type dipole.

In adjusting the spacing, S in Fig. 1A, it was observed with one experimental dipole that making the spacing less at the outer ends than at the center brought the s.w.r. lower than was possible with the two portions of the dipole exactly parallel, regardless of the spacing with the parallel condition. This led to experimenting with variable end spacing down to the point of no spacing at all, and eventually to the dipole design shown in Fig. 1C.

Now we had something. With d_2 = ⅜ inch, d_1 = 7/16 inch, and S_1 = 2½ to 4 inches, we found a perfect match possible. The only difference between 2½ and 4 inches for S_1 was that zero reflected power occurred at 221.4 Mc. with 2½ inches and at 220.7 Mc. at 4 inches. This is undoubtedly due to the fact that the drooping parts, d_1, are slightly longer for the greater spacing.

Having achieved this happy state with tubing for d_1, we then tried it with flat strips of sheet

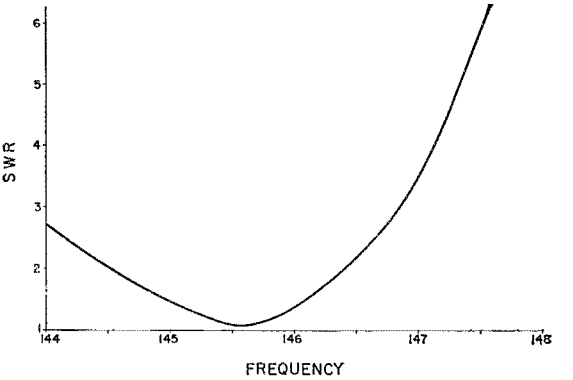


Fig. 2—Curve of s.w.r. for a 2-meter Yagi described in the text.

aluminum. With a $\frac{3}{8} \times \frac{1}{16}$-inch strip, we were able to obtain perfect matching with either $\frac{1}{2}$-inch or $\frac{3}{8}$-inch tubing for d_2, merely by changing the angle between d_2 and d_1. This immediately suggested a simple method of making provision for adjusting, and then fixing the value, once the right droop has been found. We made our d_1 elements with holes drilled at half-inch intervals at the inner ends. The balun had soldering lugs attached to its ends, and these were bolted to the element ends, starting with the first pair of holes and then moving inward if the need indicated. Once the best point is found, the excess of d_1 can be cut off.

How about 144?

The man who is interested in 144-Mc. antennas can relax. Our experience on this band shows that the folded-dipole nomogram works out close to right. Using the same element-diameter combinations as for the two higher bands, we were able to get entirely satisfactory performance. The antenna used for the experiment was a 7-element Yagi on a 10-foot boom. Referring to Fig 1A, the best combination worked out to be as follows:

$d_1 = \frac{1}{8}$ inch, $d_2 = \frac{3}{8}$ inch, and $S = 1\frac{5}{8}$ inch.

The s.w.r. curve of what might be called a "Technician Special" version of this antenna is shown in Fig. 2. Element lengths and spacings are more-or-less standard *Handbook* information, and by lengthening all elements by $\frac{1}{2}$ inch this same design became a "DX" Man's Special," with its area of best matching falling between 144 and 145 Mc. — *W1HDQ*

Voltage Transient Protection for Semiconductor Power Supplies

THE solid-state power supplies of today are very unforgiving devices if the reverse voltage across the silicon diodes is exceeded at any time. Good-bye rectifiers! When one diode in a string shorts the rest soon follow because the peak reverse voltage the string can handle is reduced. Capacitors placed across the individual diodes will reduce the threat from voltage transients, but will by no means provide complete protection.

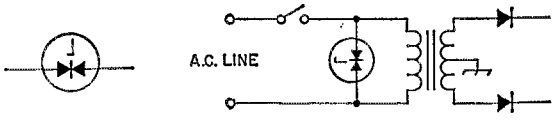


Fig. 1—(A) Circuit diagram symbol of the transient-limiting diode. (B) Proper connection of the diode across the transformer primary.

The voltage transients come from many sources. Simply switching the power supply itself on and off will create a sizeable transient if you are unlucky enough to catch the a.c. at a current maximum, particularly when there is a load on the supply. Most household appliances and motors will add transients to your a.c. line. Another source is arcing across faulty insulators on power poles. When one considers all the potential sources of transients, it becomes immediately apparent that some form of efficient transient protection is required for silicon rectifiers.

The General Electric Company has recently introduced a device, the Thyrector diode,[1] that is a very effective suppressor of line-voltage transients. A specially-treated selenium cell is connected to make use of its reverse characteristic, in much the same way that a Zener diode is used. This cell has a very steep-slope reverse characteristic as compared with a regular power-conversion selenium rectifier. When high-energy pulses are applied to these cells, the total power is the product of the instantaneous voltage and current. The cell has a nonlinear reverse resistance which decreases about logarithmically with increased voltage. This means that the transient pulses never reach a high enough voltage to cause arcing in the cell; the only limitation is the amount of current that can flow through the cell before thermal damage occurs.

For a.c. transient protection the cells are connected back-to-back to clip both the positive-going and negative-going pulses. The basic selenium cell exhibits its Zener characteristic at 25–30 volts. Cells are connected in series for higher voltage limits. The units currently available have limiting levels from 25 to 500 volts, and will handle from 0.75- to 8-amp. pulses of 0.004-second duration.

This sounds good, but being from New England we like to be shown. A transient generator using a spark-coil was set up to deliver voltage pulses of 500 volts peak-to-peak, as shown in Fig. 2A. Then a Thyrector was placed across the circuit, and sure enough, it clipped the pulses to about 340 volts, the peak-to-peak value of the 120-volt a.c. line, as can be seen in Fig. 2B.

The Thyrector diode should be placed directly across the transformer primary of the power transformer, after any switches (Fig. 1B). It may easily be installed in existing supplies, since Thyrectors are similar in size and appearance to paper capacitors and should fit in with no difficulty. — *W1KLK*

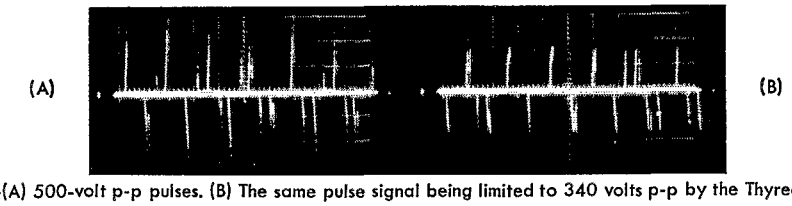


Fig. 2—(A) 500-volt p-p pulses. (B) The same pulse signal being limited to 340 volts p-p by the Thyrector diode.

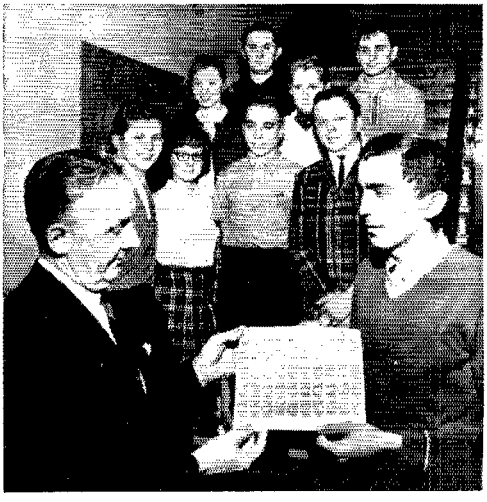
[1] Trade name, property of the General Electric Company.

FEEDBACK

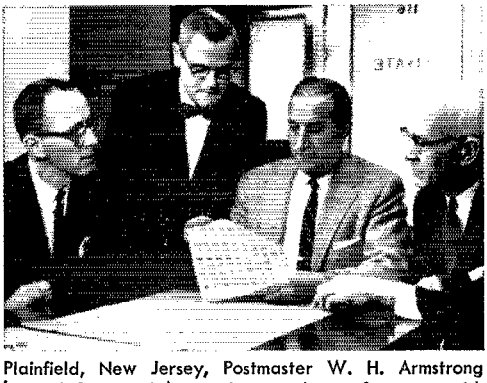
In the article "'Quickie' Orbital Predictions for Oscar III", February 1965 *QST*, the word "west" in the third line from the bottom of the right-hand column, page 14, should be changed to "east". The satellite will have completed fourteen orbits in a little less than 24 hours, which means that its orbit will cross a given parallel before the fixed Earth point on that parallel arrives. The *fifteenth* orbit would cross the parallel 14 degrees to the west of the observer's location.

WHILE the debate may continue as to the beauty of the amateur stamp, it has been a popular issue. First Day sales at Anchorage, Alaska, totalled 837,042 stamps, compared with an average first day sale of 425,000. Business continues brisk, and a few amateurs have experienced difficulty in obtaining the stamps [1], in some localities. Around the country, amateur clubs and ARRL officials responded to a hq. suggestion and set up local "first day" ceremonies for December 16. The pictures presented here take up where we left off in February *QST*. Additionally, we've learned that the following communities observed the occasion, although we do not have usable photographs at copy deadline: Charleston, South Carolina; Chelmsford, Massachusetts; Dallas, Texas; Everett, Washington; Glasgow, Kentucky; Griffin, Georgia; Janesville, Minnesota; Menominee, Michigan and Waseca, Minnesota. QST

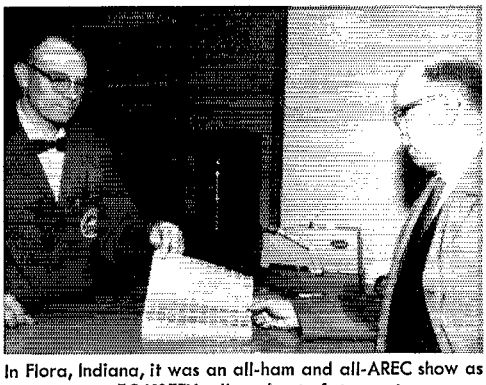
[1] Postal officials in Washington tell us that local post offices are required to order additional copies of a commemorative stamp when requested to do so by patrons. The stamp is expected to remain on the market until June, 1966, unless the total supply is exhausted sooner. We urge that amateurs continue to request the stamps and use them on all routine correspondence.



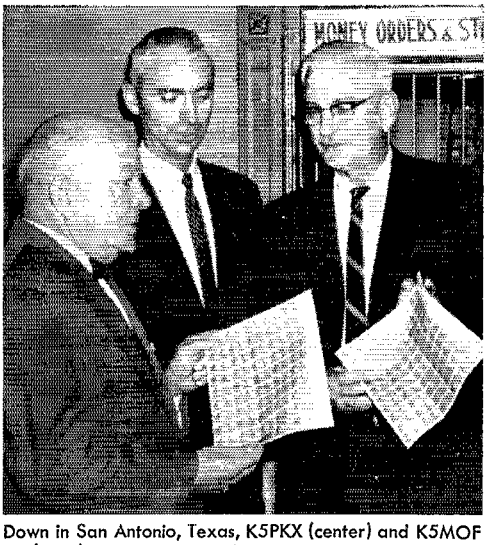
Ursuline Amateur Radio Club members line up while K8ZZS receives stamps from Youngstown, Ohio, Postmaster Chester Bailey. First row: Paul Kuzma, Carol Karsnak, Terry Simko and WA8EXE. Second row: WA8FPB and Jack Sovic. Third row: John Slanina and WA8KIP.



Plainfield, New Jersey, Postmaster W. H. Armstrong (second from right) examines a sheet of stamps with Tri-County Radio Club members WB2APY, K2SPA and W2HNY.



In Flora, Indiana, it was an all-ham and all-AREC show as past EC K9EFY sells a sheet of stamps to present EC WA9CXE.



Down in San Antonio, Texas, K5PKX (center) and K5MOF (right) purchase stamps from Postmaster Dan Quill.

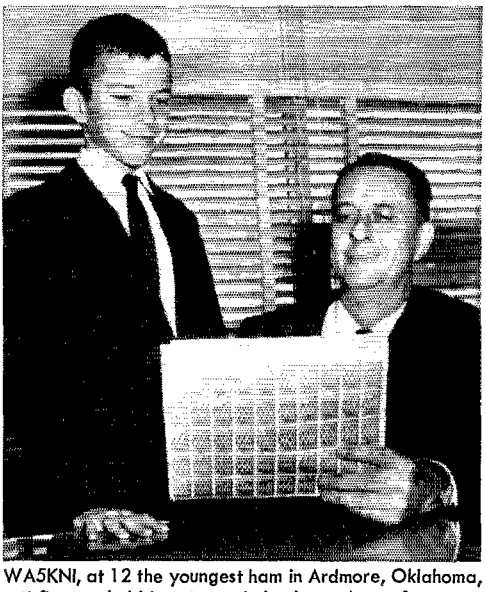
Here are some of the colorful first day covers produced by dealers, together with the official first day cover of the Anchorage Philatelic Society and the Anchorage Amateur Radio Club, at bottom.

The proclamation of Amateur Radio Week in Cleveland, Ohio, was a feature of stamp ceremonies attended by W8UDG, W8CTZ, K8PYT, K8ONA, Postmaster Sundermeier, Mayor Ralph S. Locher (seated) K8LMF and W8BAH.

Maury Amateur Radio Club members pose with Columbia, Tennessee, Postmaster T. Julian Ligett: WA4PZB, W4GGM, WA4OOG, Mr. Ligett, WA4RGQ and WA4FSY.

In Woodbury, New Jersey, Gloucester County Amateur Radio Club members WA2EPB, K2JKA and W2LVW get stamps from postal clerk Alex Carson.

New Orleans Postmaster A. Frank Fairley, right, hands stamps to W5LHS, WA5CST and ARRL Delta Division Director W5LDH.



WA5KNI, at 12 the youngest ham in Ardmore, Oklahoma, satisfies two hobbies at once in buying a sheet of amateur commemoratives from Postmaster Martin Cassity.

Under the auspices of the Mike and Key Club, ceremonies were held in Nashua, New Hampshire with W1CTW, Postmaster Evelyn C. Earley, W1RCC and SCM W1SWX participating.

A proclamation of Amateur Radio Week by Mayor Joseph A. Vrabel highlighted the stamp ceremonies in Campbell, Ohio. The crowd comprises WA8EXE, Postmaster John Galida, Campbell *Journal* publisher Mrs. Nadyne, WA8FQK, W8PWH, WA8FHP, the Mayor and W8DWE.

In New Brunswick, New Jersey, Postmaster Vincent R. Loftus, at right, spoke briefly on the important and helpful contributions of hams in time of disaster. Others present were (from left) WA2BLL, W2IAT, WN2MMN, W2CTX, WB2MMM and Assistant Postmaster John E. Coglionese.

Postal clerks Elmer Loesch and John Garner sell stamps to W3SAY (right) while Nittany Amateur Radio Club members W3NEM and K3OOU look on at State College, Pennsylvania.

Dayton, Ohio, Postmaster Hugh Albright distributes stamps to Dayton Amateur Radio Association president K8BSC, K8UZ and W8DG. The club also had on-the-scene TV coverage of the ceremonies.

Fifty Years of ARRL

In response to requests from a number of *QST* readers, we are preparing a 152-page reprint of the gold-edged historical articles which appeared in the 1964 issues of *QST*. The title will be *Fifty Years of ARRL*. Covering the highlights of ARRL and amateur radio history during the fifty years from 1914 to 1964, this book will be a companion piece to the classic *200 Meters and Down*. It will be priced at one dollar postpaid, and will be available only from ARRL Hq. It will be ready shortly after this issue of *QST* appears, and we're ready for your orders now.

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

Like Son — Like Mother

BEHIND every successful man, there's a good YL! How many times have you heard that said? However, YLs agree that there comes a time when turnabout is only fair play. To give credit where it's due, there's been many an OM who has provided the inspiration which has opened up a new world in amateur radio for a large number of YLs.

This month tribute is being paid to two teen-aged sons whose wholehearted interest in ham radio prompted their mothers to ask — "Do you think that I could learn to do that?" No sooner had they asked, than courses of action were taken that resulted in the addition of two fine XYL operators to the ham fraternity.

Bill Craig, K1WXZ and ex-WA2SKT, of Stamford, Vermont provided the inspiration that in a few months saw the addition of the call letters K1WZY, ex-WA2VEL, to his mother's name. As a Cub Scout, Bill built a simple regenerative type receiver with the result that both he and his mother, Helen, became avid SWLs. By age 13, Bill knew the code but it was the amateur radio club at Tabor Academy in Marion, Mass. that furnished the needed boost for him to get his Novice license at age 15.

Back home from school, it wasn't long before Bill had his first simple rig on the air. As he worked new states, Helen provided the best kind of audience as an enthralled onlooker — but not for long. From the moment his mother asked if he thought she too could learn, Bill was an eager teacher. Helen was ready to try out her first CQ as a new Novice licensee within a few weeks of having asked the question. Three and a half months from the day when she didn't know a dit from a dah, Helen found herself shivering in the FCC office at N.Y.C. Since a school holiday provided a fine chance for Bill to take his General exam, he had convinced Helen to also try. Both passed, making it a memorable occasion.

Now a sophomore majoring in electronic engineering at the University of Vt., Bill's chances to pursue his many building projects of radio gear or to operate are very limited. Helen, meanwhile, has become a very fine c.w. operator who enjoys ragchewing, holds an ORS certificate for traffic handling, is nearing DXCC and is a great fan. Look for her first on c.w., although she can also operate s.s.b. and a.m. anywhere from 80 through 10 meters. And to think, Bill had to force her to send her first CQ as a Novice!

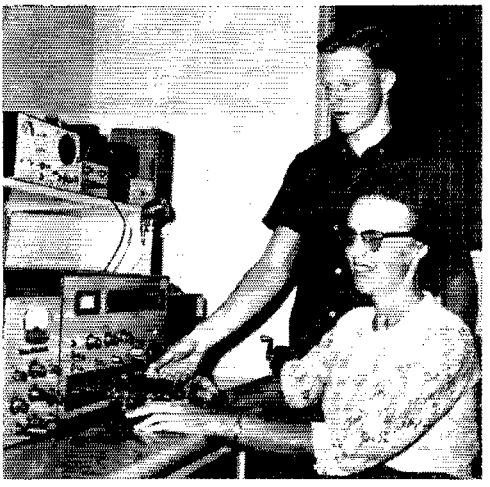
* YL Editor, *QST*. Please send all news notes to K1IJV's home address: 139 Cooley St., Springfield, Mass.

Helen, K1WZY, and her son Bill, K1WZX.

WØSWK, Dorothy Baldwin's amateur radio activities were recently the subject of a Longmont, Colo. newspaper article. Her radio station made it possible for 16-year old Elizabeth Blum to contact her father in Durango, Mexico, also a ham operator. Their first contact took place at Christmas-time and since Elizabeth is attending school in Oregon, 1200 miles from home, she found the gap narrowed considerably, thanks to WØSWK.

On the Pacific coast in Paradise, California, Marie Welch, WB6DNW, was also inspired to go on and become the only woman ham radio operator in her community as a result of her son's interests. Howard, WA6SES, talked about radio theory from age 11 on to the extent that radio terminology became second nature for Marie. When Howard passed his Novice exam in 1961 at 16, Marie's interest soared and Howard became her very excellent teacher. Her code speed climbed from zero to 15 w.p.m. in just two months under his guidance. By 1962, Howard had passed his General exam, had taught his mother how to build some of her own radio gear and aided in providing the necessary background which enabled her to pass her General exam in 1963.

In a recent newspaper article, *The Sacramento Bee* wrote that Marie's amateur radio activities recently took on a heroine connotation to at least 16 persons in Siskiyou County, and to probably many others who were victims of the recent devastating floods in Northern California and Oregon. Because of her assistance, she was partly responsible for saving 16 persons, one a 6 week old child, who were stranded near Somesbar for more than two weeks with very little food. For days Marie had been assisting an emergency net by relaying messages for victims of the flooded areas. On January 7th, an Oregon station contacted her saying a faint call was being heard there for help, but the distress signal was unable to hear Oregon answering. Marie was asked to relay recognition to the distress signal that he was being heard. When contacted, he said 16 persons had been stranded there on a ranch for two weeks subsisting on deer meat and coffee and unable to contact rescuers. Marie notified the base of rescue operations requesting help for the stranded residents and food and other supplies reached them via helicopter in two days.



Marie, WB6DNW, and her son Howard, WA6SES.

Now 18, Howard's studies and experimental work with designing his own printed circuit boards leave him little operating time. Marie has derived great pleasure from operating mostly 80-meter c.w. to date. With the advent of a new TA-33 beam and tower soon to be added, she eagerly looks forward to hunting DX where she especially hopes to QSO many Danish stations, since she also speaks fluent Danish.

The enthusiasm and interest shown by Helen and Marie in their son's activities produced this fine like son — like mother result. Bill and Howard are but two of the many good OMs behind YLs who have become successful as amateur radio operators.

The Happily Married Couple

Mayaguez, Puerto Rico was recently the scene of a banquet at which honored guests, Maria, KP4WT, and Joaquin Fernandez, KP4BMZ, were elected The Happily Married Couple of Mayaguez by the Family Institute. Both are members of the Puerto Rico Amateur Radio Club and Maria is President of the Mayaguez District Club.

Ellen, WA4FJF, and Mark and Karen Ackerman, her children, are all working together in maintaining her radio station in Marion, Ala. while her OM, Dick, WA4FIJ, is serving in Viet Nam. That they have done well, Ellen recently showed with her fine score in the YLAP when she won the Corcoran Award. This active XYL is NCS of the West Fla. Phone Net, Ala. SSB Net and YL Open House. Both Ellen and Dick were the recent recipients of Florida Skip's award for meritorious service and an ARRL Public Service Award for their help during Hurricane Dora.

Maria is known to many radio amateurs as the grandmother of KP4 land and proudly reports having 15 grandchildren. Her numerous radio activities include membership in the Antilles Emergency Weather Net, Civil Defense, Races, Mars and the Civil Air Patrol. Her enthusiasm does not end there as she has also received BPL and Public Service awards in the past for her assistance in traffic handling. Maria's traffic totalled 4,077 messages handled in 1964 and she hopes that she can assist even more in 1965. Much of her traffic keeps students from the nearby university in closer touch with their families and in adding to their happiness, Maria has found it has added to her own.

Congratulations to The Happily Married Couple of Mayaguez. (*Continued on page 162*)

Mayaguez's Happily Married Couple— KP4WT and KP4BMZ.

CONDUCTED BY SAM HARRIS,* W1FZJ

Most of the problems encountered in trying to present a factual picture of v.h.f. progress in "The World Above 50 Mc." are a direct result of poor communication. For some obscure reason the people who contribute most to the advancement of the art contribute the least to the information channels. Some very useful devices are developed which the majority of us never hear about. One example is the 420-Mc. dipper we had in last month's column. W6VSV hacked the first one of these things together and passed the details along to all his local buddies. When K6JC built his, he was so happy with the performance that he finally sent the info to me. Incidentally, he credited it to Bob (W6VSV) but in the process of redrawing the schematic the credit was lost. The point is that we almost lost the whole thing. When we get operational news we condense it and use it right up to the deadline. (Around the middle of the month.) Any news not used by deadline is usually scrapped as it generally is outdated by next deadline. Information on hardware is another story. Good pieces of equipment are always in season. Of course, the best procedure is to write an article. For example, "Beer Can Baluns" by K6HCP and WA6GYD. (Feb. *QST*). Anyone who has done this knows that it takes time and effort which doesn't get anything accomplished on the next project. It is easier to sketch a circuit and send it to your buddies. This is the easy way out but it generally limits the distribution to a privileged few. It does provide a wealth of production engineering and is probably the best move toward a finished product that has had all the bugs worked out. The problem is the next step. After it is accepted by builders who feel that it was a worthwhile project someone has to keep the ball rolling. If you don't want to write an article the least you can do is to follow K6JC's example. Send it in as an appendage to your OES report. Please! Put it on a separate sheet (s) so it can be routed properly without disrupting the paper routing of your regular monthly report. While we have the OES report on the table, remember: If your report starts a week late it reaches me too late to be included in the current column.

The information on the 420-Mc. dipper and the beer can balun would have reached me much sooner if I had been aware of the weekly v.h.f. roundtable which meets Sunday evenings (0500 GMT Monday) on 3807 plus or minus, depending on QRM. This informal get-together provides an information channel for those intrepid scatter enthusiasts on the west coast. We chanced across the net and were attracted by a discussion of the swampgator. Investigation turned up K7OSM, W6NGN, W6GDO, WA6TXH, K6SDZ, W6CDB. We found the net an hour after commencement and missed some of the early leavers. W3SDZ and W1DDF/2 also joined the discussion. We learned that if you want to know what people are doing it sure pays to talk to them.

VHF Wingding

A gathering of the clan at the Harvard, Massachusetts town hall was attended by VHFers from far and near. Stellar attraction was Loren Parks, K7AAD, of Beaverton, Oregon. Among other things discussed was the preference rating of commercial v.h.f. antennas and converters. For many years a west coast group have held an antenna-measuring competition. The results of these measurements make it obvious that the so called "gain claims" of many manufacturers are subject to some disbelief. It is proposed to add converter and preamplifier measurements to the measuring competitions this year. This year's west coast competition will be held in conjunction with the National ARRL Convention July 2–5 in San Jose, California. Plans were formulated for an east coast competition at the Swampscott ARRL New England Division Convention, April 24–25.

Alaska

Two hams in Alaska have been more than active on two meters since it was discovered that their signals could be satisfactorily bounced off Mount McKinley, North America's highest peak. The operators, Sarge Robison, KL7CQS at Anchorage and Chuck, KL7ECO at Fairbanks have been successful in keeping schedules since November 26, 1964. Two meter teletype has been established, too. (Who sez we need the low frequencies for this type of work?) KL7CQS is using a Gonset 3 to a Gonset 50-watt linear and a 20-element spiralray up about 60 feet. Receiver is a Collins R-388 with Criterion converter. KL7ECO uses a Seneca transmitter, BC342 receiver with a home-brew converter and beam.

KL7CQS, KL7AEQ, KL7DJI and KL7BKB are presently building or have on the air the two meter k.w. amplifier as described in February 1964 *QST*. KL7CDG and KØWFC/KL7 have Collins 62S-1 s.s.b. for 6 and 2 meters. KL7ECO has a 10B s.s.b. exciter and is going on 6 and 2 s.s.b. soon. KL7CLH has his k.w. fired up on two meters. KL7BET put his RTTY gear on the air at KL7ECO's and had two way QSOs via RTTY. KL7ENZ is readying an amplifier for 144 Mc.

144 Mc. and Up

Just to be different and see if we can confuse our readers a bit, think we'll start this portion of the column with the highest frequencies mentioned in

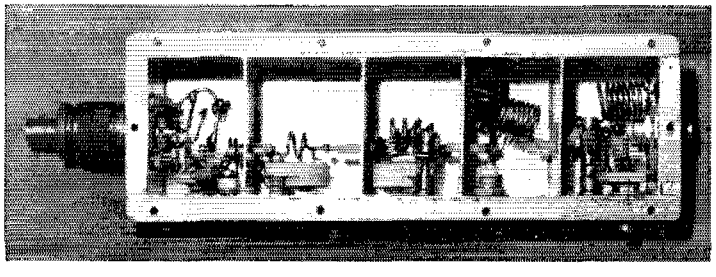
* P.O. Box 334, Medfield, Mass.

reports received. From New Hampshire W1QKA reports that W1DUB is presently reworking an SPR-2 receiver front end for 2400 Mc. and that he (W1QKA) now has a 2400 Mc. crystal mixer cavity and 30 Mc. i.f. preamp under construction. Rolly is also experimenting with an APG-5 cavity for 2400 Mc. pulsed oscillator gear and is modifying an APX-6 for 1215 Mc. Looks like the New Hampshire boys really mean it. Out in Ohio K8ZES and W8CSW hope to be working each other come summertime on 1296 Mc. Chet, W8CSW, is all set both transmitting and receiving and Sid, K8ZES, should be ready to go come warm weather. We learn from the VHF High Banders Inc. that the *Columbus Dispatch* had a four-page write-up on the ATV work of W8TYY and W8RRJ. Nice going, fellas. Glad to hear that your hard work is getting some well-earned publicity and that the general public may soon know for sure that the hams are working with 'em and not agin 'em. Another ATV report received from Ohio was from WA8KPN who sez: "Continued mutual exchange of information regarding ATV and K3VPI. At this stage in our development, he is concentrating on the transmitting end and we are working on developing super receive abilities. We are accumulating material on converters, antennas, signal boosters and amplifiers." Ralph goes on to say that K3WJT has also become interested in the project, the result of eavesdropping on the 50 Mc. (?) contacts between WA8KPN and K3VPI, and will probably join the ATV enthusiasts. Seems that Ohio is turning out to be a hotbed of ATV work cause we also hear that W8MVE in Republic has his vidicon set to go and is madly working to complete the rest of the gear. Michigan stations doing ATV work are also increasing. WA8DXW in Marshall has completed his flying-spot scanner and starting on the next step. John sez he's still looking for info on the ARC-27/T-178 and the T9/APQ-2, and that he needs a schematic of an amplifier using 2 4X150A's on 432 Mc. Never let it be said that Iowa isn't active in all modes of v.h.f. and u.h.f. work. WØIKQ at Cedar Rapids writes that he has had ATV on the air sporadically for a year with no interest at all locally. "So far have 85 watts input to 5894 linear, grid modulated on 438.85 Mc. to 32 element colinear. Two live cameras, one homebrew the other a rebuilt LTV leftover. Interlaced sync rack is homebrew as well as converter, monitor, mixer-fader and other miscellaneous gear. Sound is on 443.35 f.m. Also have 60 watts input 2C39 on 432.006 a.m. to same antenna. Looking and listening for QSOs." Stay with it Bob and one day maybe ———!! Who knows what you may see and hear! New York is also represented this month with a report on ATV. WB2OSA tells us that his station is now using an intercarrier system, the video carrier is at 444.625 Mc. and the audio (f.m.) at 449.125 Mc. The transmitters operate into separate antennas and are capable of 90 watts input each. Karl has recently completed modification of an APX-6 for 1215 Mc. and it will also operate off the car battery. The antenna, a helical, is still under construction.

Activity on 420 Mc. is steadily growing and enthusiasts are constantly building equipment. WA0FLL writes that he has completed a 420-Mc.-transceiver (from the ARRL *Handbook*) and from the tone of his report seems like he's working on more of these units. In Monroe, Michigan, K8WXO writes that some 16 rigs are expected to be completed and on the air by the end of February on 433.0 Mc. Grat also mentioned that he operates at 432.9 Mc. and has regular contacts with K8TJP in Trenton. W8RZZ and K8ENY in Petersburg, Michigan are also active on 432 Mc. At Detroit W8WNX reports conditions poor on the 420 Mc.-band although he still maintains schedules with W8JLQ in Toledo, Ohio. Larry sez signals are down as much as 60 db. (?) from summer signals. More from Michigan: W8PT at Watervliet sez that 432 Mc.-signals across Lake Michigan often have echo in the wintertime as if taking multiple path. Jack sez he's still working on a 4CX250B final for 432 Mc. but is at the spot where he'll have to build a dipper. Rest of the rig is working great.

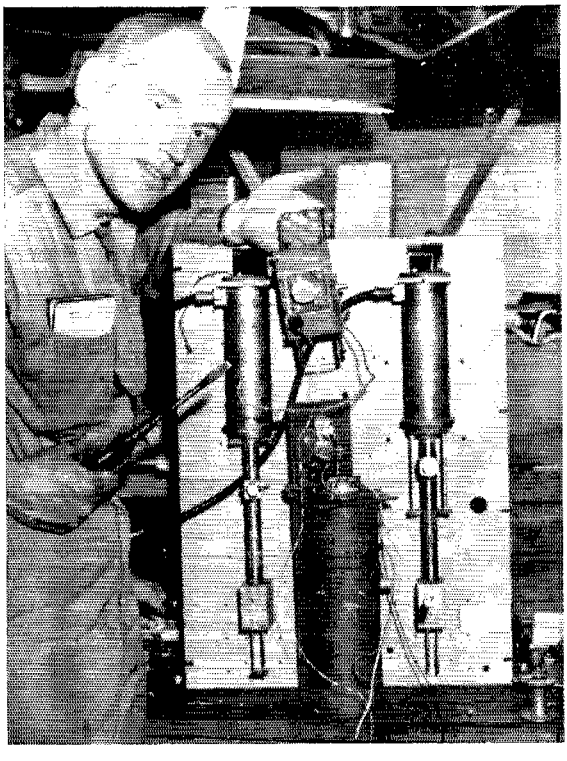
El Paso, Texas, is well represented this month in 432 Mc. news. Seems that WA5KGQ and K5QPV established contact on that band on February 6 for what is apparently the first 432 Mc. contact in that area. The QSO points up interest in u.h.f. work and should serve to stimulate others along the same lines. WA5GDZ worked fast when he heard that Sid and Hank were in QSO and built a converter so he could eavesdrop. W5UJF in Alamogordo, New Mexico is interested in 432 Mc. also, but it does take two to tango. Maybe now that it has been done others in Al's area will also take note and start building. Congratulations to the sparkplugs of this activity in 5 land, WA5KGQ and K5QPV. Howard, K4QIF, at Salisbury, North Carolina, sez he is finally getting favorable results with his 432 Mc. paramp. Still has a few problems but expects to have 'em straightened out shortly. Howie has recently built another tube preamp for 432 using a 6229 which out performs his 416B by a couple of db. Down Florida way WA4EVQ has taken to 432 Mc. and is starting out by building a 432 Mc.-transceiver. *QST* type, sez Bill; and in New Hampshire W1QKA is still operating on 432 every Wednesday and Friday night. The night of January 6 was slightly unusual sez Rolly, in that the radar interference was unusually strong, peaking S8, and K2CBA was coming through averaging S3 and peaking S5.

Now, as to 220 Mc., activity is not quite so great as on 420 but it too is increasing in slightly smaller leaps and bounds. Sam Popkin, K2NDR sez he



Multiplier in use at QTH of W4BCL, St. Simon's Island, Georgia. 144 Mc. to 432 Mc. with 15 watts output at 432 Mc.

has been off the air for the past two years, since moving into his new QTH, but expects his activity to increase now, mostly on 220 Mc. He's running 100 watts on 220 and 144 Mc. and is looking for DX skeds on both bands. Sam's problem is that he works second shift but he will be looking for skeds during "daylight or wee hours". At Chevy Chase, Maryland, K3DNO is working on a helix for 220 Mc. use. This antenna will be fixed on the New Jersey coast so you 220 Mc. fellas in the New Jersey, New York area should be listening for Maryland. Ken is also converting an ARR-2 for use as a 220 Mc. converter. K5TQP at Tijeras, New Mexico sez: "Completed checkout of new transmitter (designed and mostly built by WØEYE) using single 4CX250F; operated and keyed fb. Now to build antenna and hope to run first on the air tests with WØEYE starting February 18th or 25th." Hope you've had good luck Fred. 220 can use more good activity, good luck, good results and good reporting. Thanks! W5MJW in El Paso, Texas, has had a siege of bad luck, two trips to the hospital, XYL ill, and then that well known ill wind came along and took down his 220 and 144 Mc. antennas. This put the two meter repeater out of service for the El Paso, Las Cruces VHFer's. An unusual report received from Jack, W8PT, concerning 220 Mc. "Test schedules with WØOFY in Cedar Rapids, Iowa (275 miles) show some signal always present on 220 Mc. with only 90 watts at both ends. His s.s.b. very readable most nights. Schedule ended when a field mouse got in my power supply and burned up a string of silicon diodes. All repaired and back on the air. Electrocuted mouse buried." With proper ceremony, we hope. 220 Mc. shows great promise in southern Ohio with WA8NZS and WA8KJJ of Galion being very close to putting their transmitters on the air, and about six stations either on or nearly on within a 40 mile radius of Galion.



W1TQZ in the process of rebuilding and condensing his 100-watt 1296 Mc. transmitter.

The usual cold weather activity for vhfers is getting its share of attention from Sam King, W3BDP, at Wilmington, Delaware. Sam sez the radio shack at the new QTH is too cold to be operating in so he's spending his time at the kitchen table working on the new two-meter k.w. final. Antenna is only about 15 feet high at the present time but he did hear K2IEJ working W8KAY on sked the night of January 3rd. K3OBU, also in Wilmington, is hoping to be on 144 Mc. s.s.b. in a few months and is working toward that goal. Joe has been sending letters hither and thither making skeds for Oscar III. He's also been keeping tropo skeds with W4WNH in Kentucky and W8BKI in West Virginia with only a few short weak signals heard so far. At Lemont, Pennsylvania, K3CFA reports good ground wave on 144 Mc. on January 3, 6, 13, 19 and 25. WA4EVQ notes that on January 25 he heard W4MMX operating upper sideband on 145.125 with S6 signal. Bill also heard K4PBP on the same evening. Conditions have been quite poor (during January) for K4QIF in North Carolina although he did work a new state, Missouri (WØLFE) on the 3rd via m.s. Joel sez the shower surpassed expectations there and was much better than the December Geminids. He also passes on the information that W4VHH worked Arkansas and Wisconsin for two new states on 144 Mc. during the January shower. From Tennessee W4WQZ writes that the Bristol C.D. Net on 145.4 has increased local activity on 144 Mc. from 0 to 12-15 stations. The net meets Tuesday nights at 2000 EST with stations checking in anywhere from 144.1 to 146.9 but net control is usually at 145.4. K5TQP and K5CAY (New Mexico and Oklahoma) are starting skeds every Thursday night at 2000 MST on two meters. Good luck, fellas. Fred tells us that tropo conditions were above normal on the night of February 4th when he received best signals ever received from WØEYE in Boulder, Colorado and W5YXG in El Paso, Texas. Signals from K7NII at Scottsdale, Arizona were also better than normal. K6QKL/KH6 reports a fair amount of local activity in Honolulu on 147.0 Mc. from 0600 to 0800Z; and also that KH6EEM puts out a mighty strong signal on two meters.

Wyoming is once again represented in reports received for 144 Mc. work. Wayne Hale, K7HDY sent us the following information. "At present there are about 10 stations on two, centered around 144.12 Mc. We meet every Monday evening at 2000 MST. Rigs vary from an excellent station using a 6N2, through homebrew and three SCR 522's. Everyone is using beams with horizontal polarization. Good coverage of the Casper area is achieved although there is no mobile activity at present. I (K7HDY) have been pushing a small two-meter transceiver for emergency use but so far nothing has been decided. Several stations have shown interest in s.s.b. and increasing power. Due to severe winds and snow conditions, antennas do not reach large dimensions, making out of state contacts rather rare." Thanks for the information Wayne, keep it coming. At Kalamazoo, Michigan, W8CVQ observes that signals on 144 Mc. were good during January but range normal for the season. Walt sez that W9YOI checks into the net rather regularly but only a few 9s are heard. From Watervliet W8PT sez that tropo bending has

been slightly above normal on six days during January but no openings and no aurora, so no news. K8YWF at Tiffin, Ohio reports fair conditions on the morning of January 3rd when he worked K8BWG at Manatou Beach, Michigan, and on the evening of the 10th when he worked a number of stations in northeastern Ohio. Jerry also tells us that W8PXU and W8RSK have been working RTTY on 144 Mc. for several weeks. K8RXD comments that the January VHF Contest was the best he has worked in five years. "Activity was unbelievable," says Dean. He also notes that skeds are being kept with K4QIF on 144 Mc. every weekend at 0310 GMT. At Chicago W9RSV has just finished installing FRXD typing reperforator and is now completely equipped for RTTY on both six and two meters. WN9MSD sez he is still working on his two-meter amplifier and has recently started construction of a J-slot antenna. Joe's antenna was badly bent by the wind so 'til the new antenna is completed he is using a two-meter vertical. WA9BYF is another of the boys playing with RTTY. Don is experimenting with a Model 15 Teletype with converter for six and two meters. K9WIF reports that work on his 80-element moonbounce antenna for 144 Mc. is going slow 'cause of the bad weather. However, Walt has observed some good tropo condition on 144 Mc., particularly on the night of January 6th when he worked stations in Pennsylvania, North Dakota, Kansas and Nebraska. "Sometimes no one is on the air to take advantage of good conditions." So sez Larry, KØJWN, and he's so-oo-o right! While listening to his 144 Mc. mobile receiver on January 21st, Larry heard WØHAJ in Kansas City, Kansas, about 60 miles away. Pretty good for two meters!

A report on the Quadrantids m.s. skeds kept by WØENC at Rapid City, South Dakota, makes very interesting reading. Bob made five QSOs out of ten skeds, and three of the five were new states for him on 144 Mc. K2GUG in New York, K4SJF in Georgia and W9OII in Wisconsin were the lucky ones for WØENC and these contacts brought his states worked on 144 Mc. up to 28. And that ain't hay from Rapid City, South Dakota!

In our November 1964 column we incorrectly stated that Ray, WA2ZPD had worked three new states on 50 Mc. The error in this statement was that the three new states were worked on 144 Mc. and not 50 Mc. Our apologies Ray and also our congratulations on working into Pennsylvania, Virginia and ? on the night of September 7. (Sorry Ray, you didn't list that third one.)

Out Nevada way K7ICW worked W6NLZ on 2-way s.s.b. January 3rd for his first out of state 2-way QSO on 144 Mc. The QSO lasted about half an hour. Al also heard W6PJB on s.s.b. and WA6NNF on c.w. Later the same morning he worked WØBFB in Mitchellville, Iowa via m.s. On January 10th, 17th and 24th he again worked W6NLZ plus W6YVO and K6HMS and K6GCD; however, these were all c.w. W4WNH at Germantown, Kentucky, reports 144 Mc. completely dead during January except for the Quadrantids. Shelby had m.s. skeds with stations in Florida, Delaware and Arizona and heard pings on all except Delaware. No two way contacts though. W8KAY, W8SDJ and K4QIF are heard nightly at his Germantown QTH.

Well known VHFer, W4BCL, writes that tune up of his 432-Mc. rig was completed on February 8 and WA4JKY at Jacksonville, Florida heard same about 2000 EST that same evening. On the 9th contact was made with W4UWH at Auburndale, a 240-mile airline path to south central Florida; and contact with WA4JKY was also made on the 9th. W4UWH and W4BCL worked 432 to 432, 432 to 6 and 2 meters crossband, and these contacts should surely have stirred up interest in the Georgia/Florida areas. Pappy, W4BCL, sez he expects to be running higher power soon on 432 Mc.

50 Mc. Scatter Skeds

Saturdays and Sundays between the hours of 7 to 9 A.M. PST W7CNK, K6HCP, K6RIG, K6JC, W6GDO, W6NGN, W6TXH, WA6QQI and others maintain a c.w./s.s.b. scatter schedule. To avoid confusion and QRM the south end of the path transmits the first 2½ minutes and the north end transmits on the second 2½ minute periods. C.w. frequencies are centered around 50.030 Mc. S.s.b. is on 50.107 Mc.

Saturday and Sunday 0900 to 0915 PST W6GDO on 50.030 to WAØIQN at 50.035 in Boulder, Colorado. West end takes the first 2½ minutes.

50 Mc.

New Hampshire is represented this month by K1FXM who writes that 50 Mc. activity is nothing out of the ordinary. Dave is wishing that more people were active during the week as he seems to hear only W1ALE and a few local people on weekdays. K3QCQ reports that the month of January brought above average groundwave on January 1, 4, 5, and 6. Bill sez that during the month of January he operated only c.w. every Saturday and Sunday morning with the result that he had just two contacts for the entire month. However, progress is being made on his s.s.b. rig and hopes to be active via that mode by March. Down Auburn, Alabama way K4FJZ tells us that there are about a dozen stations (local) active on 50 Mc. Extended ground wave reaching about 450 miles appeared on January 25 for contacts into Sarasota, Florida, etc., from John's QTH. At Miami WA4TZC reports a short band opening into 8 land on January 23rd when he worked K8MMM, WA8AVO and WA8DFA. A fast word from Vergil, WA4OMH, alerts us to the fact that W4TPB is running code practice on 50.4, Monday and Thursday evenings from 2200 to 2230 for those who would like to take advantage of it. Out Tennessee way WA4OYW sez that nothing much is doing on 50 Mc. in that area except a little meteor scatter on Sunday mornings when K8MMM is frequently heard. However on February 3rd K3LOM was heard along with several others and both a.m. and s.s.b. were heard around 50.1 and 50.15. However, nothing discernible, other than K3LOM. Cal, W4UIS reports a band opening into Florida on January 23rd which lasted from 2200 to 2400 EST.

The El Paso, Texas, *VHF-UHF Spectrum* gives out the news that WA4TNR is on six-meter RTTY and is looking for other equipped stations. W5MJW has a printer and is building a converter. WA5FNV has a printer and will soon be RTTY also. Look for these stations on or near 50.380 Mc.

In Lorain, Ohio, WA8KRE is looking for c.w. skeds on 50 Mc. into West Virginia; and at Evart, Michigan WA8FTA reports openings on January 3rd, 10th and 24th but doesn't mention what he heard. Once again Illinois is represented in the 50 Mc. column by KL7EBB/9 at Mundelein. Loren says there's not much doing, if anything, in the way of skip sessions.

From Minitonas, Manitoba, via VE4RE we hear that 50 Mc. was open to his area on January 10th

(Continued on page 160)

OSCAR III – DATA REPORTING FORM

CALL	NAME	STREET ADDRESS	CITY	STATE OR COUNTRY
1–6	7–21	22–41	42–56	57–63

USA ZIP CODE	YOUR LATITUDE AND LONGITUDE	NOTE: *NUMBERS 1–78 USED FOR RTTY–COMPUTER. WRITE PROJECT OSCAR HEADQUARTERS FOR SPECIAL RTTY BULLETIN.*
64–68	69–78	

ORBIT NUMBER	MONTH	DAY	FIRST HEARD		LAST HEARD		TIME OF CLOSEST APPROACH			TELEMETRY DATA				PARTICIPATION CODE									
			MIN.	SEC.	MIN.	SEC.	HR.	MIN.	SEC.	Db	T1	T2	V	A	B	C	D	E	F	G	H	I	J	K
7 8 9	10 11	12 13	14 15	16 17	18 19	20 21	22 23	24 25	26 27	28 29	30 31	32 33	34 35	36 37	38 39	40	41	42	43	44	45	46	47	48	49

NOTES:

1 – LATITUDE AND LONGITUDE TO BE GIVEN IN DEGREES AND TENTHS OF DEGREES, (I.E. : 40.2 DEGREES).
2 – ALL TIMES AND DATES TO BE GIVEN IN GMT.
3 – "HOURS" FIGURE FOR FIRST AND LAST HEARD TIMES IS OMITTED TO SAVE SPACE. USE HOURS FIGURE IN CLOSEST APPROACH COLUMN.
4 – SIGNAL LEVEL SHOULD BE DB OVER AMBIENT NOISE, NOT S-METER READING.
5 – Db, T1, T2 AND V TO BE DERIVED FROM TELEMETRY READINGS AND SHOULD BE REDUCED RESULTS, NOT TELEMETRY READINGS.
6 – REPORT TYPE OF DATA RECORDED IN PARTICIPATION COLUMNS FOR EACH ORBIT, USING CODE TO RIGHT. GIVE DETAILS ON SEPARATE SHEET.

PARTICIPATION CODE

A – ANTENNA HEADING DATA
B – RANGE/DISTANCE MEASUREMENTS
C – COMMUNICATION THRU OSCAR III
D – DOPPLER MEASUREMENTS
E – LISTED CALLS HEARD THROUGH OSCAR III
F – ANTENNA POLARIZATION TESTS.
G – RECEIVING HI-SPEED RTTY
H – RECEIVING HI-SPEED CW
I – RECEIVING SLOW SCAN TV
J – SPECIAL – NOT LISTED
K – UNUSUAL EVENT NOTED

Oscar III went into orbit on March 9 at 1830Z. If you are one of ARRL's OES or if you have participated in previous Oscar exercises, you will have already received copies of the above Data Reporting Form. If you are now listening to Oscar III use a facsimile of this form, preferably on an 8½ × 11 sheet, to report your observations to Project Oscar, Foothill College, Los Altos, Calif. Note that data is arranged so that it may be easily transposed to IBM computer cards for easy processing. Unknown data (orbit number, for example) should be left blank. Observe carefully the instructions contained in Notes 1 through 6. Listen for W6EE and Oscar III prediction bulletins as follows: s.s.b. on the hour (3810, 7205, 14,300); c.w. at quarter past the hour (3507.5, 7015, 14,030); RTTY on the half-hour (3620, 7040, 14,080). See the articles in February and March *QST* for further details on how to use Oscar III. And report what you hear or do!

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

When:

With all due respect to our hard corps of old-timers, it's becoming easier to conclude that amateur radio's DX men are growing younger. Not individually, of course, but collectively on average. If this is true, there are other more nebulous conclusions to jump at. Maybe the modern kid is smarter, or tougher, or more adventurous and competitive, or something.

We were quite willing to let our meditations on this trend go at that, but we recently came across an essay in the Chicago *Daily News* that further illuminates the matter. Writer Donald J. Henahan convinces us that this tendency toward youth, an inevitable consequence of the population explosion, is universal. That's why cartoon and monster kiddy shows are gobbling up TV, and why fewer and fewer BC stations hold out against the guitar and bongo beat. In the interests of solvency youth *will* be served.

"A Ford Foundation study at Harvard in 1957," says Mr. Henahan, "showed that children's allowances had tripled in 10 years and that 48 per cent of the nation's wealth already was concentrated in the hands of citizens under age 15. The importance of the Harvard study was obscured at the time by the faulty conclusion drawn in the report: that rich people were getting younger.

"Working under a grant from the Rubicon Die Casting Foundation, in cooperation with the President's Committee on Art Shrinkage in an Expanding Economy, the Institute has brought together two significant previous surveys. The federal Bureau of Population deduced some time ago that the nation was headed into a period of Population Explosion. Working independently, Kahn-Mann Inc., Cultural Consultants, came to the conclusion that a new factor was operating in our artistic economy: the Retrogressive Aging Effect.

"The American population is growing at a startling rate, while also getting increasingly younger each year. The Kahn-Mann study pointed out that by sociometric reckoning some 84.3 per cent of the nation will be under 40 years old by 1970. By 1984, more than 90.2 per cent will be under 20! Feeding these figures into RCA's new Parabolic Parameter Projector (pat. pend.), Institute experts discover that by 2000 A.D., 99.4 per cent of the 800 billion living Americans will be under 5 years of age, and getting younger every minute. Even without mathematical training, one can figure out that within a few years after the turn of the century there will be no one around at all."

Ergo and eureka, fellows — *sic transit* QRM.

*7862-B West Lawrence Ave., Chicago, Ill. 60656

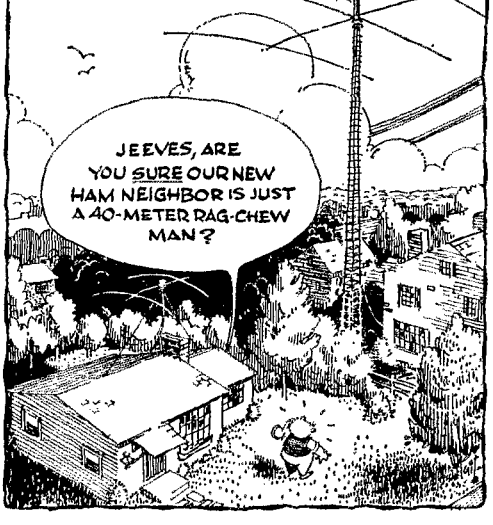
What:

For a lemon, not bad. Not bad at all! We've just nursed the annual ARRL DX Competition through its worst short-wave propagation period since 1954, probably the punkest we'll see again till '76. Don't neglect to file your Test results, sweet or sour, with ARRL on or before the 24th of this month. . . . Time to take one of our more roundabout DX rambles, so let's hop aboard the Bandwagon and do some draggin'. . . .

160 c.w. habitués, naturally, like conditions just the way they are. The less sunspots the better. **Ws** 1BB 1ECH 9PNE, **Ks** 5JVF 8BFH and **WA2UOO** report 1.8-Mc. action by one **CO2QR, DL1FF, EI9J**, a logful of **Gs, GI3s** PDN SMO, **GMs** 2BUD 3IGW/a 3MKR 3PMR 3SSK 3TMK, **HB9CM, HI8XAL, HR3HH, JAs** ICR 2WB 6AK, **KL7AUV, OA4KF, OH2HK, OE1KU, OKs** 1AEZ 1KVK 1WT 1ZQ 2KET, **PY1NFC, VK5KO, VO1FB, VPs** 2AV 3CZ 7NY, **XEs** 1OK 2OK, **ZBs** 1HKO 2AE, **ZE3JJ, ZP9AY, 4U1ITU, 6Y5XG, 9Lis** HX TL and **9M4LP** . . . . . W9PNE reached the 160-meter 40-country mark . . . . . W1BB's statistics before season's end showed 1964-'65 better than 1963-'64 by a 138/23 to 120/21 margin (DX stations/countries) . . . . . The January 9th-10th week end was the best of the year so far, in the opinions of many participants. The band stayed open for transatlantic work 'way past dawn, a *most* unusual top-band development. But now OM QRN moves in up W/K way to send all but the hardiest 1.8-Mc. devotees scurrying toward higher frequencies. Several stalwarts will make 160-meter DX an all-year effort in '65 to take fullest advantage of the sunspot minimum. We'll surely be hearing from them.

75 **phone** is at prime time, too. **Ws** 3HNK 7WLL, XE1NNN and s.w.l. W.P. Kilroy spot the voices of **DJ6QT, DLs** 3II 0800 GMT, 5UW 8, **GC2TR** (3715 kc.), **GI3s** CDF 8, OQR 9, **HB9s** ET 7, FU, **HI8XAL, LA5HE, OD5AX** (3795) 23, **OH0s** NC NI (3795) 22, **OKs** 1ADP 7, 2SE 7, **OX3s** JV (3795) 18, WX (3798) 20, **PJ2CR** 5, **TI2JIC** 8, **UP2KAF** (3600) 23, **UW9AF** (3607) 20-21, **VK2NN*** (3660), **VOs** 1CM* (3805), 1DN (3798) 22-23, 1FB (3807) 0, 2AW (3800) 22, **XE2s** DDK 8, WH 7, **YS1IM** 7, **YV5s** BBG (3800) 5-6, BMR (3795) 7, BPJ (3804) 6, BWP (3804) 6, **ZLs** 2AAG (3798) 8, 3BQ 8, 3QN 8, 4LM 8, 4LN 8, **4X4IX** (3770) 22, **5A3TH** (3790) 20 and **7X2VX** (3795) 22-23, the lone asterisk representing straight-a.m. bravery.

40 **phone**, a wild melee when the bounce is best, tempts **W3ZNB, WAs** 2WOR 5IPM, **WB6FMJ, XE1NNN** and listener Kilroy with audio from **CM8PB*** (7050) 13, **CN8AQ** ('48) 23, **HI3AFE*** (75) 12, **HKs** 2AWS* 75) 8, 4ANH, **HR1s** CB PG (234) 5, SO (292) 7, K3DRJ/-



KG4 (225) 6, KGs 1FR (229) 23, 4AN (206) 5, 4CI (232) 3, 4CR (227) 5, KH6BGF (238) 7, KZ5s AF (220) 2, NN, LA5YE, OA4s DG (234) 5, NTF, OHs 2JJ ØNI (80) 8, OX3JV (18) 18, PJ2AQ* (75) 12, PY7VMX (48) 21, TG9s EP (220) 9, MO (223) 5, SB (209) 7, TIs 2JIC (230), 6, 8AF* (100) 13, VKs 2ADE 3TN (91) 9, 3UJ (85) 8, XEs 1DDM (220) 9, 2JJF (205) 7, YNs 3KM 6RAM (261) 3, YVs 5BPG (207) 5, 9AB/3* (75) 8, ZC4ZZ (15) 21, ZL2WS (93) 10, ZSs XX (85) 5, ZH (99) 5, 5A1TK* (38) 18, 5H3JJ (40) 19–20, 5X5IU (10) 20, 5Z4AA (40) 18, 6Y5MJ (205) 6 and 9J2JR (42) 20, the stars for lonesome a.m.ers.

80 c.w. gets up DX steam before the static barges in. Ws 1ECH 1SWX 4ZSH 7DJU, Ks 1MOD 3KMO 3VPN 5JVF, WAs 2KSD 2SRQ and 4OYO knock off stuff like DJs 3JC/LX (3503) 7 GMT, 5AZ 7SW 8FW, DL1RK, EA1GJ (1) 3, EIs 6Y (21) 9, 8H, EP2RC, F8TM, FR7ZC (6) 23–0, a bunch of G-men, GM3PFQ (10) 23, GW3SVY (1) 22, HB9KP, HI8XAL (10) 0, HKs 3RQ 7XI (18) 4, JA1s BK (8) 12, DH DLM DSW DZH EGM (6) 14, ELX GKP IUE KAU MCU MHH MZI QHC QUX, JAs 3CDK 3HLV 6AK (2) 12–13, 6BFD ØSZ, KG4BQ (10) 1, KZ5s CU TD, LUs 5DON (6) 9, 9EO (3) 3, OE1GFW, ON4IE, a dozen OKs, OY2Z (1) 23, PAØRE (3) 2, PYs 1ADA (6) 5, 1BTX (6) 4, 7MP (16) 1, SPs 3DG 7HX, TFs 3OM (4) 0, 5TP (2) 16, UA9s AG BG CM EU, UAØKKB, UB5s DQ (2) 4, KGL 1, UC2AR (10) 6, UD6BZ (3) 3, UF6LA, UH8DC (8) 2, UI8LC, UJ8KAA, UQ2KAT (2) 23, UT5KDP, UW9DP, VE8NP (1) 3, VS9ASP, XE1AX, YO6SD (8) 23, YUs 3ABC 3FS (8) 6, 3OV 4AC, ZB1A (1) 4, ZL3ABV, 4X4 DH (2) and 7X2BM.

40 c.w. still guns for King Twenty's DX crown, treating Ws 1ECH 1YNE 3HNK 3ZNB 4ZSH 7DJU 8IBX 8ZCQ, Ks 5JVF 7QXG 8TVO ØGVA, WAs 2FUL 2KSD 2WIJ 2WOR 4JJY 4TLB 5IIS 5IPM 6VAT 8GGN, WBs 2CON 2DZZ 2NLH 6CUU 6FWW 6ITM 6IWS 6MEQ, DL4LA and KA2TP to a feast of AP5HQ, shy BY1PK (5) 12, CEØAG (1) 3–4, CMs 1AR (12) 3, 2EJ (20) 0–1, 8STS (25) 4, COs 2DL 2FC 2HK 2RC 6AH (10) 2, 8DG, CRs 4BB (9) 2, 6AI (5) 0, 6GV (16) 2, CT3AQ (5) 22–23, CX1FB (15) 9, DMs 2AUK (20) 1, 3YFH, DU1TA, ELs 2AD (3, 40) 22, 2AM 3C, EP2s BQ RV, ET3USA, F2CB/FC, FG7XX (3) 4, FY7s YF (18) 12, YK (10) 23, HB9AFN, HI8s BGA (7) 23–0, IBC (10) 1, NPI 2, SRM (40) 1, many HKs including ØAI, HMs 1AQ (10) 10, 1BB 18, 1CF 5CL (8) 13, HRs 1RP (19) 3, 2FG (30) 1–2, IT1AGA, JAs 1AEA 1CFD 1CSX 1CXW 1DRC 1EPR 1EUV 1EVM 1FGW 1HZN 1IHE 1IIB 1ISL 1JXT 1KHI 1KVG 1MIN 1NFY 1ORM 1PFL 1PHE 1PON 1PTI 1QGI 1QUX 1RA 1RFP 1RHM 1YE 2BHG 2BLG 2BV 2CBK 3AOV 3DAZ 3DFX 3DFT 3DRT 3EGE 3FI 3GHI 3HCQ 3HIG 3JHV 4AIH 4AKL 4BFO 4BJO 4BOF 5BEI 5BIA 5BJC 5JH 6YB 7AGL 7ARZ 7AXP 8AZE 8AZV 8BCO 8BFT 8BME 8BRC 8ZO 9JMR ØBCO, KA2s JH (18) 13, TP 8, KGs 4CQ (32) 3, 4BQ 6ALU, KH6CMM/KB6 (6) 6, KM6BI, KRs 6BQ 6OJ 8CF, KS6BN (6) 7, KV4DB (15) 1, LUs 1HBS (15) 2, 2CE (4) 4, LX1CR, M1B, OA4NTJ, OEs 3PWL (14) 13, 6KZ (6) 22, OHs 5VF ØNF (20) 22, loads of OKs, OR4VN (30) 0, OX3AY, OY7S, PJ2MI (4) 1–10, many PYs, PZ1s CM CP, SPs 2AEL 8SZ 9UH, TF5TP, UAs 1KED (6) 20–21, 2BZ 9HM ØDA ØEH (3) 13, ØEW 16, ØFF ØFJ (9) 12, ØFP 12, ØIG ØKAE (10) 1, ØKCA ØKCC ØKKB 13, ØKZD ØLH 13, ØLS (12) 13, ØMA 16, ØSL ØTB (9) 12, UC2s IB KAB (5) 23, UD6BV, UH8AE (10) 21, UI8s AI CQ, UM8s DZ FM (21) 13, UT5CC (6) 20–21, UW9BF, UY5BL (9) 20, VK4TE (22) 7 of Willis isle, VPs 1HA 2GAW (6) 23, 2LS (12) 3, 4VU (3) 23, 6AK 6BW 6PJ (10) 12, 7BG (20) 0–1, 8HJ (10, 31) 1, 9FT, VR1B, VS9AFI, VU2LE (15) 2, numerous XEs, YN1JMC (3) 4, YOs 2BI 5KAU (2) 21, 7ALL 8KAE (1) 23, ample YUs and YVs, ZB1RM, ZC4GB, ZD8BB (15) 4, ZE3JJ (8) 4, ZSs 1O (8) 4, 5UR (6) 4, 6KO (9) 5, 4W1H, 4X4s DK NUF WF, 5A3TX, 5B4FD (3) 23, 5Z4AQ, 6W8AJ (20) 8, 6Y5XG (10) 2–0, 9J2VB (4) 0, 9K2AD and 9M4LP (2) 23. . . . . Forty Novice frequencies find WNs 2PFD 4WHX and 9LFU snapping up CM6HT, KG4AM, KP4AQL, OY7ML (185) 3 and WP4CLK, no easy trick among those BC sidebands.

15 Novice business is surprisingly brisk, WNs 2PFD 6KKM 7ASM and 9NHQ capture CE9AB 22–23, DJs 5YQ 14, 7XM 17–18, DLs 1SO 8FQ 9VZ, Fs 7DC 9IK, Gs 2F1X 3NFV 3SHE 3SR, JAs 1KSO 3GHI 4FW 6TY 8BAY 8ZO, KP4s AOO AQL BFF BKS BPH, VO1GR 17–18, TG9ST 22–23, WG6APH, WN9KLO/KG6, WP4s CLL CMZ, YN3KM, YV1AB and ZE3JJ. If this is low DX ebb for 21 Mc. there are fireworks ahead!

15 c.w. among the five-year licensees holds up well, enabling Ws 1YNE 3HNK 4GTS 7WLL 8YGR 8ZCQ, Ks 1MOD 1ZND 3SLP 6OVF 7QXG 8TVO, WAs 2WIJ 3AZI 4JJY 4TLB 5IIS 6VAT, WB6s CWD FWW, GM3MCH and I1ER to telegraph with CN8BU (61) 6–18, CRs 6AI 6EI 6ES 6FW 6GS 6HG 18, 6JL (30) 17, 7IZ, EL2AM, ET3s US (75) 16, USA, FB8XX (30) 14, FO8AA, HB9GJ (60) 15–16, HC2s JB (75) 18, SB (40) 19, HIs 4ARM 8DAB 8XAL, HM5BZ, JAs 1IBX 1KSO

5A3TX catches his DX via mike, key or keyboard from the shores of Tripoli. Carl is W3YLU when home in Pennsylvania. (Photo via W3HNK)

2ETU 6, 5FQ (50) 22–23, 6TQ (50) 23, ØACO (50) 23, KP4s BFF BQG, KV4CI, KZ5s AW HK (60) 17, M1B, OA4NQN, OD5LX, OH0NJ, PAØs SNG (60) 12, WAC (50) 14, PJs 2CZ (20) 14, 3AH, UD6KAB, VK5DE, VO2JM (90) 17, VPs 2CJ (30) 14, 6BW (20) 14, 9BZ, VR6TC, VS9AMD, submersible WA4BDO/mm, WP4CLB, XE1PJ (40) 4, YVs 1DP (10) 13, 5EG (210) 18, ZD5M, ZEs 1AS 1BR 2JC 3JJ (80) 17, ZSs 1ACD 1JK 1NQ, 4W1H, 5A3TX, 5R8AL, 6W8BL, 7Q7RM 19, 9J2s BC (60) 15–16, DT W, 9M2UF, 9Q5s ED JR PA QR (50), 18, QY and TJ.

15 phone's popularity gets a boost from improved conditions over the spring equinox. Ws 3HNK 4GTS 7WLL 8YGR 8ZCQ, Ks 1MOD 3SLP 6OVF 7QXG 8TVO, WAs 2WIJ 4JJY 4TLB 5AER ØFBQ, WBs 2CAN 2FVD 6CWD 6FMJ 6FRP 6FWW, s.w.l.s W.P. Kilroy and L. Stewart record radiations from BV1USG* 0, CEs 1GJ (427) 23, 2AW 0, COs 2DL 2FA 22, 6JL, CRs 4AD 4BC (180) 17, 5SP 6JT 17, 7FH 18, 7IT 18, CT1s LN NT, EAs 1GH* 8CR, EL2U*, ET3USA (275) 12, F2s TW XA, GB2SM* (380) 14, GC3MLR (375) 15–16, HCs 1WW* 7DO*, HIs 6JBA 8CLU* 8XAL* (385) 17–18, 8XHS, HK3s AUE* RQ*, HP6MA, HRs 2ABC* (395) 15–16, 2GK 3AC 4DHS 6CGA 9EB 22, JAs 1DXE 1FAF* 1KFQ* 1LVI* (406) 21, 2BLG* 8AST*, KGs 4AA* 6APJ*, KP4BPW, KV4CX*, KW6EJ* (400) 22, KZ5s TG VM 21, LA2MA, LU1DAB*, OAs 5G* 6AM*, OD5-LX*, PJs 2MI 19, 3AJ 3AT, TG9s FA/8 RJ* US, TI2s DE (247) 22, EAG 22, TR8AE, TU2AE, VE8BZ 16, VKs 2NN* 3AHO* (400) 23, 3VL (160) 23, 5BQ 5WX 5YC, VPs 2DAA (225) 18–19, 2KJ 2LH 20, 5RG* 17, VR6TC (240) 23–0, W8s BZB/7G1* 23 of Project Hope, TNC/-KW6* (300) 23, WAØDVC/KG6*, XEs 1JJA 2GGL 2FK 3EP, YNs 1MAN* (430) 16–17, 4CF*, 4CM* 4DT, YS1HUKE*, YVs 3DY*, 5BPJ* (415) 17, ZC4s BG KF MO, ZEs 1AM 1AS 18, 1JE* 15–16, 2JA 2KL 7JV*, ZLs 1AJD (411) 0, 1BDA 1RI 2BDA* (411) 0, 2UD* 20, 3FV (403) 0, 3TD*, ZSs 1AB (230) 9–10, 1DM 1TZ* 3HT* (385) 17, 4RF 6ATA* (378) 16, 6FR* 19, 6TB 6WS, ZP50G*, 5As 1 TK 5TR* 15–16, 5N2AAF* (410) 15 who is former 5N2JKO, 5N2RFB 16, 5H3JJ*, 5R8BX 18, 5T5AB 18, 6W8CZ (160), 6Y5UC, 7G1H* 0, 7Q7RM, 9G1DM 17, 9J2s GR (210) 18, MI, 9L1s WA WN (200) 18, 9Q5s AI (150) 20–21, AJ (220), EB (190) 19, FB (210) 19, IA 19, KC* PP, 9U5s IB KU (225) 19, MC and 9X5AV, the asterisks denoting single-sideband senders, still in minority on 21 Mc. . . . . Ten phone gets a whitewash on our side but we see in VERON'S *DXpress* that UA2ACV, UT5DU and 6Y5XG are being heard. From now on things will be different — gradually speaking — on 28 Mc.

* * *

We'll have to skip 20 till next month when Ws 1ECH 1YNE 3HNK 3ZNB 7DJU 7WLL 8IBX 8TRN 8YGR 8ZCQ, Ks 1MOD 1ZND 7QXG ØGVA, WAs 2WIJ 4JJY 4PSA 4TLB 5HJK 5IPM 6VAT 8GGN 8MAT 9FMQ, WBs 2DZZ 2FPG 2NCI 6CUU 6FWW 6ITM 6NQS, KA2TP, PY2SO and XE1NNN will supply the 14-Mc. c.w. slant, with Ws 3ZNB 7WLL 8YGR 8ZCQ, WAs 4JJY 4PSA 5AER 5HJK 5IPM 6VAT, WBs 2FPG 6FMJ 6NQS, XE1NNN, listeners B. Bumm and L. Stewart presenting the phone picture, assisted by subsequent reports now rolling in. Be our guest and join the chorus.

Where:

OCEANIA — 9M6AC (K9OAD) writes, "As things stand now, 9M6AB (WAØGWQ) and I plan to QSL via

bureaus, and receive cards via the Malaysian bureau or direct." . . . . . ARRL Assistant Secretary W1ECH relays the new DU bureau address, P.O. Box 1083, Manila, P. I., and also supplies this KW6 QSL route: KW6CGA, USCG Loran Stn., Box 7, Wake Island, Central Pacific. Former proprietor KW6CJ has departed . . . . . ZL2-AWJ will prefer IRCs for QSL reply when he gets to the Chathams as ZL2AWJ/3 . . . . . WA6IRS remarks, "If any of the gang worked KX6s BU and/or DB on c.w. in the last couple of years, chances are 90 per cent that I was the op. I have logs and will be delighted to supply QSLs to deserving applicants. I also operated KX6BU in the ARRL DX Contest phone portion." . . . . . Neophyte DXers still make the mistake of shipping KP6-bound QSLs to the KP4 bureau. Ex-KP6s AJ AN AX AZ BC BF BQ DD GA JZ LJ LZ, Ws 1MV/KP6 6FAY/-KP6 and ØANJ/KP6 can claim their shares by shipping appropriate self-addressed stamped envelopes (s.a.s.e.) to KP4YT.

AFRICA — Ex-ZS7R-VQ6R confirms that "The prefix ZS7 has been replaced by ZD5 with effect from January 1, 1965. My new call is ZD5R." . . . . . VQ8AI tells W4AX, "Advise the boys to QSL me direct only. My QTH is okay in *Callbooks* since 1936." . . . . . "List me as QSL manager for 9U5ID as of January 15, 1965," instructs W8HBI, stressing the usual s.a.s.e. or International Reply Coupon (IRC) routine . . . . . "9U5IB forwards logs at the end of each month," says W8WC, Barry's QSL aide. "I have 9U5IB logs from November 1964 through January '65." . . . . . K1MOD testifies, "FR7ZD does QSL, but in my case it seemed to require a few picture postals, photos of my station, a two-page letter in French, s.a.s.e., twelve varieties of ancient U.S. one- and two-cent stamps, and a four-year wait."

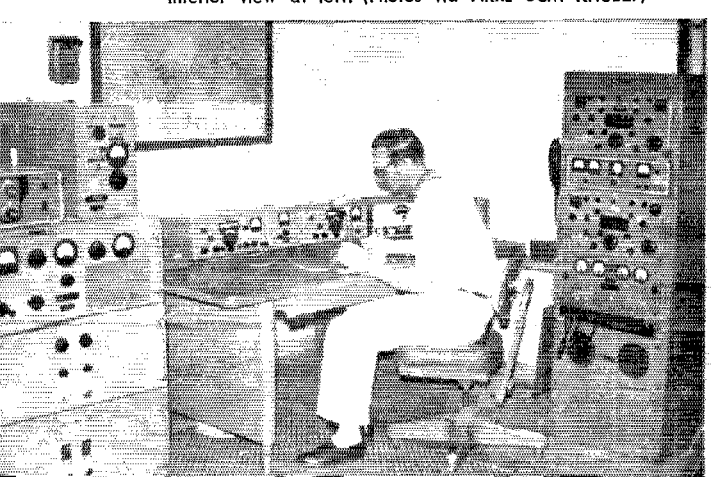
ASIA — KA2CM, secretary of FEARL, will appreciate hearing from these former Yanks in Japan: KA2s AB AE AK AL AR AV BC BM DD DL DO DS FF FZ GF GI JM KF KH KM LE LG LM LR LW MF MM OV RF RP VT WH, KA5AS, KA7s CP CS DF HB RD RT, KA8s AA AR DM LF LS, KA9s BP JD RL and RP. QSLs for these stations are still on hand at the FEARL bureau, and twenty-five cents in postage or coin will get them delivered. Forwarding addresses were tried but failed. KA2CM finds considerable operating and/or clerical carelessness evident on the QSL front. "When getting my cards together for DXCC I found several unusable because of simple mistakes. Let's all take the time to make out our QSLs correctly." Curt reports KA2USF's QSLing now up to date for 1964 QSOs . . . . . "I'm QSL manager for KA2WM," notifies VE7BMC. "Terms are self-addressed stamped envelopes or IRCs, and W/Ks should realize that U.S.-postage-stamped envelopes are not mailable from Canada. I receive logs from KA2WM's two operators every two weeks." . . . . . W1RAN whisked off over 1300 HZ3TYQ/8Z4 QSLs by mid-February. Most went direct in s.a.s.e., the unclaimed remainder via bureau . . . . . W2VLS vows 100-percent QSLing for QSOs with 3V8GM, 4X4s UJ WF and 4X0WF.

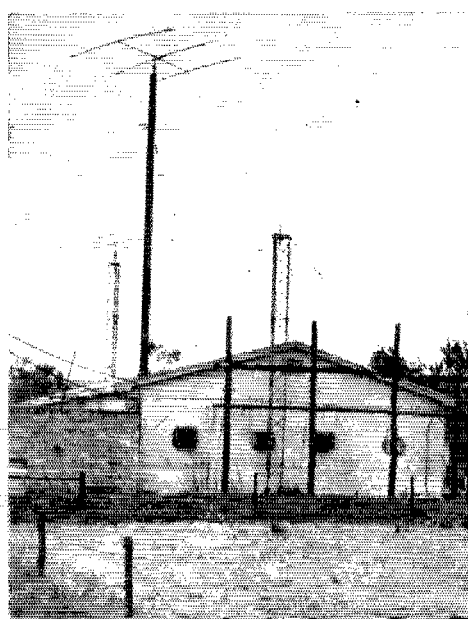
EUROPE — If you manage to work IØs AGI FNI and UP this month from Capraia's island you can QSL via ARI, P.O. Box 347, Genoa, Italy . . . . . Malta is due for a new label, possibly 9H1, according to WGDXC's *Bulletin* . . . . . K1MOD hints, "Anyone having trouble getting QSLs from RAF-operated stations might consult their headquarters, G8FC." . . . . . K0GVB (ex-kC4USS) now handles QSLs for SV0WOO of Athens, s.a.s.e. required . . . . . G3BRI tells WA8GGN he works no 7-Mc. Yanks, spurious contrary evidence notwithstanding . . . . . If you want IT1AGA's king-sized QSL direct, submit Gius a *large* s.a.e. with IRCs.

HEREABOUTS — This month "QSLers of the Month" status is accorded CM5GG, CRs 4BB 6AI 9AH, DJs 2CK 6QB, DL5AO, EI9J, EL2AC, ET3USA, FB8s XX YY, FG7s XL XX, FO8s AA BI, FR7s ZD ZI, G6RJ, GW6YQ, HAs 5KFR 8WT, HB9TE, HKs 1ZU 0AI, HL9TY, HP1IE, HR2ABC HDBK, JA1KFN, K2JGG/-JY, KA2KS, KG4CH, KP4ARS, KS6BN, KV4AA, KW6EF, KX6BU, OE3TL, OIIs 5TW 5VF 8NU, OK1s AFC GT IQ, ON4LX, OX3UD, PAØs LOU WAC, PY5-ASN, SM5s BPJ WI, SVØWPP, TFs 2WIA 2WIO 2WIV 3AB, TL8SW, TR8AD, TU2s AN AU/5U7, UAs 1IE 9WS, UP2KMU, UW3TD, VE8BB, VKs 3BL 9BW, VPs 2AV 7NQ, VQ8AI, VR3H, VU2JA, XE2FO, YVs 5CZ 9AA, ZD8BB, ZL1APZ, 5A3TX, 5X5IU, 5Z4ERR, 6Y5MJ, 7G1H, 9M4LP and 9Q5QR, plus QSL managers Ws 2CTN, 2GHK & Co., 3KT 5EGR 5EJT 5VA 7ZM1D 9WHM, Ks 1QHP 8SGC 9BPO, VK2EG, WA4STL and 5R8BC, through testimony from "How's" confidants Ws 1ECH 1YNE 3HNK 3ZNB 8IBX 8TRN 8YGR 9EXE, Ks 1ZND 8RXD ØGVA ØLFY, WAs 4JJY 4PSA 4TLB 6VAT 8GYX 8LST 8MAT, WBs 2JYN 6ITM, PY2SO and L. Stewart, all for particularly prompt pasteboard production. Any other QSL kudos candidates for display here? Ship us the tip . . . . . *Tip!* The following italicized colleagues require QSL/QTH data on holdouts indicated: *W1CSP*, FM7WB; *W7WLL*, KAs 3EB '55, 5WW '55, 7JS '55, KJ6FAA '54-'55, KW6BB '54, OX3NB '55, VE8TD '47; *K2OLG*, KL7s CKM '59, FBN '58, TF2WCK '57, VP1BS '58, VQ3GC '59, ZB1JW '60; *K8TJE*, 5R8CB; *K7QXG*, 9Q5BZ '53; *WA6SLU*, TN8AF; *WA8GYX*, TF2WHT '63; *VU2MD*, KP6AE '48. You helpum catchum wampum? . . . . . WA8MAT and WB2DZZ add their availability to the list of Statesiders willing to assist overseas DX ops with QSL problems . . . . . "Kindly mention that QSLs for KP4s should go to the bureau address, not my home QTH," pleads KP4YT . . . . . The Caymans prefix may soon become ZF1, according to VE3CJ via W1WPO's DXCC Desk . . . . . QSLs for DXpeditionary-style operation by VP7s BG and CX should go to W8LIM accompanied by s.a.s.e. . . . . OX3AY points out to K7QXG that his QTH gets winter mail service just once monthly by boat. Patience, therefore . . . . . QSL returns statistics at K7QXG (per cent): Canada 90, U.S.A. 88, South America 80, Central America 100 except for three KZ5s, U.S.S.R. 29, and all others about 61. How do yours run? . . . . . Save your postage, warns K1MOD, who still gets lots of QSLs for current "FP8BR" QSOs although the call hasn't legally been used since 1961 . . . . . Beginning with 1965 contacts, W3HNK adds YV5CEY to his QSL managerial list which already includes ZE4JS, 5As 3TX and 5TR. Jose, formerly YV5-BWP, likes 75-meter s.s.b. DX . . . . . Here comes the postal parade, but keep in mind that each listing is necessarily neither accurate, "official" nor complete.

AC5H, Hammarlund DXpedition, GPO Box **7388**, New York, N. Y.
BV2A, Box 2007, Keelung, Taiwan
CE3LB, F. Madrid, Box 10343, Santiago, Chile
CN8AW, T. Hall, Gen. Del., U. S. Naval Air Facility FPO, New York, N. Y., 09544
EA9EO, G. Perea, Teniente Arrabal 2, Ceuta, Sp. Morocco
EL2AH (via SM5BM)
ET3DR, D. Ross, APO, New York, N. Y., 09843
HC2JB (to HC2SB)
HI3AFE, L. Chabine, Aptdo. 231, Santiago de los Cab., D.R.
HI8IBC, P.O. Box 1157, Santo Domingo, D.R.
HK1JF, K. Roseuow, Box 1125, Barranquilla, Colombia
HK2AWS, J. Saramiento, Aptdo. 295, Cucuta, Colombia

BV1USG of Taipei is a juicy DX tidbit often workable on 14-Mc. single-sideband. K7VGV mans the mike in the interior view at left. (Photos via ARRL SCM KH6BZF)





VU2TP, left, helps keep India on our DX map with his Bombay layout. Right, future VU2s and aspiring commercial radiomen take advantage of the code course at VU2SX, St. Xavier's College. (Photos via K2EVW/3)

IT1CFN, A. Scrima, 12 via Riccardo Zandonai, Palermo, Sicily, Italy
JA1DSW, Masayuki Hamada, 2-23 Odakicho, Yokosuka City, Japan
JA6YB, Kaz Sakai, NHK, Kagoshima, Kagoshima City, Japan
KA2WM (via VE7BMC)
ex-KB6BA-YA1AW, H. Johnson, 5720 NW 48th St., Oklahoma City, Okla.
KG6IF (opr. Harry) H. Train, jr., K8DXC, 253 Linden Pl., Toledo, Ohio, 43609
KX6s BU DB (see preceding text)
ex-KX6CI (to K5QNI)
KZ5HD, Box 3006, MARS Stn., Howard AFB, C.Z.
LU2CE (via RCA)
PY5BAG (via LABRE)
PY7BAL/ø (via LABRE)
SP5ALG (via W2VLS)
SVøWOO (via KøGVB)
TF2WIO, W. Gildone, ETN3, Box 27 GEM, Navy 568, FPO, New York, N. Y., 09751
TG5HC (via WA8LST)
TG6PB (via CRAG)
TI2AWL, c/o U. S. Embassy, San Jose, C.R.
TJ1AD (via DARC or DL3BK)
TU2AN, C. Wilfrid, P.O. Box 1374, Abidjan, I.C.R.
UAøKFG/UA3 (to UWøFK)
UWøFK, S. Lyubchenko, P.O. Box 102, Yushno-Sakhalinsk, Sakhalin Island, U.S.S.R.
VE8BB, Box 954, Yellowknife, N.W.T., Canada
VKøDS (via VK3IE)
VP1HB, H. Bowman, Stann Creek, Br. Honduras
VP1JTH, P.O. Box 647, Belize, Br. Honduras
VP2AV (via W2CTN)
VP2DAD (to K1IMP)
VP2MJ (via K3HGX)
VP7CX (to W8LIM)
VQ8AMR (to VQ8AM)
VS9AAS (via 5Z4HE)
VU2NRA (via W4ANE)
XE2LLP, 1678 Arista Av., Mexicali, B.C., Mexico
XW8AZ, E. Doerr, USAID, APO, San Francisco, Calif., 96352; or P.O. Box 402, Vientiane, Laos
YS1RFE (via K7UCH)
YS1SAM, USAF Mission, c/o U. S. Embassy, San Salvador, El Salvador
YS2MFI, M. Antonio, Box 125, Santa Ana, El Salvador
YV1LC, P.O. Box 122, Valera, Venezuela
YV1PS, Box 19, Maracaibo, Venezuela
YV5BNR (via WA6WTD)
YV5CEY (via W3HNK)
ZD5R, V. Parkhouse, P.O. Box 99, Mbabane, Swaziland
ZE1BK (via W2CTN)
ZL2AWJ/3 (to ZL2AWJ)
ex-ZS7R (to ZD5R)
ZS8G, Box 379, Maseru, Basutoland
3A2DD (to WA2HOK)
3V8GM (to W2VLS)
4W1A (to MP4BBW)
4X4UJ (via W2VLS)
5N2AAF, P.M.B. 1044, Zaria, Nigeria
9G1DY, N. Price, P.O. Box 2949, Accra, Ghana
9G1FQ, Box 194, Accra, Ghana
9J2FK, P.O. Box 26, Livingstone, Zambia
9M6AB, G. Ruff (WAØGWQ), P.O. Box 222, Jesselton, Sabah, Malaysia
9M6AC, J. Rugh (K9OAD), P.O. Box 222, Jesselton, Sabah, Malaysia
9U5IB (via W8WC)
9U5ID (via W8HBI)

Our thanks for the preceding go to **Ws** 1BDI 1ECH 1JNV 1TS 1VG 1WPO 1YNE 1YYM 3ZNB 4AX 6KG 7DJU 7UVR 8IBX 8YGR 8ZCQ 9EXE 9TKV, **Ks** 1MOD 1ZND 5JVF ØGVA ØJPL, **WAs** 4PSA 4TLB 6LED 6SLU 6VAT 9CNS 9FMQ, **WBs** 2JYN 6ITM, **IT1AGA**, **KA2TP**, **PY2SO**, **VP7CX**, **XE1NNN**, L. Stewart, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's DX-MB (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Florida DX Club *DX Report* (W4HKJ), International Short Wave League *Monitor* (12 Gladwell Rd., London N.8, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2FGD), Kanawha Radio Club (W. Va.) *Splatter* (K8WMQ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1SHN, W1BPW), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif.), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PAØs FX LOU VDV WWP) and West Gulf DX Club *DX Bulletin* (W5IGJ). Is it your turn to jog the churn?

Whence:

EUROPE — For those who are still unfizzled after your annual ARRL affair, there are other DX contests on the docket this month. From 1500 on the 3rd to 1700 the 4th, USKA (Switzerland) holds its annual Helvetia-22 DX Contest on 10 through 160 meters, c.w. and phone entries to be filed separately. The usual RST- or RS001, RS002, etc., serials will be exchanged between Swiss amateurs and the rest of the world. Each HB station can be worked once per band at 3 points per contact, this point total to be multiplied by the number of Swiss-band-cantons worked for final score (watch for these canton designators appended to HB calls: AG AR BE BS FR GE GL GR LU NE NW SG SH SO SZ TG TI UR VD VS ZG and ZH). Logs postmarked within 30 days of the contest for shipment to HB9ZY, USKA Traffic Manager, Meggen-Lu, Switzerland, will be eligible for possible certificates of merit to be awarded high scorers. Good chance to gun for the 22 QSLs needed to qualify for USKA's coveted H-22 certification! _ . _ . _ Then, from 1200 GMT, April 24th, to 1800 the 25th, you can choose phone or c.w. weapons for battle in the 1965 PACC Contest sponsored by VERON (Holland) wherein non-Netherlanders will work as many PA/PI persons as possible, once each per band, 1.8 through 30 Mc., using the customary RS- or RST001, RST002, etc., serial swap. You earn 3 points per two-way exchange, this point total to be multiplied by the number of Dutch band-provinces worked for final score (province abbreviations to be used: DR FR GD GR LB NB NH OV UT ZH and ZL). Each log, postmarked on or before June 15, 1965, should be sent to PAØVB, VERON Contest Manager, Keizerstraat 54, Gouda, The Netherlands, to be eligible for possible certification of performance. At the same time you might request specifications on VERON's various DX diplomas. A resume of last year's PACC results appeared here last month . _ . _ . Official single-operator results of the PZK (Poland) 1964 SP DX Contest show U.S.A. entries scoring in this order: Ws 4SNU 1WPO 1CKA 8RQ 3EYF 1WY 3MCG 9KXK 6ISQ 7DJU 4HOS 3MSR and WA9AJF. VE3EVK, VO1AW and VE1AE finished 1-2-3 for Canada. Poland's call areas were championed by SPs 1HU 2IU 3AMZ 4AFK 5ADZ 6ALL 7JX 8HT and 9QS, with SP5ADZ leading the pack. Continental highs were CR7IZ, PY2SO, UAs 3UJ 9WS and W4SNU. Club station (multiop) leaders were SP4KAI, UA4KPA, UB5KED, LZ1KBI, OK3KAG, YO8KAE, HA6KVB, YU1JRS and UC2KAA . _ . _ . Better set aside the May 8th-9th week end for a crack at the annual U.S.S.R. DX Contest, a c.w.-only deal. We'll scamper through participation particulars next *QST*. . _ . _ UWøFK tells W9TKV that UAøKFG/UA3 logged 2375 QSOs with 106 countries on all continents during a Moscow visit last August and September. Claude adds, "The real reason for UAøKFG/UA3's three-operator activity

was . . . to attain the highest Central Radio Club accolade of 'master'. Centrally located stations in UA1 UA3 UB5, etc., have better chances of qualifying — working the necessary 40 stations in one hour, 110 oblasts in 12 hours, etc. — than do far eastern UA/UWs. They certainly proved the point." UAØKFG/UA3 used 150 watts, a vertical on 15, 20 and 40 meters, and a 15-tube superhet . . . . DLs 4LA and 5EX (KØRZJ) are instructing an eight-week amateur radio course during off-duty hours. Excellent activity to pass a period of unfavorable conditions . . . . K3CUI hears that UA1KAE/2 of Russia's Novolazarevsk antarctic outpost tries 14,035-14,040-kc. c.w. between 1300 and 1600 GMT . . . . SM6CKU enjoys working W2ZPO and other transoceanic s.s.b. friends near 3800 kc. at 0700 GMT or so. And W1AKY must hold some sort of record in working more than 200 Swedish stations on phone. One incentive: his brother is SM5APF . . . . K1UOV notes that H1WBH has bagged 13,000 QSOs with 160 countries since 1945, mainly using 20 . . . . M1M finally worked San Marino (DJ7XC/M1) from K3KMO for his own DXCC score . . . . SVØWOO is pitchin' it from Athens with a DX-35, SX-111 and vertical, mostly on 20 c.w. . . . . IT1AGA, active daily on the most promising c.w. DX bands at 1300-1600 and 2200-0200 GMT, has captured almost 300 operating awards. Neighbor IT1CFN takes care of the phone situation on 14- and 21-Mc. a.m. almost daily at 1400-1900 GMT . . . . SVØWF of Rhodes is a VOA supervisor when not fishing on 14,315-kc. s.s.b. with his HT-37, SX-111 and Hy-Gain spinner around 1200 GMT . . . . WGDXC has it that s.a.e. and IRCs will get you the lowdown on IOTA, the Islands on the Air certification, from Geoff Watts of the *D X News Sheet*, 62 Belmore Rd., Norwich, Norfolk, Nor. 72T, England.

OCEANIA — "Looks like I may get to the Chathams in late April for about two weeks," writes ZL2AWJ, prospectively ZL2AWJ/3. "Finances, pressure of work and the hard facts of transportation have prevented an earlier visit. The only air service is operated by the NZAF with flying boats. Flights are few and far between, and priority is naturally given to residents who have kept the list filled for the last few months. Sea travel is just as irregular but the shipping company is sympathetic to my cause." G'luck, Ted. . . . . "Kwajalein has begun to look like an antenna farm," writes departing KX6CI (K5QNI). "There now are some 22 hams on the island. I'm going to White Sands with hopes of returning to Kwaj in the near future. Hamming as a KX6 is great!" . . . . K8DXC left Marcus isle in February, lamenting, "KG6IF will probably be inactive for a while, for I was the only operator on the island." . . . . "They changed our club call from KG6GX to KG6ALU," affirms WA6LED/KG6, "but we're still active daily on 20 and 40 c.w." . . . . 9M6AC (K9OAD) writes from Sabah, formerly British North Borneo: "9M6AB (WAØGWQ) and I are Peace Corps Volunteers working for Radio Malaysia. With luck 9M6AB will be on 20 within a few weeks with a DX-60 on d.s.b. and an HQ-145. I plan to use the same receiver with an HX-20 on 14 Mc. Our antenna is an extended Zepp which we plan to replace later with a quad." . . . . W1JNV says K1IMP would try Pacific DXpeditioning with the proper encouragement . . . . Pacific patter in the clubs press: VKØTR of Macquarie is said to loiter with a.m. on 14,120, 14,130 or 14,160 kc., possibly assisted by VKØPO. . . . FK8AU visited and hammed with FU8AG for a week in January. . . . 9M8EB tries 14,111-kc. single-sideband around 0030 GMT and says he's the only regular there now.

ASIA — Despite official red tape, broken roads, no second op, a frigid shack, poor rations, wind-snapped skywires and contrary conditions, W1TYQ put HZ3TYQ/8Z4 on the air in January only one day later than the target date announced three months earlier. W1RAN relates that Vic opened up with a 25-W/K 7-Mc. appetizer, then gulped a 14-Mc. long-path feast garnished with a sprinkling of 3.5-Mc. tidbits. W1TYQ may get in some HZ3TYQ/9K3 licks this month or next depending on his airplane duty schedule and other equally unpredictable factors . . . . W2VLS points out that last October's 4XØWF sortie by 4X4WF and SP5ALG probably establishes a "lowest QTH" record for DXpeditions. They worked W/Ks on 7 and 14 Mc. from a Dead Sea location some 1200 feet below sea level. SP5ALG (4X4UJ) intended a U.S.A. visit about now . . . . Yanks-in-Japan notes courtesy KA2s CM and TP: KA2s LD and RJ, armed with fresh radioteletype authorization good for ham frequencies above 28,850 kc., scored a first in December by working each other for 40 minutes on 29 Mc. via printer. . . . As of this January there were 75 KA2s, 5 KA5s, 9 KA7s, 10 KA8s and 5 KA9s. The KA1 prefix is never used, and there is no present Yank activity in KA3 KA4 and KA6 call areas. But watch for possible early action by KA4US, an FEARL team effort. . . . Remember that KAs are not permitted to engage in third-party traffic work . . . . VU2CQ writes, "The real DX days are gone, and conditions are rather poor. I wonder when the bands will open up again like old times. Anyway, old Mickey has been going strong since 1928." VU2CQ is building his fourth or fifth s.s.b. exciter, being one old-timer who insists on trying all new angles that come along . . . . W7DJU is so impressed by JA1DSW's tape recordings of DX QSOs that he's giving it a whirl. The strips go neatly with QSL exchange . . . . Far eastern comments noted in club literature: AC5H was W4BPD warming up at AC5PN's place for his Sikkim swing. Watch for Gus in his usual 14,034-, 14,065- 14,105- and 14,125-kc. slots. . . . VU2NR made it to the Andamans in February but Statesward 14-Mc. conditions were not the greatest. . . . W5LAK expects to be signing an OD5 call at any time. . . . VS9SJF's Socotra signals frequent 14,160-kc. a.m. or 14- and 7-Mc. c.w. around 1600 GMT.

AFRICA — K2LAF should be completing his multicountry Africa swing this month. "My trip is primarily for business purposes but whatever operation is possible will be done, c.w. on 14,005 kc., s.s.b. on 14,275 kc." . . . . VP7CX wants to try his luck from some of the rarer African areas this year after much Caribbean DX sport in company with VP7BG . . . . "Band conditions are very bad lately with 20 closing down shortly after dark," opines CN8AW. "Our Kenitra ARC now instructs a code and theory class on Wednesday nights. Much enthusiasm is displayed by members and we should pick up a few new hams at completion of the 36-week course." . . . . W3HNK says, "5A5TR is near 21,390 kc. with single-sideband almost daily at 1500-1530 GMT." . . . . In lines to W1IKE, a Project Hope leader expresses great appreciation for WA2WUV's voluntary efforts in the activation of land-based 7G1H . . . . You can parlay your QSLs from FB8s WW XX YY and ZZ into a fancy new sheepskin backed by REF. It's called DTA, or French Austral Lands Award. F9OE says that F3FA is handling inquiries . . . . Club newsclips from African points: ZD3C (W4WRK) started up on 14,280-kc. sideband in February. . . . VQ8AMR (VQ8AM) panicked the 20-meter pack from Rodriguez isle for a few February days although beset by punk propagation. . . . TL8SW (ex-XW8AH-3V8CA) is back on 14,264-kc. s.s.b. . . . Check 14,100, 14,130, 14,300 and 21,400 kc. for the voice of the Comoros, FH8CD. . . . EA7ID collects affidavits from DX men urging activation of Ifni and Rio de Oro. The petitions may carry some weight with licensing authorities in future DXpeditionary endeavors. W6FAY/-EA9 reports rampant inhospitality in that region as things now stand. . . . FB8WW's Maurice likes 21,200-kc. a.m., also 15-meter c.w., since his SR-150 gave up the ghost to temporarily foil 14-Mc. sideband searchers. . . . DL7AH (ex-9Q5AB) hungrily awaits a 7X2 suffix at this writing after accumulating some 75 kiloQSOs from the Congo.

PY2s CQ and SO, avid OM-XYL DX-hunting team of Sao Paulo, are world-wide favorites. Jose and Sonia, each holder of WAS and DXCC, help administrate DX matters for LABRE's PY2 branch. (Photo via K5JVF)

SOUTH AMERICA — WØETT, down south with the Peace Corps, wants information on other amateurs serving in that world-wide outfit. Write Ken Anderson, Peace Corps Volunteer, c/o Consulada Americana, Recife, Brazil. "Radio conditions in South America are really great," declares Ken. "I've never heard DX come through like this in Colorado." . . . . "Just worked my first WA3," writes YL PY2SO to W1TS. "Also heard one of those new WA7s. Things happen fast up there." . . . . VP1AB chopped through licensing red tape to help WØGFQ, KØGHK and WA5ATM perform as VP1GFQ in mid-February with Galaxy and Hy-Gain apparatus atop a British Honduras mountain . . . . PY7BAL/Ø aroused the 7-Mc. c.w. mob from Fernando de Noronha beginning in early February.

HEREABOUTS — Gripes of the Month are registered from random points. Self-appointed pile-up policemen

(*Continued on page 156*)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr.

Joseph Eschelbach, WA2GQZ, manager of the Second Regional net has become City Editor of the *Long Branch Daily Record*. He promises to get a weekly column going on amateur radio . . . will promote ARRL and ARPSC. Here's Joe's message for non-aligned amateur licensees.

"A lot of hams are providing public service without realizing it and without coming under ARPSC. Many General Class operators spend time in the Novice bands. *They* are in a position to render a public service, providing they operate at speeds Novices can cope with! All, of course, should be well versed in good operating practice to help the Novinces in their technique. Other amateurs in the game for some years devote time to running code classes and lending a hand in club activities and serving on TVI committees. Some join in less direct service such as antenna raising parties. Any number of fellows spend time in helping someone else and *thus* contribute a service."

All readers note the quoted section. There are *many* ways of expressing ourselves, helping others and the public. To make *your amateur communication* more directly contribute to public service it's Joe's suggestion, for you that you get hooked up with the Amateur Radio Public Service Corps. By taking part in such organization and developing disciplined operating skills through enjoyable *participation* you can make your effectiveness and results top any you have known. In this way what you do counts *directly* toward public service. Take your pick of registering in the AREC (Emergency Corps) division or NTS division (traffic netting) in ARPSC! Shall we send a Net Directory or what?

Concerning Operating Practices and "Values". Newcomers in hamdom can profit from some practical operating tips such as Ken Hughes, W6CIS, is currently passing along in "RPX," Sacramento bulletin. (1) For the Novice who is trying hard he says, "Why not use just *one* 'DE'? There's no purpose at all served by more than one DE between the call of the station you're working and your own station call." Excessive use of DE (like the superfluous A.R.S. or chief opr. in addressing QSLs) is to many a mature operator the sure label that the sender is a rank greenhorn. (2) As to good procedures, one c.w. man was heard to call CQ and end his efforts with KN! He'll assuredly make few contacts and certainly never the A-1 Operator Club. A good second to him, says Ken, is the phone MC who says 'QRN NANCY'. To voice what he really means he should *say it with words* and talk about 'static' and 'atmospherics'. And finally (3) "Competitive activities have their place and should be continued. There's no better place than contests for the sloppy operator to learn his practices don't pay off. They assist operating skills. Ideally, contest work can be a change of pace or vacation from some more serious objective of our personal operating. We all should be doing something worthwhile in an effort to justify our priceless frequencies. There are many ways to be useful and operate in the public interest. I believe emergency communications should head the list."

Training Aids Additions. We have a number of new items available to ARRL Affiliated Clubs. There are two newslide collections with tape narrations, SC-7 "120 Years of Brasspounding" and SC-8 "The World Above 50 Mc." Each runs about 40 minutes. The 16 mm black and white sound films are F-48 "Teletypewriter; General Principles, Operation and Maintenance" and F-49 "Transistors; Servicing Techniques." Each film runs approximately 20 minutes.

Re Fifteen Meters. . . . K2UTC and other Official Observers have had to send quite a few notices to voice-using U.S. Amateurs for off-frequency work just below the 21250–21450 kc. U.S. phone sub-band. Careless operation? Or poor frequency calibrations? Whatever the reasons, we hope the OO notices have saved the amateurs concerned the more embarrassing FCC citations for off-frequency work.

While we're talking about 15 meters I suppose we should deplore some *local* QRM that complainants find fault with when DX is coming in-Sure enough when 15 or similar bands are *truly* closed to DX, local contacts with caution, can be made. But here is a band that increasingly

K1WJD's turn for a victory smile for a top of the pack showing in the January c.w. CD Party. The photo shows Bud NCSing EAN, complete with special log sheet and hex nuts. The station includes an HT-33A HT-32 75A-4 and coax switching, while antennas include dipoles for 80 and 40 and a TA-33 for the higher bands. (Photo by W1JYH!)

from now on our sunspot cycle is going to open quickly at times for country wide and worldwide DX. So ethical operation in this range imposes the personal operator responsibility to keep listening with special care, and curtail local Rag Chewing as signs of DX develop. ARRL's Operating Aid No. 11 states a number of accepted operating principles that ought to be closely followed, for the good of all. Send a radiogram to the League asking for same, if you can use this in your station. Three of the precepts applicable to what we have been talking about can be repeated here:

1. Listen with care when operating, to minimize interference.
2. For short distance communications, use the v.h.f.'s.
3. Adjust to minimum power necessary (no high power across town please).

On this last, the requirement is more than just an ethical point, it's a matter of law. The Communications Act, as amended, says something like this:

"Sec. 324. In all circumstances, except in cases of radio communications (relating to distress), all radio stations including those owned and operated by the United States, shall use the minimum amount of power necessary to carry out the communication desired."

Six-Meter Traffic Nets Invite Participation. Everywhere where there are six-meter operators there's new opportunity to "make with new fun and respect" through v.h.f. net operations. A good example of what we have in mind is the recent establishment of MSN, the Maryland Six-meter Net. It was launched by W3RKK, M-D-DC's PAM, with full approval by Maryland's SCM, W3QA. Also the new operation was warmly welcomed by W3QCW (RM MDD), and by W3ZNW the manager (RM) of MDDS, this section's successful *Slow Speed Net*.

There's daily liaison for traffic transfer between MSN and MDDS, which latter connects with MDD, the regular c.w. section net, giving NTS connections. The new six-meter net (50.150 Mc.) is open to any amateur, regardless of class of license. There are other 2- and 6-meter nets but few with *daily* skeds. Also many ARRL Phone Activities Managers and VHF PAMs are now ready to launch new six- and two-meter nets. They first usually aim at pledging a group of stations that will actively support at least a three-times-a-week operation. We feel there's a vast almost untapped reservoir of good operator potential here on six. Such nets are authorized (v.h.f. Sectionwide Nets) for every ARRL Section. If certain standards for QNI (reporting) per week and for netting results as approved by an SCM are met, ARRL Net Certificates can be issued as soon as three months after net formation. Six-meter phone and c.w. traffic activity eventually should serve a dominant role in emergency communications as well as traffic distribution. The feeling of results and well being from relaying, delivering or originating meaningful messages can belong to the v.h.f. enthusiast as well as for his h.f. net contemporary. May we wish these new enterprises well and invite all v.h.f. nets dedicated to emergency and traffic aims to register for the next ARRL Net Directory.

— F.E.H.

JANUARY CD PARTIES

We ran out of superlatives to describe the January 1965 CD Parties as soon as reports began to pour in. A combination of known (as well as unknown) factors added up to a terrific turnout in both sections, with an amazing showing on phone. Our pictured top operator K1WJD supplies interesting statistics on his c.w. stint: best QSO per hour rate was on 40 (40.4), followed by 20; highest number of contacts was on 80, ditto most sections; all adding up to a topnotch showing and high c.w. for January.

On phone, W1YNP single-operated W1ICP, turning in a 55-K-plus vocal total just edging out our usual top scorer K2QDT. Bob reports an excellent phone party with fine operating and wonderful 15-meter skip. But who else is *there* except K2EIU/5 says he!

The following are high-claimed scores, QSOs and sections. Final results will appear in the April *CD Bulletin*.

— W1YYM

C.W.

K1WJD	232,375-708-65
W1JYH	224,960-696-64
K4VFY*	221,760-687-64
K4PUZ	218,880-860-64
W9EWC[1]	191,455-649-59
K2EIU/5	191,360-592-64
W1EOB	189,120-584-64
W9YYG	175,770-562-62
W1ICP[2]	168,900-556-60
WA9AUM	162,260-526-61
KØAZJ	160,200-530-60
W9LNQ	159,400-490-64
W1SWX	159,340-507-62
WB2ALF	154,940-502-61
K9WIE	154,800-513-60
W1ECH	154,240-475-64
W4DVT	146,240-450-64
WØNYU	145,215-454-63
K5OCX	142,500-469-60
W6TYM	142,500-470-60
W4YAU	138,775-450-61
K8RDE	138,260-440-62
K1ZHS	134,815-450-59
W9MAK	133,045-444-59
W1DYE	131,865-442-59
W1BGD	130,845-422-61
WØCXN	130,560-408-64
K2PHF/6	128,710-415-61
W7AYY	127,490-412-61
K8MFO/8	126,850-423-59
W4YZC	124,490-415-59
WA5BNG	124,000-400-62
W4BZE	123,300-406-60
WA2WLN	122,100-400-60
K3YQJ	121,245-406-59
WA6WTD	120,170-391-61
W4KFC	119,255-384-61
W2GKZ	117,800-373-62
WA2UOO	116,370-426-54
W8VPC	115,900-373-61
W4WHK	115,500-380-60
W6YRA[3]	110,010-380-57
W9QQQ	109,800-366-60
W4MXU	108,600-355-60
WA1CRK	107,520-377-56
W4LK	106,790-362-59
K1ZND	106,700-381-55
K1AEG	106,400-380-56
K1YKT	106,030-366-57
W2ZVW	105,840-371-56
WA4PFQ	105,270-358-58
K7CHH	103,395-333-61
W6WX	103,200-337-60
K9DKU	101,360-362-56
K3KMO	101,100-330-60
K1EWL	100,200-327-60
K8TIG (K2SIL, W8s CQN FAW)	197,780-631-62

PHONE

W1ICP[2]	55,440-224-48
W1JYH	54,450-235-45
K2QDT	54,280-236-46
W1BGD/1	39,360-185-41
K2EIU/5	38,915-175-43
W1ECH	35,670-167-41
WA9BWY	34,850-166-41
W9NPC	33,200-160-40
K8RDE	32,565-161-39
K4QIO	27,030-159-34
K9MAN	27,000-150-36
W8WUO	26,100-145-36
WAØEMS	24,660-137-36
W4MXU	24,310-136-34
W4LK	23,040-128-36
K9DHN	22,605-132-33
W9LNQ	22,240-134-32
K1ZHS	21,280-126-32
K1CAU/Ø	20,520-110-36
W2ZVW	19,840-117-32
W4WQZ	19,520-119-32
K3RFH	19,250-110-35
WA2WLN	18,900-119-30
W7AYY	18,375- 99-35
W2PEV	15,520- 94-32
WB2ALF	15,360-122-24
K9HJS	15,035- 97-31
K1RQE	14,725- 95-31
W3IIC	14,140- 96-28
K9IVG	13,760- 84-32
W2GKZ	13,440- 89-28
W4ZM	13,200- 81-30
WA2UOO	12,870- 94-26
K1WJD	12,825- 88-27
WØWAS	12,090- 88-26
K2PHF/6	11,935- 70-31
KØYIP	11,745- 80-27
W8IBX	11,610- 80-27
KØLGZ	11,060- 79-28
WA2UWA	10,790- 83-26
KØGSV	10,400- 75-26
WA9FDQ	10,005- 66-29
W3KJJ	9,480- 73-24
WA2YLL	8625- 71-23
K1YKT	8505- 75-21
K1AEG	8480- 79-24
W1PYM/6	8400- 55-28
W1SWX	8160- 61-24
WB2DEP	7920- 63-24
KØJPL/Ø	7875- 58-25
K9RAS	7680- 60-24
W6TYM	7540- 53-26
WA4AGU	7500- 60-25
W9YYG	7200- 55-24
W9AQW	6600- 56-22
W4WBC	6425- 50-27
K4ANB	6405- 54-21
WA2BAH/2	6325- 55-23
W4KFC	6175- 58-19
W1WPO	6080- 57-19
K9GSD	5200- 46-20
K9UCG	5200- 47-20
WA8GYT	5100- 54-17
K8TIG (K2SIL, W8CQN)	40,560-201-39

[1] W9AQW, opr. [2] W1YNP, opr. [3] K9ELT, opr.
* Adjusted.

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are in GMT)

Apr. 1: CP Qualifying Run — W6OWP
Apr. 10–12: CD Party (c.w.)
Apr. 16: CP Qualifying Run — W1AW
Apr. 24–26: CD Party (phone)
May 7: CP Qualifying Run — W6OWP
May 15: CP Qualifying Run — W1AW
June 12–13: V.H.F. QSO Party
June 26–27: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Apr. 3–4; Florida QSO Party, *Florida Skip* (p. 142, last month).

Apr. 3–4: H-22 Contest, USKA (p. 98, this issue).

Apr. 10–11: Ohio QSO Party, Ohio Council of Amateur Radio Clubs (p. 116, this month).

April 17–18: Connecticut QSO Party, Candlewood ARC (p. 122, this issue).

Apr. 24–25: PACC, VERON (p. 98, this issue).

Apr. 24–26: Missouri QSO Party, Northwest St. Louis ARC (p. 120, this issue).

May 8–9: Russian Contest, Radio Sport Federation (next issue).

May 15–17: Georgia QSO Party, Columbus Amateur Radio Club (next issue).

May 16–17: Special operation from 4U1ITU. Details in a later issue.

W1AW SCHEDULES

Operating Hours

Daily: 2330 to 0530 GMT.

Visitors to the ARRL headquarters building, located on the same premises, are welcomed during regular office hours from 8:15 A.M. to 4:30 P.M. EST Mon. through Fri. The station will be closed Good Friday, April 16.

Operating Frequencies

C.W.: 1805 3555 7080 14,100 50.7 145.6
Voice: 1820 3945 7255 14,280 50.7 145.6

Frequencies may vary slightly from round figures given, they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:
C.W.: Mon. through Sat., 0100; Tues. through Sun. 0500.
Voice: Mon. through Sat., 0200; Tues. through Sun., 0430.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

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 Apr. 16 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted April 1 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION:* Note that since the dates are given in Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Apr. 16 becomes 2130 EST Apr. 15.

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.

Daily tape-sent code-practice transmissions are available on an expanded basis this season. These start at 0030 and 0230 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0230–0320; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0230–0320, 10, 13 and 15 w.p.m. daily from 0030–0100 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0230–0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your list by sending *in step with W1AW* and to allow checking strict accuracy of your copy on certain tapes, note the GMT dates and texts to be sent in the 0230–0320 GMT practice on those dates:

Date Subject of Practice Text from Feb. *QST*

Apr. 5: *It Seems to Us*, p. 9
Apr. 8: *"Quickie" Orbital Predictions for Oscar III*, p. 11
Apr. 14: *A.C. for Your Car*, p. 16
Apr. 20: *Operating the Teleprinter*, p. 29

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

Apr. 26: *Turns Ratio*, p. 28
Apr. 30: *Primary and Secondary Power*, p. 28

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.

WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours: ADST −3, AST −4, EDST −4, EST −5, CDST −5, CST −6, MDST −6, MST −7, PDST −7, PST −8, Hawaiian −10, Central Alaska −10.

A convenient conversion card is available, free of charge, from the ARRL communications Department, 225 Main St., Newington, Conn. 06111.

W1AW NOTE

W1AW now transmits bulletins and code practice on 160, 80, 40, 20, 6 and 2, as detailed above. Additional equipment for the station has been under long-term construction and is to be installed as fast as it becomes available. Note elsewhere on this page the frequencies and times for bulletins and for the two daily sessions of tape-sent code practice so as to make full use of these services. The use of additional operating bands will be reinstituted as rapidly as new equipment under construction and procurement becomes available and is installed.

ELECTION NOTICE

To all ARRL members residing in the Sections listed below:

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be received at ARRL on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nominating form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL [place and date]
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division hereby nominate.....
as candidat for Section Communications Manager for this Section for th next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
West Indies	Apr. 9, 1965	William Werner	Aug. 10, 1965
Idaho	Apr. 9, 1965	Raymond V. Evans	Apr. 10, 1965
Nebraska	Apr. 9, 1965	Frank Allen	June 10, 1965
Oregon	Apr. 9, 1965	Everett H. France	June 10, 1965
Eastern Pennsylvania	Apr. 9, 1965	Allen R. Breiner	June 15, 1965
Manitoba	Apr. 16, 1965	William H. Horner	Resigned
Iowa	May 10, 1965	Dennis Burke	July 2, 1965
South Dakota	May 10, 1965	J. W. Sikorski	July 3, 1965
Oklahoma	June 10, 1965	Bill F. Lund	Aug. 9, 1965
Western Massachusetts	June 10, 1965	Percy C. Noble	Aug. 11, 1965
Kentucky	June 10, 1965	Mrs. Patricia C. Schafer	Aug. 20, 1965
Northern New Jersey	June 10, 1965	Edward F. Erickson	Aug. 21, 1965
Southern New Jersey	June 10, 1965	Herbert C. Brooks	Aug. 26, 1965
West Virginia	July 9, 1965	Donald B. Morris	Sept. 18, 1965

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for January Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	293	1709	1593	106	3701
K6BPI	72	2206	1094	112	3484
W1PEX	71	650	596	30	1347
W0LGG	74	596	520	25	1215
W0OHJ	35	447	435	12	929
WA3CPT	34	438	382	44	898
WA2RUE	48	434	320	82	884
W3EML	29	460	364	5	858
K2TXP	5	382	363	14	764
K6EPT	75	341	299	42	757
W7DZX	10	380	329	8	727
W7BA	7	356	323	30	716
K7JHA	21	337	292	4	654
W3VR	46	301	279	7	633
W0ZWL	0	420	3	191	614
K9KZB	20	295	277	18	610
W8UPH	22	276	232	43	573
W6GYH	177	200	184	2	563
WB6BBO	26	286	239	10	561
W5PPE	18	268	260	8	554
W6WPF	3	263	234	29	529
W6ZJB	257	15	11	246	529
WA4BMC	176	194	139	18	527
WA2UZK	82	230	194	16	522
W6RSY	28	242	130	103	503
W1BGD	25	240	153	84	502
Late Reports:					
W5PPE (Dec.)	37	402	378	24	841
W6ZJB (Dec.)	49	356	345	11	761
K1LNC (Dec.)	121	321	171	18	631
WA4IJH (Dec.)	16	251	222	27	516
W7GUH (Dec.)	45	235	130	105	515
W5GHP (Dec.)	69	220	166	54	509

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W4LEV	164	1274	1227	47	2712
KR6GF	780	18	12	0	810
Late Report:					
W4LEV (Dec.)	337	1184	1088	98	2707

BPL for 100 or more *originations-plus-deliveries*

W7NPK 309	W9NZZ 110	W4NTR 103
W2EW 214	WA4OAO 109	Late Reports:
K3ZYP 160	W6JYK 108	WA2BNF (Dec.) 163
W4URX 146	WA4LHK 106	W1LES (Dec.) 118
K2UBG 141	W8DAE 106	K1WHM (Dec.) 105
WB2DXM 116	W6LRU 105	K4FLR (Dec.) 102

More-Than-One-Operator Stations

KR6DI 178 K1NAN 160 KR6MB 123

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: W1BGD, W2URP, K2VNL, WA8DDI.

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 a sum of origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Sacramento Valley	John F. Minke, III, WA6JDT	Feb. 25, 1965
North Carolina	Barnett S. Dodd, W4BNU	Apr. 10, 1965
British Columbia	H. E. Savage, VE7FB	Apr. 10, 1965
Michigan	Ralph P. Thetreau, W8FX	Apr. 10, 1965

In the Eastern Florida Section of the Southeastern Division, Mr. Albert L. Hamel, K4SJH, and Mr. Landon L. Hoyt, WYPLE, were nominated. Mr. Hamel received 549 votes and Mr. Hoyt received 263 votes. Mr. Hamel's term of office began Feb. 25, 1965.

In the Orange Section of the Southwestern Division, Mr. Roy R. Maxson, W6DEY, and Mr. Frank P. Merritt, Jr., K6YCX, were nominated. Mr. Maxson received 402 votes and Mr. Merritt received 82 votes. Mr. Maxson's term of office began Mar. 1, 1965.

C. D. ARTICLE CONTEST

A Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (in 800–1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1965 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map.

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 and time of receipt. All totals shown represent submissions received through January 31, 1965.

W1FH....313/339
W4DQH....313/337
CX2CO....313/334
W2AGW....313/337
W3GHD....313/337
W1GKK....313/338
4X4DK....313/331
W8PQQ....313/330
W6CUQ....312/337
W8JIN....312/337
W9RBL....312/337
W7GUV....312/335
W8BRA....312/335
W8UAS....312/333
W4GD....312/333
W8HGW....312/337
W2TQC....312/331
W2LV....312/331
W2JT....312/331
W2BXA....312/336
HB9J....312/336
W2LPE....312/333
G2PL....312/335
W8BF....312/333
W3KT....312/336
PY2CK....312/335
G4CP....311/335
G3AAM....311/335
W8EWS....311/335
W9NDA....311/335
W8KIA....311/335
W8MPW....311/329
W7PHO....311/329
W8DMD....311/333
W1JYH....311/334
W3LMA....311/333
W9YEV....311/335
W6AM....311/336
W4OGW....311/328
W2ZX....311/330
W2SUC....311/328
W2BOK....311/328
G3FKM....311/328
K3UPG....311/335
DJ1BZ....311/329
DL3LL....311/327
CE3AG....311/335
W1CLX....311/334
W9HUZ....311/331
W6YY....311/331
KV4AA....310/334
W2DEC....310/326
W1ME....310/333
W0QVZ....310/331
W9LNM....310/333
W8KML....310/334
W1BIH....310/331
W5MMK....310/331
W4AIT....310/333
W8LKH....310/330
W0DU....310/332
W8JBI....310/329
OE1ER....310/332
W3JNN....309/333
W6GPB....309/330
W5KC....309/332
W6EBG....309/334
W7GBW....309/333
K2BZT....309/326
G8KS....309/327
K2DCA....309/326
W5ABY....309/326
W0BFB....309/327
W4TM....308/330
W9AIW....308/331
W4ML....308/328
VE7ZM....308/332
LU6DJX....308/332
W0ELA....308/331
W2ZGB....308/324
W5AFX....308/333
W0ADF....308/325
W2LAX....308/325
W2TVR....308/326
W8DAW....308/332
W2AYJ....308/327
K4LNM....308/322
W4OPM....308/323
5Z4AQ....308/326
W1HZ....308/236
W3JTC....307/330
W2UVE....307/325
W5CKY....307/326
W2WZ....307/330
W7ENW....307/331
W0NTA....307/327
W2OKM....307/325
W2FXN....307/321
W4VPD....307/324
W0SYK....307/325
W5UX....307/322
K6ENX....307/324
W6CYV....307/325
W2TP....307/316
W9AMU....306/323
W3RNO....306/328
W4GXB....306/327
W3WGH....306/321
W1ZW....306/323
W4PLL....306/321
W3ECR....306/323
W8IRN....306/324
W2FZY....306/319
K4AIM....306/320
K6EVR....306/323
W3GAU....306/329
W8NGO....306/323
W4LYV....305/325
W1MV....305/322
W8PUD....305/322
K2LWR....305/318
W9GIL....305/322
DL6EN....305/320
HB9MQ....305/322
PA0FX....305/325
W4OM....305/327
W2HTI....305/320
DJ2BW....305/322
W7AC....305/329
W2GUM....305/327
W0PGI....305/320
I1AMU....305/324
W4MR....305/325
K2GFQ....304/325
W5ADZ....304/326
G3YF....304/326
W2HNJ....304/324
K2OEA....304/320
W7WVE....304/321
W2NUT....304/320
W0QGI....304/320
W1HX....304/324
W9KOK....304/328
K4RID....304/318
W6WWQ....304/321
DL3RK....304/321
W2PCJ....304/321
WA2IZS....304/321

Radiotelephone

CX2CO....313/334
W3RIS....313/338
W9RBI....312/335
W8BF....312/333
4X4DK....312/330
PY2CK....312/335
W8GZ....311/334
W7MHO....311/329
W8MGW....311/333
W4DQH....311/333
W2ZX....311/330
W8KML....310/331
W1FH....310/331
W2JT....310/324
5Z4ERR....310/332
W6YY....310/330
PY4TK....310/327
W8PQQ....309/326
W9JJF....308/325
W3JNN....308/329
W2BXA....308/330
W6AM....306/330
TI2HP....305/327
WØAIW....304/325
W4OGW....304/313
I1AMU....304/327
K4AIM....303/317
G8KS....303/315

New Members

From January 1, through January 31, 1965, 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.

W6RKP....301
SM3TW....224
W1GDQ....199
VE6SF....195
K8VUR....168
YV5BIG....167
EP2DJ....146
W6JTA....129
VE3AVV....120
KR6JZ....120
4X4ON....117
K1NWE....115
DJ6QP....114
DJ0KQ....111
VE1AFY....110
WB6CEG....106
VE3ACD....104
WA2TKL....103
WA4NST....103
W9LQR....103
KA2CM....103
K2MHE....102
WØQEV....102
W3NWB....101
WB6CIY....101
K8AEX....101
DJ1TX....101
OZ3KE....101
W5KGJ....100
W6WKJ....100
K7PJF....100
K9QVB....100
JA8BY....100
LZ2FN....100
LZ2VB....100
SM2RI....100

Radiotelephone

W6RKP....289
VE6SF....181
K8VUR....166
K8VDV....141
F8AHV....124
OZ3SK....116
K4IIF....113
TU2AE....113
HK4DP....105
IITRA....105
OH2XA....104
W6MBV....102
VE1AFY....102
W2AUO....101
WA4LWE...100
OZ3KE....100

Endorsements

LA7Y....322
W4AAU....321
W6ID....312
WØAJU....312
K4ICK....311
W1BAN....310
W1IAS....310
W2RDD....310
W4LRN....310
W5PM....310
W6HX....308
W8KBT....305
W1CKA....302
W9DWQ....301
OK1FF....301
K4TML....300
JA1DM....300
G2BOZ....300
WØAIH....295
G3HCT....293
W6IBD....292
W4PAA....291
W6LN....291
W9LTR....282
G3KZI....281
K4HNA....280
W7UMJ....280
W6KYG....274
W2BHM....272
W5OOS....272
W2AZS....270
W4RLS....270
K6EDE....270
W6LGZ....270
K8IKB....270
II8M....263
W1BPW....262
W9ERU....261
W2RA....252
KP4DBA....251
W3YZI....250
WA2RAU....247
K8VDV....244
HK3LX....244
K5JZY....240
K8EVZ....240
W9IVG....240
W9GUV....240
W3QMG....236
W3DJZ....235
K1DIR....235
W9NLJ....234
WØSLB....230
K1HVV....227
W2ODZ....221
W6PQT....221
W1YYM....220
W5AI....220
HB9NU....220
K1IMP....218
ZL4GA....218
W2CZF....212
K7ADL....211
WA6TNE....210
W6UMI....210
W8LUZ....210
Z86VX....206
W2LJF....201
K6PCC....200
VY2BOA....200
W2YCW....194
KL7DTB/6....193
W4VMS....191
W2FVI....190
W2FXE....190
WA6OHJ....190
WØFDL....190
OE8K1....190
K8AJK....181
W1ECH....180
K2BG....180
K4RZK....180
WA6GFE....180
W7DQM....177
K4VBV....175
VE2BCT....174
DJ2SR....173
W1MD....171
K9CVE....171
WØWRO....171
K8ZBY....170
WA4LYQ....168
K7UCK....162
WØJSN....160
W9QQN....160
DJ1QP....160
VE3UR....154
W2KXL....153
W9GXH....151
W9YYG....151
K9WJU....149
SM7BGM....148
W4WBC....142
W2HWA....141
W7QY....141
W2RJXD....140
WB2KID....140
W2JSX....132
WA5EFT....132
WA2YWI....131
W1HNI....130
WA2RMP....130
SM2ABX....130
SVØWAA....130
W1QUS....126
VE3HL....122
K4MOJ....121
W9TQA....121
K2AFY....120
WA2CFG....120
WA2IZV....120
K6IMT....120
W9FJX....120
WØLBS....120
II8ZE....120
W5HTM....116
K2JJK....113
IS1SZU....113
JA8GR....113
W4GTS....110
W5RTG....110
KP4BAJ....110

Radiotelephone

HB9J....314
W1ONK....312
W2VCZ....301
MP4BBW....300
K1IXG....290
W4PAA....282
K6BVR....281
W1JXH....273
W5IZW....273
W9BER....272
K4HYL....270
W4MS....266
W4RLS....264
II8M....261
W2PTM....260
WA2ELS....254
W9LTR....247
WA2RAU....242
HK3LX....241
W4PJG....240
W2GBC....238
W3YZI....238
W2WMG....233
W3DJZ....231
W4FPS....230
OA4CV....230
K6ERV....225
OA4PD....225
HB9NU....220
OA4CW....220
WØIK....218
W9BGQ....214
W3QMG....213
W1DGJ....201
W2CZF....200
WA2HOK....200
OA4KY....200
W9IVG....198
II2PB....198
K1CDP....191
W2GHK....191
K2OEA....190
W8EVZ....186
VE3BKL....182
W6KTE....180
II8CA....177
W7DQM....177
VE2BCT....174
Z86VX....166
I1AHW....164
W9DWQ....161
W8JFD....160
W8KUP....160
WØQUU....155
W9TKD....154
WA4JOS....151
WA4LYQ....150
VE3UR....148
K2YLM....146
W4VMS....142
K1IMP....141
KP2AU....141
W2JSX....131
VE3EUU....124
VE2ANK....121
VE3AGC....120
W9NIJ....115
K2JJK....113
K4FTZ....110
K8AXG....110

Station Activities

ATLANTIC DIVISION

DELAWARE—SCM, Roy A. Belair, W3IYE—PAM: W3CFA. RM: W3EEB, DEPN meets Sat. on 3905 kc. at 1860 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Appointments: K3NHL as OPS. W3BDP as OES. Renewals: K3KAJ as ORS and EC. K3NHL has a 40/20 beam and provides DX with Delaware contacts. K3OBU is setting up Oscar III skeds. K3SXA will be stationed in New London, Conn., for the next three years. The Delaware Hamfest and Picnic date is Aug. 15 with Aug. 22 as the rain date. If past performances are any indication this is one *not* to miss. Traffic: W3EEB 192, K3YZF 79, W3JJ 22, K3YHR 6, W3IHKS 5, K3NYG 4, W3IYE 2.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SG1, W3SAO. E. Pa. C.W. Net lists 483 QNI with QTC of 391. PTTN Training Net lists 310 QNI with 139 QTC. The First Annual Section Meeting for 1965 will be held Apr. 17 at Old Colonial Inn, Susquehanna, Pa. Interested amateurs not on our regular mailing list should contact W3EML, K3YVG or this office for complete data. Neither League membership nor section appointment is required to attend. Everyone is welcome. W3CUL is taking a needed rest in Florida. W3IVS is tending the store during the absence. K3TVT has been keeping upper Bucks County represented in the PTTN. K3QGX has activated the airways again after a stint with the Armed Forces. WA3CKA, formerly of W2-Land, also is active on 75-meter phone. W3QDW and W3EEN have been keeping the Pill Peddlers QRL with the flu bug and claim they have been missing out on the traffic fun. The fist of W3JKX still is quite stiff after the operation. WA2WFM now is WA3BWG in the Levittown area. K3VRP and K3WKG are on 80-meter mobile and planning for 160. K3WEU reports the Shriner's Hospital class soon will come forth with some new licensed operators. WA3BFR installed a home-brew modulator and has entered the phone band QRM. New club officers—Warminster ARC: K3ZAC, pres.; K3QXB, vice-pres.; K3YEQ, secy.; K3OBR, treas. Susquehanna Valley ARC: K3ARR, pres.; W3SGI, vice-pres.; K3SJK, secy.-treas. WCAU ARA: W3HKZ, pres.; W3GSC, vice-pres.; W3HGZ, secy.-treas. The North Penn ARC has moved its headquarters to the Women's Club of West Norriton, Jeffersonville. K3KBN is now at East Tennessee State University, New Gear Dept.: K3NKO new Valiant II; K3AOH a BC-221 frequency meter; W3ID an 80-meter dipole; K3HIE, two 10-meter mobiles; RTTY for L3LTI and K3VDT. The newest operator in the Milton area is WA3BZO. W3AHZ has resigned as Montgomery County EC in favor of K3EZJ, wob is now EC anad C.D. Radio Officer. Traffic: W3CUL 3701, W3EML 858, W3VR 633, K3MVO 446, K3MYS 171, W3ZRQ 140, W3ELI 121, K3WEU 118, K3YQJ 116, K3FHR 108, K3HNP 108, WA3BYH 86, W3JKX 75, W3QDW 67, K3YVG 63, K3PIE 62, W3VAP 60, K3RUA 56, K3RZE 54, W3RV 36, K3HKW 27, K3KTH 24, W3MPX 22, K3LSV 20, K3PWM 20, W3CBH 19, K3MHD 17, K3MNT 8, K3TYI, 8, WA3CKA 5, W3LXN 4, W3PDJ 4, W3ADE 3, W3ID 3, W3KJJ 2, W3OY 2, K3HTZ 1.

MARYLAND—DISTRICT OF COLUMBIA—SCM, Bruce Boyd, W3QA—SEC: W3CVE. RMs: K3JYZ, W3QCW, W3UE, W3ZNW. PAMS: W3JZY, W3RKK.

Nets	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*Ave.*
MDD	3643	0000Z	Daily	31	314	10.4
MEPN	3820	2200Z	M-W-F	22	23	
MEPN	3820	1700Z	S-S			
MDDS	28100	0130Z	Daily	31	54	1.7
MISTN	50150	0100Z	Daily			

Traffic News: A new traffic net (MISTN) has been started, credit to W3RKK. Using 6-meter phone, it attracts new operators and reaches new areas in the section. W3ZNW says MDDS is expanding and K3UXY is helping the expansion by sending out 1000 letters describing the net to new hams. K3ZYP is the BPL star for the month. W3PQ made effective use of 160 meters. K3VHS was NCS for MEPN. W3PQT picked up a good message total on several state phone nets. Congratulations to WA3APQ on starting his traffic career with his first six messages this month. *Technical*: K3NCQ is on 432 Mc. W3YKQ is a new OES. W3JZY lost all of his low-band antennas in the mid-January ice storm but kept going on v.h.f. *General*: W3CDQ is helping the Washington QCWA with banquet reservations. K3OAE has returned to M.I.T. (W1MX) until June. K3OSX finds that night school four times a week cuts into net activity. K3QDD is bogged down by exams. K3GUR and K3KMO are concentrating on DX and K3JYZ is looking forward to the DX Contest. K3EOV is transferring his mobile rig to a new car. *Special*: W3CVE reports the start of a large scale radio training program for boys sponsored by the National Boy Scout Headquarters. W3CVE is in charge of the code study phase of this program. Traffic: (Jan.) K3ZYP 241, W3PQ 128, W3ZNW 96, W3PQT 87, K3UFV 86, K3TJE 82, W3RKK 68, K3GZK 54, K3UXY 51, K3JYZ 49, W3QCW 48, K3VHS 43, K3QDD 27, W3EOV 25, W3UE 22, K3LFD 21, K3LLR 18, K3OAE 17, K3OSX 14, W3ATQ 8, WA3APQ 6, WA3BNL 4, W3BWT 2, W3QA 2, WN3AJR 1. (Dec.) W2PQT 120, W3EOV 29, W3RKK 19, W3YZI 14, K3RUQ 12, W3MCG 11.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RM: WA2BLV. WB2PHV, Northfield, has been appointed ORS. The Salem County Radio Club elected K2GYM, pres.; W2FQK, vice-pres.; WA2FGS, secy.-treas.; K2ARY, act. mgr. The 6 UP ARC of Burlington elected W2KUU, pres.; K2AJJ, vice-pres./act. mgr.; K2QIJ secy.-treas. The club is making plans now for Field Day. WB2GUK, Atlantic City, has been appointed Asst. EC for Atlantic County in addition to being made an ORS. The DVRA elected the following officers: W2VU, pres.; W2HX vice,-pres.; K2PGB ,secy.; W2TAM, treas. N.J. Phone & Tfc. Net totals for Dec.; 31 sessions, QNI 596, traffic 289. W2IU made 27 QSOs in the CD Party on 160 meters. The Southern Counties ARA elected the following: WB2PHV, pres.; WB2FIS, vice-pres.; W2TUR, treas.; WB2MRA, secy. Gloucester County ARC paper continues to be filled with worthwhile information. K2JKA is editor. The club welcomed W4ID of Eau Gallie, Fla., as a new member. W2OQS, Riverside, is back in circulation after a recent operation. He is a member of the Burlington County Radio Club. This club meets the 2nd Mon. K2BG is secy. The Rancocas Valley ARA meets in Riverside on the 1st Tue. WA2DLC won the League's Golden Anniversary Contest for his essay. He is a member of the Shore Area Amateur Radio Club. WB2AYJ and WB2GUK are conducting radio classes in the Atlantic City H.S. The school station is W2ZMU. Many thanks to the club secretaries who are sending me monthly reports. Also thanks to the editors of club papers, which are a great help to me. Traffic (Jan.) WB2GUK 101, W2RG 95, WA2KIP 92, W2ZVW 83, K2RXB 53, W2MMD 52, W2ZI 31, WA2VAT 23, W2GIW 2, W2IU 2, WA2KAP 2. (Dec.) W2GIW 8.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ZRC. PAM: W2PVI. RMs: W2RUF, W2EZB, W2FEB. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800. NYSPT&EN on 3925 kc. at 2200 GMT. NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at 0900 Sun. and 3510.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 1900. IPN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 and 2345 GMT. NYSCN on 3510 kc. Sun. at 1000 and 3670 kc. at 1700 Sat. Please note that we have a new SEC, Dan Clark, W2ZRC, 1144 Grover Rd., East Aurora, N.Y. Dan succeeds W2ICZ, who had to resign for business reasons. AREC queries should first go to your EC, or if you have none, then to W2ZRC. Many thanks to W2ICZ for his efforts the past few years. W2RUF, Net Mgr. for NYS C.W., reports that W2FEB won the most valuable station award and W2FCG the award for the most

• 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.

QNIs with 340/366. Traffic handled for 1964 was 5678 messages. W2IYR has been appointed OES. New officers of the Otsego ARC are K2DLB, pres.; W2QHM, vice-pres.; Clyde Becker, treas.; W2VGM, secy. Sorry to report that K2IHO has become a Silent Key. Wally had been licensed continuously since 1931. The Walton RA elected W2FMU, pres.; K2TMG vice.-pres.; W2OSL, secy.; K2STS, treas.; WB2FWG, act. mgr. Lackawanna RC's officers are K2HQN, pres.; K2PMC, vice-pres.; WA2JV, treas.; WB2ARG, secy. The club recently held a meeting at the Buffalo Eye Bank and members are active in the Eye Bank Net. W2UTH has a new tower. K2MIP is the new pres. of the Seneca Drums ARC. W2QY retired from Ek Co. and W2RUJ. K2DZV, W2ICE, W2YBK, W2PSD, K2SSB, WA2KND and W2UTH were among those present at the party. Now is the time to write to the Dept. of Transport, Telecommunications Branch, Ottawa, Ontario, for permit forms so that you may operate your mobile or portable rig in Canada for that vacation trip this summer. The f.m. group in Erie county, headed by W2EUP moved its repeater to Wethersfield in Wyoming county and, as a result, several mobile-to-mobile contacts have been made on 2 meters between Buffalo and Syracuse. 146.94 Mc. is the calling frequency nationwide. Traffic: W2OE 271, W2GVH 270, W2RUF 192, K2KQC 151, W2-FEB 139, K2JBX 134, W2HYM 102. WB2IJF 73, WA2-TVI 72, W2MITA/2 65, K2IMI 30, WB2JQS 30, K2RYH 24, W2FCG 23, WB2NZA 16, K2OFV 15, K2AYQ 14, K2-DNN 11, WA2GLA 9, K2MIP 8, K2HOH 6, W2PVI 5, WB2FPG 4, WA2PZD 1, WA2QVR 1.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—Asst. SCM: Robert E. Gawryla, W3-NEM. SEC: K3OTS. PAMs: W3TOC, K3VPI (v.h.f.). RMs: W3KUN, W3MIFB, W3UHN, K3OOU. Traffic nets: WPA, 3585 kc. 0000 GMT Mon. through Sun. KSSN, 3585 kc. 2330 GMT Mon. through Fri. The Two Rivers ARC and Cathedral Prep ARC gained ARRL affiliation. Election news: Greater Pgh. V.H.F. Society officers are W3EWV, pres.; K3TRN, net mgr.; K3-WNZ, treas.; K3QBI, secy.; W3BWU and K3JTH, trustees. Carnegie Tech. ARC officers are K8RSP, pres.; K3IRS, secy.-treas.; K8BCK, chief op. Huntingdon ARC: K3OVY, pres.; K3AYV, vice-pres.; W3-WIV, secy.; K3TEZ, treas. Metropolitan Erie V.H.F. Society: K3SBT chairman; K3SBC, treas.; K3UVL, secy.; WA3ANA, hamfest chmn.; K3SBU, FD chairman; W3KPJ, cert. chmn.; **K3WTZ, historian. K3ZGI** counted the ballots. Gleaned from monthly club bulletins: Coke Center ARC—K3PPZ put a new TR-3 on the air. W2QCP acquired a Globe Champion 300. WN3-AWC gained full membership status. Two Rivers ARC —K3SQP and WA3AYC have gone mobile. WA3AOC and W3OFM are ham band chess addicts. W3LHN was appointed Asst. EC for Allegheny County AREC. K3PIB operates a new TR-3. K3CFA is designing a direct phasing type s.s.b. exciter for 6 meters. 72-year-old youngster W3VV feeds a 61-ft. vertical with a kw. final. New gear at the shack of W3GSI is 32S-1 while W3VPK sports a new 75S-1 receiver. WA3CKV is the new call of the Northwestern Penna. DX Club. W3NEM is active in the WPA, 3RN, EAN and TCC traffic nets. W3LEZ, K3FFJ, WA3AIR, WA3AGS and ex-W3BCE all work in the same office at the Letterkenny Army Depot. K3QWZ K.3USC, K3SBU and W3-UHP lost antennas during a severe January sleet storm. W3AQY works s.s.b. on 6. K3GSJ received a 24-hour clock from his fellow employees. K3HFL built a milliwatt 6-meter transceiver. K3AFO studies electrical engineering at Gannon College. K3ZGG burns the midnight oil on 10 meters. WN3IWA passed the General Class exam. Another ham family in the Erie area is K3FKQ, WN3BAH and W2MBC. K3UIK runs an Ameco 6 & 2 transceiver on 6. K3FLK received his 20-w.p.m. certification from ARRL and will tackle the Extra Class exam. Endorsements: K3OOU and K3ZMH as ORSs; W3KPJ as OBS. Traffic: (Jan.) W3KUN 129, K3PYS 97, K3TEZ 85, W3LOS 84, K3ZMH 37, K3SOH 24, W3UHN 24, W3JHG 21, W3GJY 16, K3SMB 14, W3MFB 13, W3JYI 10, W3RUL 9, W3TOC 7, W3OEO 6, W3YA 6, K3EDO 5, W3LOD 2. (Dec.) W3JHG 10.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: George J. Nesbed, W9LQF. SEC: W9RYU. RM: WA9DXA. PAMs: W9VWJ and WA9CCP. Cook County EC: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. New calls heard in the Springfield area are WA9LDC and WN9NZC. A new Central Division Red Cross Net has been inaugurated. All those interested in Red Cross activities are asked to check in every Mon. at 5:30 P.M. on 3980 kc. s.s.b. WA9AJF received his 40-w.p.m. Code Proficiency certificate. W9NLT demonstrated construction of test equipment at a recent meeting of the North Shore Amateur Radio Club. The Central Illinois Radio Club (Bloomington) participated in the March of Dimes Mothers' March. Cook County amateurs were very active during the sleet storm which paralyzed many communities in the northern part of the state. The Lane Tech. High School Radio Club has reactivated its club station, W9WKR. W9IDA's new call is W5OBD. W9HFF is heading the code and theory classes at the Fulton County Radio Club (Canton). During January, the ILN handled a traffic count of 65, and the North Central Phone Net's count was 395. The Ninth Regional Net had a QTC of 878. WA9DXA has a new T-150. W9PNE has logged his 40th country on 160 meters. W9NWK reports that the Interstate Single Side Band Net handled 316 messages. WN9MQU is using a Heath kit Twoer with a new eight-element Hy-Gain beam. WA9ABT has installed the W8KR full break-in system. The Ill. V.H.F. PON (Post Office Net) meets every Mon. on 50.9 Mc. at 8 P.M. CST. WA9BYF was appointed Communications Officer for Oaklawn and Evergreen Park Civil Defense. Our sympathy to the families and friends of W9UE, K9ZNU and W9RRX, who recently joined the ranks of Silent Keys. The Starved Rock Radio Club will hold its Annual Hamfest June 6 at Ottawa. The Proviso East High School Amateur Radio Club has received the call WA9LWF for its club station. The new officers of the club are WA9GPH, WA9-CWX, WN9JZM and WN9HVW. A certificate is being given for proof of contact with four members of the club. K9BTB and W9VPU are finalizing equipment to utilize facilities of Oscar III. The officers of the newly-formed Red Devil's Sparks Club of the Hinsdale Township High School are W9DUH, WN9LYR, WA9IJL and WA9IYZ. The Six Meter Club of Chicago held its 4th Annual Banquet March 6. K9QYY has been appointed emergency communications chief for the 9th Navy MARS district covering 13 states. New appointments include WA9KKA, WA9LYV, WA9MED and W9CF as OESs, WA9GCM as OBS; WA9APT as ORS. WA9CCP also has been appointed a PAM to help W9VWJ. K9-KZB is the only BPL recipient this month. Traffic: (Jan.) K9KZB 610, WA9CCP 415, WA9CNV 169, WA9-DXA 82, WA9GUM 62, K9BTE 54, W9JXV 32, WA9-AJF 24, W9MAK 24, K9HSK 18, W9PRN 14, W9IDY 12, W9UCG 7, W9LNQ 6, K9RAS 4, K9SKR 4, WA9FIH 2, WA9EBT 1. (Dec.) K9GSD 304, K9QYY 18, (Oct.) K9-WUA 70.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. New appointments: K9TQQ as EC of Fulton Co., W9DKP as EC of Rush Co., K9KTL and WA9AVT as ORSs.

Net	*Freq.*	*Time*	*Jan. Tfc.*	*Mgr.*
IFN	3910 kc.	1330Z daily 2300 M-F	193	K9IVG PAM
ISN	3910 kc.	0000Z daily. 2130 M-Sat.	314	K9CRS PAM
QIN	3656 kc.	0000Z daily	107	
RFN	3656 kc.	1200Z Sun.	57	
HVHF			37	K9GLL PAM

W9QLW, RM 9IRN, reports 100% representation by Ind. in 9RN and traffic of 313. Silent Key W9TT is sadly missed. The Marion Co. AREC Net meets Tue. at 2000 EST, on 50.7 Mc. Tipton Co. ARC officers are WA9FHF, pres.; WN9NOG, vice-pres.; K9HMX, secy.; W9CXM, treas. BPL winner: W9NZZ. QIN Honor Roll: K9VHY, K9HYV, W9TT, K9KTL, WA9AVT, W9IQW. WA9EED is using an indoor long-wire antenna. Will your club be represented at the IRCC meeting at Butler Univ. on Apr. 4? Richmond hams were active after fire destroyed the telephone exchange. WA9JHP has remodeled the shack. The Hoosier Lakes Radio Club, members, wives and guests enjoyed an annual banquet at Winona Lake, Ind., Feb. 4. After dinner Pres. WA9LMW introduced the 18-member North Webster School Swing Choir, for the evenings excellent entertainment. *Amateur radio exists because of the service it renders.* Traffic: (Jan.) K9IVG 361, W9NZZ 184, W9TT 177, W9MM 165, W9QLW 134, WA9-AVT 132, WA9BWY 118, WA9FDQ 85, W9BUQ 82, W9-VAY 75, K9VHY 66, W9OG 54, W9YYX 53, K9EFY 52, WA9AUM 37, W9DGA 37, W9ZYK 29, W9FZW 26, K9-KTL 22, K9AJC 21, W9FWH 21, K9QVT 20, W9RTH 20, W9SNQ 19, WA9GXC 14, WA9BGI 12, W9DZC 12, WA9BRD 11, K9WET 10, W9FJI 9, K9RWQ 9, W9DOK 8, K9FPA 8, K9ILK 8, K9UEO 7, W9URQ 7, W9BDP 6, K9UHQ 6, K9DHN 5, W9HWR 5, W9CLY 4, K9FHQ 4, W9ZZR 4, WA9GKF 3, K9IIV 3, W9TKK 3, WA9ASZ 2, K9DHJ 2, WA9DVJ 2, K9PNP 2. (Dec.) WA9IZR 68, K9DHN 60, W9CLY 20, W9ZBP 15, WA9GXF 11, WA9AMY 8, W9DKR 8, W9BDP 6, K9SNQ 6, WA9DPS 5, K9QJT 2. (Nov.) W9CLY 13, K9DHN 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. RM: W9IQW. PAMs: W9NRP, K9IMR, K9HJS, WA9EZT.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Manager
WIN	3535 kc.	0045Z	Daily	26	220	46	W9IQW
BEN	3985 kc.	1300Z	M-F	22	128	19	W9NRP
BEN	3985 kc.	1800Z	Daily	31	518	128	K9HJS
WSBN	3985 kc.	2315Z	Daily	31	1133	190	K9IMR
SWRN	50.4 Mc	0300Z	M-Sat.	25	477	10	WA9EZT

New appointments: W9HWQ as EC for Trempealeau County, W9CBE as OBS, W9GOC as OPS, WA1BWF as OES. Renewed appointments: W9FXA, as ORS, K9-GDF as OPS, K9DKU as OBS. Net certificates went to W9TT for WIN; W9DCK, WA9DHO, K9FWN, WA8-AYG, WA8HBP and W9LWY for WSBN. Coming events: The hamfest sponsored by the Ozaukee County RC at Belgum, Wis., on May 15 and the WNA picnic at Neenah, Wis., July 11. Wisconsin had 100% representation on 9RN for Jan. New on 2 meters is WA9JGO. W9VSO led Wisconsin OOs for Jan. with 9 notices sent. New officers of the Jefferson County ARC are W9SCM, and W9NRP. Traffic men are complaining about the lack of traffic. No one made the BPL in Jan. W9CFS is Radio Officer for Portage county. W9QQQ has a new SB-400. Traffic: (Jan.) W9CXY 237, W9DYG 233, K9HJS 149, K9IMR 122, W9IQW 92, W9YT 47, W9AOW 42, W9GOC 41, WA9GJU 38, K9AIF 33, W9NRP 33, W9CBE 26, W9AYK 24, W9HWQ 23, K9DJY 19, W9IRZ 18, K9GSC 14, K9KPS 14, W9VAJ 10, W9OTL 7, W9RQM 4, W9QQQ 3, W9WJH 3, WA9EDZ 2, W9FXA 1. (Dec.) W9WJH 64.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Mejdrich, WØOPX—Asst. SCM: Herman R. Kopischke, Jr., WØTCK. SEC: WAØBZG. RMs: WAØEPX, KØJFJ. PAMs: KØFLT, KØVPJ. MSSB PAM: WØHEN. V.H.F. PAM: WAØCQG. MSPN meets M-S on 3820 kc. at 1800Z and 2300Z; MSSB, M-Fri. on 3805 kc. at 1730Z, 3812 kc. at 0045Z; MSN (c.w.) M-S on 3595 kc. at 0030Z; MJN (slow speed c.w.), 3595 kc. at 0100Z; 6-Meter Net, S-Fri. on 50.25 Mc. at 0430Z; North Star YL Net on 3820 kc. at 1500Z each Tue. Appointments endorsed: WØWAS as OO, KØMEQ as EC. New officers of the RARC are WAØEWK, pres.; Bob Rossi, vice-pres.; KØJFV, secy.; WAØCCA, treas.; KØJXB, custodian; KØSAZ, editor. OPS WAØBYO is operating from a new QTH in Rochester, using a Marauder Warrier, a Drake 11-B and a Hy-Gain vertical. WAØEWK, KØPSI, WAØFVL and WAØEWN have been enjoying fine 6-meter openings to the East Coast. WØMBD has acquired a 90-ft. antenna supporting windmill tower. EC KØMEQ is pleased with his new 41-ft. high three-element Mosely. Welcome to KØEWC, back on the air again. Jim operates at KOTE at Mankato. Welcome to newcomer WAØGLU, who is on 40- and 20-meter c.w. RTTY OBS WØFLK increased the power to 950 watt. The submitting of this report brings to a close the two-year term of WØOPX as SCM. Throughout my term and especially during the period of the League's Incentive Licensing program the efforts and assistance of the Directors, ECs PAMs, RMs, OOs, OBSs, OESs, OPSs, QRSs, officials of affiliated radio clubs, the League's Hq. staff and the many friends and net members were greatly appreciated. The OM and I will keenly miss you all. The new QTH of WØOPX and WØRIQ will be Box 274, 833 Palo Verde, Eagle Mt., Calif. 73-88. Traffic: (Jan.) WØGRW 61, WØRA 60, WØHEN 59, WAØIAW 51, KØZRD 41, KØFLT 40, WØTCK 34, KØQBI 33, KØVPJ 30, KØJFJ 29, KØSRK 29, WAØBZG 20, WØOSJ 20, WAØIEF 18, WØUMX 18, WAØEPX 17, WØKJZ 17, WØMXC 16, WAØDOT 15, WAØEDN 13, WØFKC 13, WØATO 12, WAØFCJ 12, KØLJU 12, WAØHJ 11, KØZKK 11, WAØACI 10, KØIGZ 10, WAØDFT 9, WAØDGW 9, WAØFIE 8, WAØEZQ 5, KØZRC 5, WØLIG 3, WØSZJ 1. (Dec.) WØGRW 104, WAØEPX 19, WØFCJ 14, WØKJZ 11, WAØETO 7, WAØJDG 6, WØTIV 6, WAØFUR 1.

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—PAM: KØTVY. The Minot Amateur Radio Assn. held its annual election Jan. 11. The following officers were elected: WØHVA, pres.; WØDRJ, vice-pres.; WØHJU, 2nd vice-pres.; KØYWD, secy.-treas.; WØGJJ, act. mgr.; WAØELN, sgt. at arms. The North Dakota Net reports 25 sessions with 175 check-ins, 14 for a maximum and 4 for a minimum and handled three formal and five informal messages with two relays.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—Asst. SCM: Jene H. Melton, WAØDEM. SEC: WØSCT. RM: KØGSY. Sioux Falls ARC has changed its meeting night back to Mon. KØCVF won the SFARC WAS contest. WAØAOY ras a new HW-12 with station and mobile power supplies. WØENC reports nightly skeds with WAØFDY, St. Paul, on 144 Mc. Bob has now worked 28 states and 7 call areas on 144 Mc. with maximum distance 1250 miles. WØCUC and WAØIQI are in India. The EC certificates of WAØCKH and KØYJF have been endorsed for another year. KØVYY has purchased a sideband converter for his 500. WØLXO, formerly of Watertown, now is located in Sioux Falls. WØRWE is the new RACES Radio Officer for Minnehaha County. Traffic: WØZWL 614, KØGSY 373, WAØAOY 131, KØVYY 105, KØBMQ 55, WØHOJ 52, KØAIE 48, WØSCT 42, WAØBWJ 24, WØDVB 21, KØYGZ 19, KØCXL 12, WØDIY 12, KØTXW 10, K1CAU/Ø 8, KØBSW 6, KØZBJ 6, WØDJO 4, KØYJF 4, WAØCKH 3, KØTGX 3, WØFJZ 2, WAØBMG 1, WØJCE 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAM: WA5GPO: NMs: WA5AVO, K5IPS, W5NCT, WA5IEQ. Welcome to W5NND, Snowball. Also, welcome to W5OBD, Mt. Home. Shorty uses a TR-3 driving a 100 Bandit and is now on 40 meters. K5SGG is Navy MARS coordinator (QTH: 816 College, Helena). W5NPM will be returning soon to get our EC activities back in full operation. WA5CBL has DXCC 227/204. Jan. net reports:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave. Tfc.
OZK	3790	0100Z	Daily	29	84	224	2.9
QAN	3695	0400Z	Daily	25	35	32	1.4
RN	3815	0001Z	Daily	31	65	423	2.1
APN	3885	1200Z	Mon.-Sat.				

CAREN helped in the March of Dimes Telerama with 26 hams participating. Support your local Emergency Coordinator. Join the AREC today! Your help is needed and will be appreciated. Anyone interested in an official station appointment is invited to apply. My address is on page 6. Traffic: W5OBD 312, W5DTR 146, K5TYW 86, W5NCT 50, WA5HNN 43, WA5IEQ 21, W5YM 17, WA5GPO 10, WA5CBL 5, K5TCK 5, K5AKS 1.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. PAM: W5TAV. V.H.F. PAM: WA5KHE. The Baton Rouge ARC Hamfest dates have been changed to May 1 and 2. Officers of the East Jefferson High School ARC are WA5HGX, pres.; WA5IDB, vice-pres. and secy.; WA5JXL, treas. Officers of the Springhill ARC are W5ADE, pres.; K5QNK, vice-pres.; K5WOD, secy.-treas. WA5FNB is busy with traffic on LAN. WA5KHE is getting things together for 75 watts on 2 and 6. K5LZA was married Dec. 19. His XYL is an ex-Novice, the best man was K5BDC, groomsman K5SAR, usher K5CJQ, bride's father ex-WN5FAS. W5GHP made the BPL for December traffic on LAN, RN5 and CAN. WA5DRP is working for emergency nets in the Baton Rouge area. WA5DES is doing a good job as OBS. K5MOJ meets the Interstate and Delta Sideband Nets. WA5EID has a new Hy-Tower antenna which he is adapting for 80-meter use. W5EA is busy with LAN and 4th Army MARS. K5FYI was awarded an Operator of the Month certificate by 4th Army MARS for "Hilda" work. K5KQG has been having rig trouble and reports that W5SWS is sporting a new Cadillac and that K5JKR is building a new final. WA5HRD is a regular on LAN and RN5. W5IQH has been having rig trouble and also is very QRL professionally but still manages to handle quite a bit of traffic. The Westside ARC, New Orleans, has acquired a new Zeus generator for emergency power. W5TAV is fighting QRM and skip on Central Gulf Coast Hurricane Net and says the Delta 75 Phone Net is a bit better. K5OKR still is going strong on LAN and the Gulf Coast Hurricane Net. WA5BLO is a stalwart on LAN, RN5 and CAN. W5CEZ is putting together a "Twoer" for the big S.W. Louisiana V.H.F. Net. WA5CST is working a lot of DX, and is pushing for a New Orleans QSO Party sponsored by Greater N.O. ARC. Traffic: W5GHP 509, W5CEZ 174, W5IQH 92, WA5BLO 86, WA5FNB 74, WA5HRD 55, W5EA 32, K5OKR 22, WA5DES 17, W5TAV 9, K5FYI 3, K5MOJ 3, K5KQG 2, WA5DRP 1, WA5EID 1.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. The "Miss" C.W. Net is really on the upswing, according to W5JDF. WA5GHF and WA5IMU are balls of fire on "Miss." This net meets at 6:45 P.M. CST on 3647 kc. W5CLS finally has his HBR-16 working fine. Glad to have K5YTA back and active again. WA5INZ also is very active on c.w. K5VBA/5 puts out a good signal from Starkville. Congratulations to all who received Public Service Awards for aid during "Cleo," especially W5WZ. WN5JWO is doing a fine job in Meridian. I was very happy to present the new charter to the Hub City Ham Club in Hattiesburg. WA5CJP is doing a fine job as new president. Columbia ARC also has a new charter. W5IHP reports he now has a three-ham family. Sons K5SSR and WA5LTL both operate HW-12 at present. New appointments: WA5GHF, WA5-IMU, K5PPI as ORSs; K5PPI as OPS; W5CKY as OO. Traffic: W5JDF 101, WA5GHF 85, W5WZ 26, WA5IMU 25, W5CLS 8.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: W4RRV. PAMS: K4WWQ. W4RMJ, WA4AIS. RM: W4MXF.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*
TSSB	3980 kc.	1930C	M-Sat.	23	85	716
ETPN	3980	0640E	M-Fri.	21	15	329
TN	3635	1900C	M-Sat.	26	72	195
TPN	3980	0645C	M-Sat.	31	176	1024
		0800C	Sun.			

Congrats to TPN for breaking a thousand QNL. Long skip has plagued other nets making the NCS job very difficult. Thanks to all who QNI and the NCS for doing their job. WA4FHY recently married. K4SXD, trying for DXCC, finds conditions worse than net conditions. The Tenn QSO Party was featured by much c.w. activity, little phone, larger scores and more out-of-state activity. The Frye ARC has K4MRZ, pres.; K4CBE, vice-pres.; W4RSE and K4TSD, secy.; K4IOP, treas. K4JXG's OO activity was helpful in the removal of a 15-meter RTTY commercial station. W4SGI has returned from U.N. Korean duty. After a trip to the Atlantic Islands and EA, W4ZZ reports language problems in meeting local hams. Traffic: (Jan.) W4OGG 255, W4FX 218, W4MXF 124, W4PQP 121, WA4IBZ 93, WA4GQM 81, K4SXD 62, W4UVP 61, K4EWI 54, **W4RMJ 43**, WA4JVU 37, K4WWQ 37, W4PFP 26, W4TZJ 25, W4WBK 25, WA4IUM 22, K4NRZ 22, K4UMW 19, W4VNU 18, WA4ATM 14, W4VTS 14, WA4GOL 12. WA4NUJ 12, WA4KOG 11, K4BTV 10, WA4OXD 10, K4HRY 8, W4VJW 8, W4TYV 7, W4YAU 7, WA4EWW 6, WA4GLS 4, WA4BXH 3, W4BIV 2, K4GBN 2, WA4KCA 2, WA4KOG 2, WA4NYL 2, W4PUL 2, K4PYH 2, K4RCT 2, WA4REJ 2, WA4RQD 2, K4ZYL 2. (Dec.) WA4HRG 149, WA4GQM 128, K4RCT 24, WA4LAX 15, W4UIO 4.

GREAT LAKES DIVISION

KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: K4URX. PAMs: W4BEJ, WA4RDE, K4YZU. V.H.F. PAM: WA4IUM. RM: WA4LCH. New appointees: K4WJI as OO, W4WNH as OES. Officers of the Kentuckiana Radio Club are K4KZH, pres.; K4DMU, vice-pres.; W4HOJ, secy.-treas.; WA4RVP, asst. secy.-treas. The Louisville Gas and Electric Amateur Radio Club elected WA4ENH, pres.; W4JQB, vice-pres.; WA4LFW, secy.-treas. This club has an emergency training net on 52.525-Mc. wide-band f.m. each Wed. except the first at 8 P.M. EST. Net reports Dec.:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	M-F	0630	21	64	43
MKPN	3960	Daily	0830	31	622	83
KTN	3960	Daily	1830	31	635	147
KYN	3600	Daily	0900 & 1900	62	636	396

Ky. was represented 93.6% on 9RN in Jan. More representatives are needed for 9RN. Check with WA4LCH. W4BAZ visited the Muhlenberg Amateur Radio Club. W4SZB was PAM for the MKPN for five years. WA4RDE is a new PAM. K4VOF (Fla.) is the second station to work all 120 Ky. counties and earn the Bluegrass All County Award and a Ky. Colonel Commission. K4ZRA is on 2-meter f.m. All Louisville 2-meter Novices, contact WN4UMN. K4DZM is relocating in Louisville. W4ISF and K4WJI are submerged in RTTY. The Ky. QSO Party winner was K4VDO. W4JUI's son, ex-K4HTO and ex-WB6HQJ is the patent holder of a transistorized threshold detector. WA4LMD, of Louisville, received very nice publicity by helping to secure medicine for an ill child in Santiago, Chile. Operation Avalanche 2 was supported by WA4FYH, Louisville, and Jefferson County Civil Defense station, involving 11 hospitals, 500 moved casualties and 28,000 school children. Traffic: (Jan.) WA4AGH 246, WA4LCH 230, K4OZG 204, W4BAZ 182, WA4FYH 149, WA4BSC 86, WA4DYL 86, K4DZM 64, K4YZU 48,W4CDA 36, W4KJP 34, K4QIO 32, W4BTA 31, WA4MEX 28, WA4RDE 27, WA4GMA 23, W4ZXV 20, WA4QLK 19, WA4VEC 18, W4SZB 15, WA4GHO 10, W4YYI 9, WA4LFW 8, K4VDO 8, WA4LDJ 7, WN4UMN 7, WA4HLW 6, K4HOE 6, WA4KFO 5, WA4PVY 5, K4WJI 5, WA4GHQ 3, W4JUI 2. (Dec.) K4ZRA/4 70, W4ISF 42, K4ZRA 12.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8ELW, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAM: W8PT. Appointments: K8JIM, K8IGQ, K8OMS, K8OOX, W8QGQ, W8SLV, W8UCG as ECs; WA8HGE, K8IVG, K8ZZV, W8SS as OBSs; W8MBM, WA8JJH as OESs; W8AAM, K8EPZ, W8FSZ. W8SS, W8SWF as OPSs; K8TIG as ORS. New club officers—Central Mich. ARC: K8ATU, pres.; K8ZKH, vice-pres.; W8FEV, treas.; W8TIJ, sec.; W8FSZ, K8ZJY, board. Saginaw Valley ARA: K8SWQ, pres.; K8JLD, vice-pres.; K8QAK secy.,; W8LNE, treas.; W8CAM, W8QQK, K8IIB, board. Mason County RC: WA8CID, pres.; K8VXO, vice-pres.; K8JED, secy.; K8DIX, treas.; K8CKD, act. mgr. Kent RC: W8IWF, pres.; K8CGD, vice-pres.; WA8DOE, secy.; W8ALV, WA8DFP, W8EW, K8GQG, K8NTE, K8ZKU, directors. M&M RC: W9FWD, pres.; WA8FHD, vice-pres.; K8ZZV, secy.-treas. Silent Keys: W8LU, W8WMU. K8EBX sponsors the Midwest V.H.F. Traffic Net, Mon. through Fri. on 50.13 at 0200Z. It covers Mich., Ind., Ill. and Wis., but it is not registered. New Generals: K8IAI, WA8BLU, WA8MRJ, WA8MAJ, WA8IAQ, WA8CGT. WA8BLU has a new TR-3. W8SH lost his antennas so is off the air. Saginaw AREC again handled the Mothers' March of Dimes, as did Ingham County AREC. SEMARA discontinued its c.w. net. Hope that W8ZDF and W8COW are out of the hospital. W8DF and WA8GHL are building Heath SB-400s. Van Buren County ARC has been running Novice and General classes at New South Haven High School. W8FM finally "retires." Oh, yeah? W8EJR built his own keyer. K8JJC has a new SB-200 linear. FX has a "new" home-built p.p. 4X-150A final with key click troubles. WA8CXF writes about "The Ideal Ham." Flint c.d. headquarters now is completely rebuilt. W8JYJ, still is handling Thule traffic. After 48 years in the same house W8AHV is moving. W8SWF sent his NCX-5 back. WA8MEE still is using an NXC-3. W8WNX shows how to work in the CD Party. K8YEK is working RTTY DX. Traffic: (Jan.) K8HLR 392, K8TDJ 240, K8QKY 193, K8LNE 181, K9TIG 155, W8ELW 140, K8KMQ 96 ,WA8BQK 92, K8GOU 85, K8EBX 82, W8FX 73, W8EU 72, W8RTN 67, WA8CXF 66, WA8KXO 56, W8JYJ 54, W8BEZ 50, K8JJC 43, K8QLL 40, W8EJR 30, W8TBP 28, W8HKT 23, K8YGH 22, W8WVL 18, K8IUZ 17, K8MFO 16, W8AUD 14, K9RNU/8 14, WA8HGE 13, K8KQV 11, K8BYX 10, K8JED 10, W8SH 10, WA8HYR 9, K8VDA 9, W8AHV 6, W8FWQ 6, W8ZHB 6, WA8MEE 5, W8YNY 4, W8PJS 3, W8SS 3, W8TIJ 3, K8GJD 2, W8IBR 2, K8LOS 1. (Dec.) WA8LBE 27, W8SH 25, WA8CZJ 6, K8EBX 6, K8VFR 6, WA8GBN 5, W8SS 2.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C., Erickson, W8DAE. RMs: W8BZX, W8DAE, K8LGB. PAMS: W8VZ, K8BAP, K8UBK. W8EWP is on RTTY; W8FBT and W8FXB have new towers. The Cuyahoga Falls RC held its tenth anniversary dinner with 87 hams attending and W8UPB, our Great Lakes Director, spoke and showed a movie "Project U.S. Hopes." The Thirteenth Annual Ohio QSO Party will be held Apr. 10 and 11. K8BXT sent the following news: Warren ARA's 1965 officers are K8OZK, pres.; K8ZFZ, vice-pres.; K8BXT, secy.; Imogene Kaeman, treas.; K8-JLK is trustee; WA8CGA has a new HQ-170A; W8ANN has a new TR-3; WA8CJI has a new HA-350; W8HCL is on 6 meters; WA8GUN has an HT-37; W8QGT has a new HT-44 and an SX-117; K8GVY has a new Drake R4 receiver. The Seneca RC heard W8IJL speak on long Yagi antennas. Parma RC's *P.R.C. Bulletin* states that W8ZAH spoke on antenna analyzers, W8EPP showed the film "The Wonder World of San Francisco"; W8LKO, W8YMV and K8NCW joined the Silent Keys; the club is conducting a code and theory class. South East ARCs *Ham Fax* says that, WA8CEA in the Coast Guard received his 2nd-class commercial license. Queen City Emergency Net's *The Listening Post* tells us the 1965 officers are W8PKD, pres.; W8-QID, vice-pres.; WA8GRR, secy.; W8MXR, treas.; and K8PMW, comm. mgr.; WA8GIR is in the hospital. Canton ARC's *Feedline* states that K8ECH moved to California where he is now WA6JSK, K7UOD moved to Alliance, K5KNQ moved to Canton. The Sunday Noon Naggers Net's 1965 officers are WA8GHV, pres.; K8WQL, vice-pres.; WA8GCE, secy.; WA8HZO, treas. The Massillon ARC held an auction. WN8MMI is a proud father. Columbus ARA's *Carascope* informs us the club heard a talk on microphones, the v.h.f. section heard Mr. Don Tobin tell of life in Russia. Findlay RC's *W8FT News* states the club's 1965 officers are W8UN, pres.; WN8NNP, 1st vice-pres.; WA8GAU, 2nd vice-pres.; K8WOV, secy.-treas.; W8OTK, editor; W8OMN, tech. editor. Toledo's *Ham Shack Gossip* says WN8-OMC and WN8ORZ are new hams in Toledo and WN8OPX and WN8OQA in Curtice; WN8OPV, WN8-OPU, WN8OPY, WN8OPT and WN8OGV, WA8FQR arrived home from a visit to KP4-Land; G3LC attended a Toledo Mobile RA meeting and spoke; Wood County ARC's 1965 officers are K8HWU, pres.; WA8HWD, vice-pres.; WA8MXS, secy.; WA8MSA, treas.; Toledo Mobile RA's 1965 officers are W8WIT, pres.; K8RFO, vice-pres.; K8KPJ, secy.; WA8JTA, treas.; the St. Lawrence Seaway 2-Meter Net elected WA8LYA, net mgr.; WA8DYA, asst. net mgr.; K8TVX secy.. Springfield ARC's *Q-5er* tells that the club held a bowling party; W8OKB and W8VZE succumbed to the mike and W8YAC has a new Drake 2B. The *High Banders' log* informs us 1965 officers are K8ZES, pres.; WA8GKK vice-pres.; WA8DON, secy.; K8QBY, treas.; K8MAF, trustee; K8TFL, certificate custodian; WA8CJP and

(Continued on page 116)

THE six-pole I.F. filter used in the HRO-500 receiver offers unusual performance and flexibility to the operator. It employs six ferrite cup-cores to achieve the high Q and steep skirts required for SSB and CW operation. A front panel *Bandwidth* switch changes the coupling between the six filter sections to provide a choice of 500 cps or 2.5 Kc bandwidths at the 6 db point, with a 6 to 60 db shape factor of 2.5:1, and also allows the operator to bypass the filter entirely to obtain 5 Kc and 8 Kc bandwidths using the I.F. transformers alone. Most important, the filter itself is tunable over a six Kc range in the 500 cps and 2.5 Kc bandwidths to provide Passband Tuning for selectable sideband or single-signal CW reception without shift in beat note or change in dial calibration. Incidentally, the six-pole filter is *electronically* tuned with a multi-gang capacitor to vary its frequency without recourse to complex mechanical linkages.

LET'S review the benefits of Passband Tuning. A conventional receiver has a filter with a fixed passband which might be likened to a narrow window on the band in use. As the receiver's main tuning dial is varied, signals march across the passband "window" and become audible as they do so. Should an interfering signal also appear in the passband window, it may be eliminated or reduced in intensity by diddling the main tuning dial in an attempt to move it out of the "window" while still keeping the desired signal in the passband of the receiver. Unfortunately, the process of moving the undesired signal out of the passband also moves the desired signal with respect to the BFO, and the pitch of a CW signal or the clarity and intelligibility of an SSB signal is thereby changed. This is undesirable. With Passband Tuning, however, the filter itself is tunable and the passband window may therefore be moved, and herein lies the difference which makes Passband Tuning so superior to ordinary filter techniques. When an interfering signal appears in the passband, the front-panel *Passband Tune* control is adjusted to move the window instead of the signal. The passband may therefore be moved away from the undesired signal, leaving it outside the window while still keeping the desired signal in the passband. Since the receiver's main tuning control is not touched, and the signals themselves are not moved with respect to the BFO, there is no change in beat note as the filter is varied.

IT's particularly interesting to demonstrate the effect of Passband Tuning by tuning in an 850 cps shift RTTY signal while in the 2.5 or 5.0 Kc position. Flip the *Bandwidth* switch to 500 cps, and either the *mark* or *space* tones may be selected at will with the *Passband Tune* control alone!

THE 2.5 Kc bandwidth is also movable for SSB reception. The first advantage of *Passband Tuning* for SSB work is immediately apparent — either upper or lower sideband may be selected simply by moving the filter to either side of the fixed BFO frequency. There is, of course, zero change in (suppressed) carrier frequency of the SSB signal, since the only variable is the passband window. Sideband suppression checks may be made more accurately than with an ordinary receiver, since the suppression capability of the filter may be tremendously increased by moving the filter further away from the unwanted sideband. Remember, as the Passband Tuning control is varied, there is no change in the "pitch" of the SSB signal — highs or lows in the received signal are emphasized or de-emphasized as the filter is moved, but the "tuning" of the received signal stays put. As a result, when splatter or monkey chatter starts smearing that elusive DX signal, the operator doesn't touch the main tuning control — he simply adjusts *Passband Tune* to move the passband window away from the splatter for an optimum trade-off between audio response to the desired signal and rejection of the "chatter". The results are often dramatic enough to make one move the *Passband Tune* control back again to check and make certain the interfering station didn't QRT!

IT would have been easier to put a conventional filter in the solid state HRO-500, but then, the new HRO is not a conventional receiver.

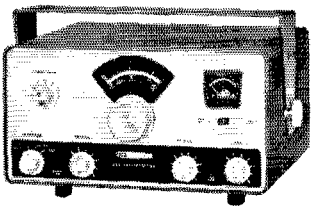
MIKE FERBER, W1GKX

P. S. The answer to last month's question on the NCX-5 dial stop mechanism is that the smaller stop gear has only 29 teeth as opposed to the 30 teeth on the larger stop gear it drives. Each time the smaller gear makes one revolution, the larger gear precesses one tooth further, bringing its stop one tooth closer to the stop on the smaller gear. After 24 revolutions, the two stops finally meet.

National Radio Company, Inc.

HEATHKIT® *Amateur Radio Gear . . .*

"SINGLE-BANDER" SSB TRANSCEIVERS

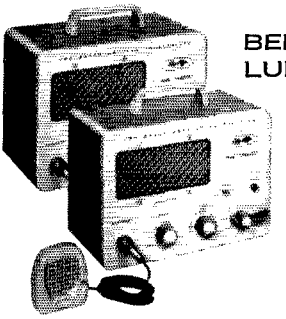


HW-12
Choose 80, 40, or 20 meters
$119.95

200 watts on the band of your choice with built-in PTT and VOX. Versatile! See line listing below for power supplies. Go mobile or fixed!

Kit HW-12 (80-meter), **Kit HW-32** (20-meter), **Kit HW-22** (40-meter), 16 lbs.....each **$119.95**

BENTON HARBOR LUNCH BOXES . . .

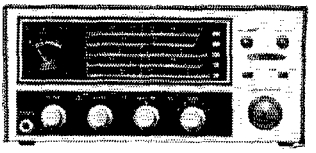


HW-29A
6 & 2 Meter Transceivers
$44.95

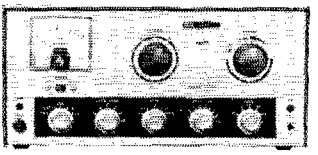
Take along one of these handy 5-watt rigs on your next outing. Complete for 117 v. AC operation. Use Heathkit GP-11 power supply for mobile.

Kit HW-29A (6 meter) & **HW-30** (2 meter)...each **$44.95**

"COMBO" FOR THE NOVICE



HR-10
Receiver
$79.95



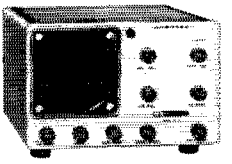
Heathkit DX-60A
AM/CW Transmitter
$79.95

Here's inexpensive amateur radio . . . yet the finest quality! HR-10 provides amateur band coverage 80-10 meters with xtal filter, calibrator, BFO, and AVC. DX-60A provides 90 watts AM or CW with low harmonic output from xtal control or external VFO.

Kit HR-10, 20 lbs.....**$79.95**

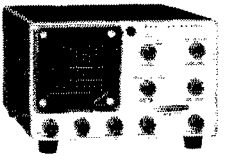
Kit DX-60A, 25 lbs.....**$79.95**

HEATHKIT "MONITORS" ADD PROFESSIONAL QUALITY TO THE AMATEUR STATION



HO-13
"Ham-Scan"
Spectrum Monitor
$79.00

HO-10
Signal Monitor
$59.95



"Ham-Scan" shows a panoramic display of radio signals 50 kc's on each side of receiver tuning. Shows band conditions instantly!

Kit HO-13, 12 lbs.....**$79.00**

HO-10 shows actual quality of transmitted and received signals. Displays envelope, AF and RF trapezoid patterns.

Kit HO-10, 12 lbs.....**$59.95**

TUNNEL DIPPER

HM-10A
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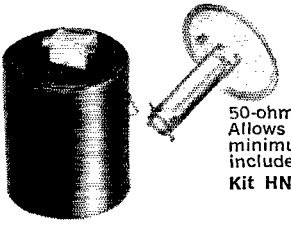
Outperforms the usual grid-dip meter through solid-state circuitry.

Kit HM-10A, 3 lbs.....**$34.95**

HEATHKIT "CANTENNA" TRANSMITTER DUMMY LOAD



HN-31
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50-ohm impedance. Oil cooled. Allows power measurements with minimum radiated signal. (Oil not included).

Kit HN-31, 3 lbs.....**$9.95**

For Complete Descriptions See Your 1965 Heathkit Catalog

Kit HP-13 DC Power Supply (converts 12 v. DC to power for single-banders), 7 lbs.....**$59.95**

Kit GP-11 Vibrator Power Supply (6 or 12 v. DC to 250 v. DC @ 100 ma.), 6 lbs.....**$16.88**

Kit HP-23 AC Power Supply (converts 120 v. AC to power for single-banders), 19 lbs.....**$39.95**

Kit HS-24 Mobile Speaker, 3 lbs.....**$7.00**

Kit PM-2 RF Power Meter, 2 lbs.....**$12.95**

Kit CO-1 Code Practice Oscillator, 2 lbs.....**$7.95**

Kit HD-11 "Q" Multiplier, 3 lbs.....**$14.95**

Kit HG-10 VFO, 80-2 meters, provides 5 volts RMS, 12 lbs.....**$34.95**

Kit HD-20 100 kc Crystal Calibrator, 1 lb.....**$14.95**

Kit HM-11 Reflected Power Meter, 3 lbs.....**$15.95**

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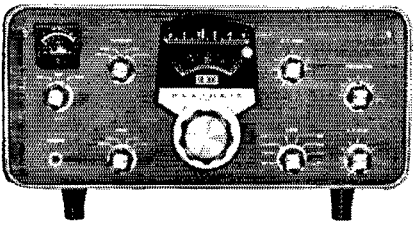
YOU CAN SAVE UP TO 50%

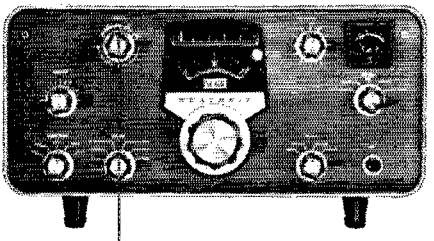
HEATHKIT DELUXE SB SERIES . . .

SB-300 SSB RECEIVER . . . $265.00



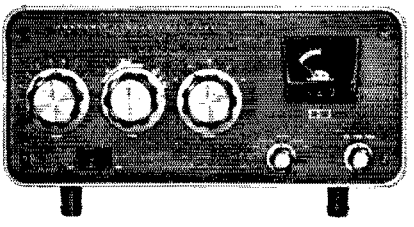
• A new standard of amateur performance & value • 80-10 meters with provision for VHF converters • Crystal-controlled front-end for same rate tuning on all bands • 1 kc dial calibrations—100 kc per dial revolution • Bandspread equal to 10 feet per megacycle • Provision for transceive operation with matching SB-400 transmitter • Drift less than 100 cps per hour after warmup • 8 ohm audio output matches HS-24 speaker • Compact—weighs only 22 lbs.

SB-400 DELUXE SSB TRANSMITTER . . . $325.00



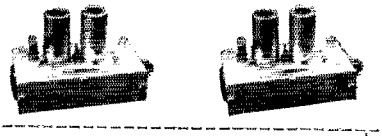
• Built-in power supply • Complete transceive capability with SB-300 receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts PEP SSB, 170 watts CW • Crystal filter type SSB generation (upper or lower sideband) • VOX operated CW uses CW sidetone • 1 kc dial calibration—100 kc per dial revolution • 500 kc coverage per bandswitch position • 33 lbs. weight.

SB-200 KW LINEAR AMPLIFIER . . . $200.00



• 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter —Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation • Weight 42 lbs.

6 & 2 METER PLUG-IN CONVERTERS EXTEND OPERATION OF SB-300



6 meter model extends coverage from 48-54 mc (50-52 mc crystal supplied). 2 meter model extends coverage from 142-150 mc (144-146 mc crystal supplied). Designed to plug-in to SB-300, but work with any receiver having proper voltages and 10 meter coverage. 2 lbs. **SBA-300-3** (6 meter), **SBA-300-4** (2 meter), 2 lbs. . . . . **$19.95** each

FREE 1965 HEATHKIT CATALOG

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Moonbounce or across town...

hy-gain VHF ANTENNAS

are best for you!

hy-gain BASE STATION ANTENNAS FOR 6 METERS

hy-gain BASE STATION ANTENNAS FOR 2 METERS

hy-gain DUOBAND BASE STATION ANTENNAS FOR 6 and 2 METERS

For the finest, most complete line of VHF antennas designed to deliver optimum performance and maximum mechanical reliability, you have to look to Hy-Gain. Hy-Gain VHF antennas are the product of years of extensive research, development and field testing. Each model incorporates the very latest in antenna design theories and is built to deliver heretofore unprecedented gain and performance.

HY-GAIN VHF BEAMS

All Hy-Gain 6 and 2 meter beams feature strategically staggered optimum spaced elements that are referenced solely to increased field strength intensity and pattern control. This new concept in beam construction results in vast increases in directional gain not attainable with close-spaced beams or optimum spaced beams using linearity as the sole reference. Hy-Gain VHF beams also feature Hy-Gain's exclusive Beta Match which provides an optimum transfer of energy without sacrifice in gain or pattern control. To assure a perfect balance of currents to the driven element, all Hy-Gain VHF beams are supplied with a coaxial balun. Mechanically, Hy-Gain VHF beams have no peer...they are constructed of heavy wall seamless aluminum with machine formed aluminum brackets and injection molded styron fittings and insulators. All are built to survive 100 mph winds.

HY-GAIN 2 METER JAYPOLES

Two meter stacked Jaypoles are available as 2-element and 4-element all driven stacked arrays that deliver outstanding omni-directional gain. Uniquely designed phasing and matching harness maintains a perfect parallel phase relationship and is center fed to minimize beam tilting for low angle radiation. Driven element maintains an extremely broadband response and effective isolation from the supporting mast. May be side-mounted or mounted on a roof saddle.

HY-GAIN HALOS

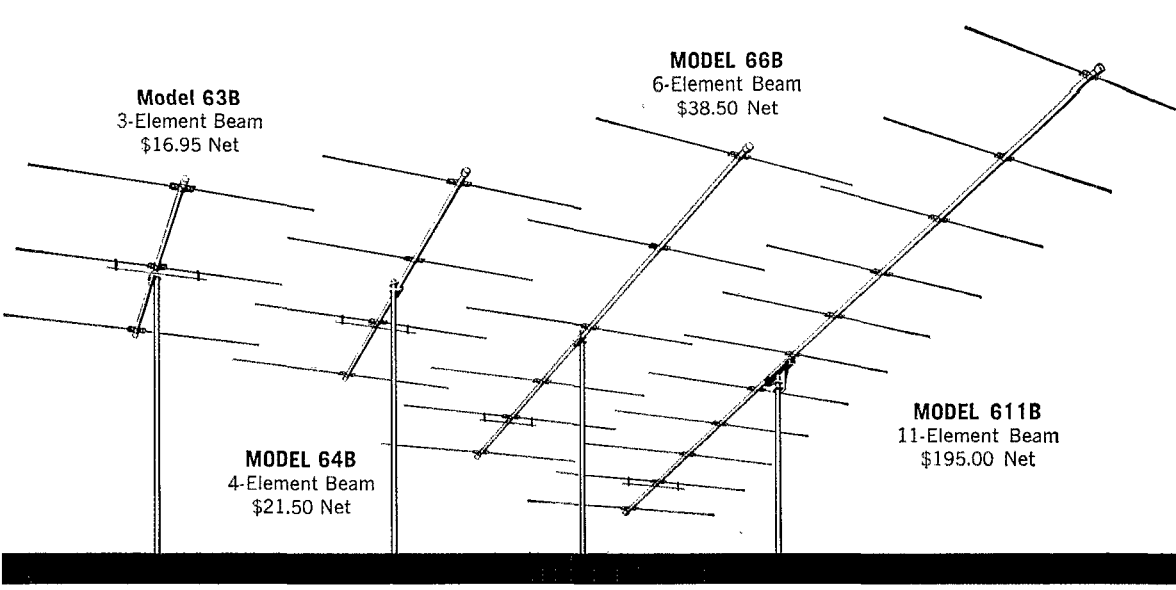
Rugged seamless aluminum Halos for 6 and 2 meters are horizontally polarized to deliver outstanding omni-directional performance. Each model features Hy-Gain's unique Beta Match and is factory pre-tuned for 52 ohm coax. Twin and quad stacked models provide additional gain through pattern compression that concentrates signal at the horizon.

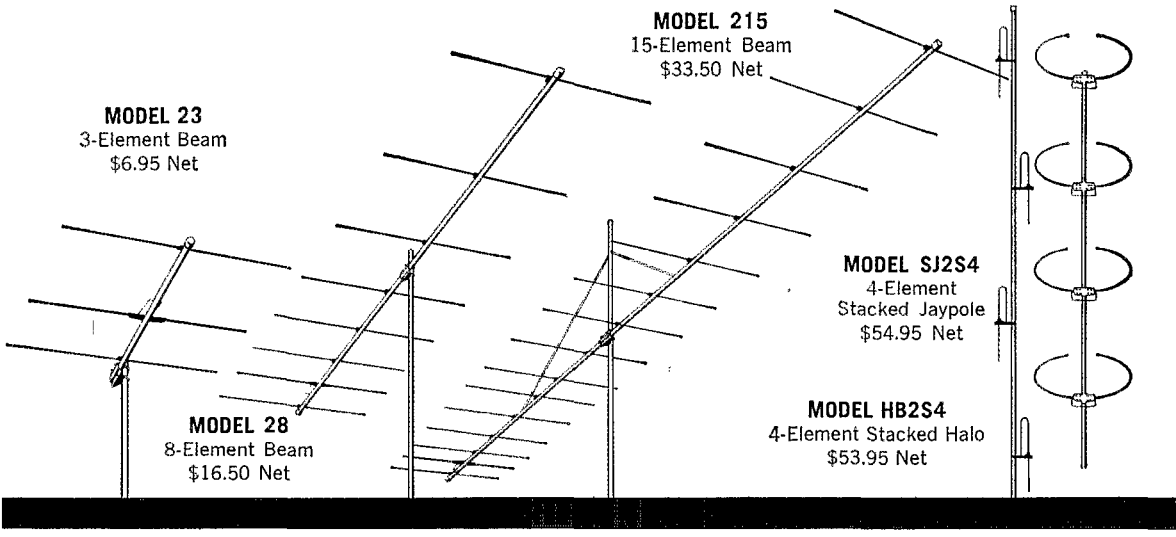
HY-GAIN DUOBANDERS FOR 6 & 2 METERS

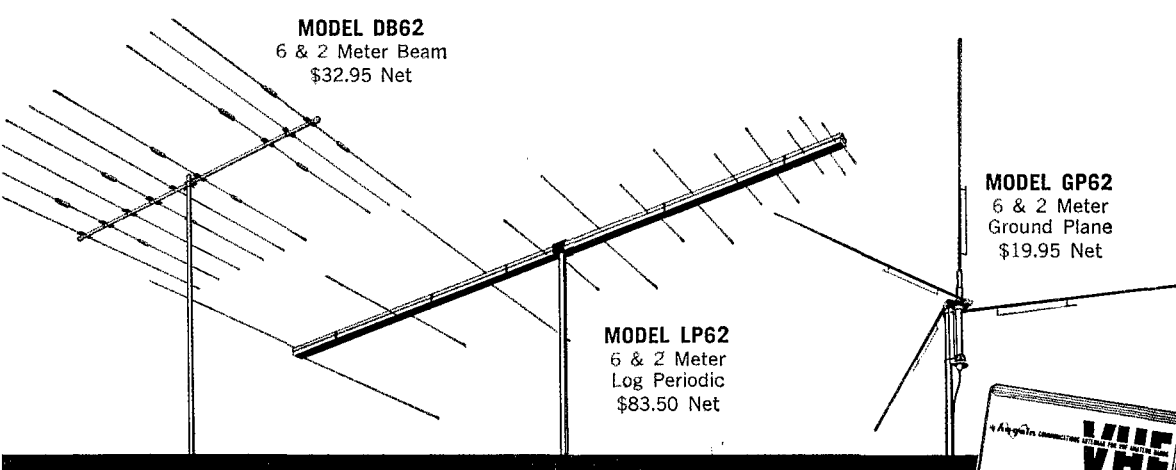
Model DB62 6 and 2 Meter Beam...A single transmission line beam for 6 and 2 meter operation...4 elements on 6 meters; 18 elements on 2 meters. Delivers outstanding gain on both bands. Ruggedly constructed to survive winds of 100 mph.

Model LP-62 6 and 2 Meter Log Periodic The ultimate in a duoband, uni-directional antenna for 6 and 2 meters. Delivers outstanding gain on both bands. Unique skip band design insures highly efficient operation across the entirety of both bands with SWR less than 2:1. Double boom — all elements constructed of heavy gauge seamless aluminum tubing. Built to survive winds of 100 mph...absolutely the finest duoband directional antenna you can buy.

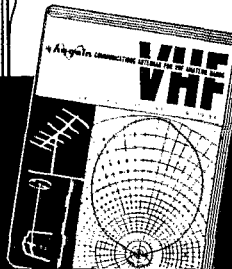
Model GP62 6 and 2 Meter Ground Plane Uses parallel decoupling stubs that provide uncompromising performance on both bands. Rugged all aluminum construction with machine formed heavy gauge aluminum base and radial brackets. Maximum wind survival, 100 mph.







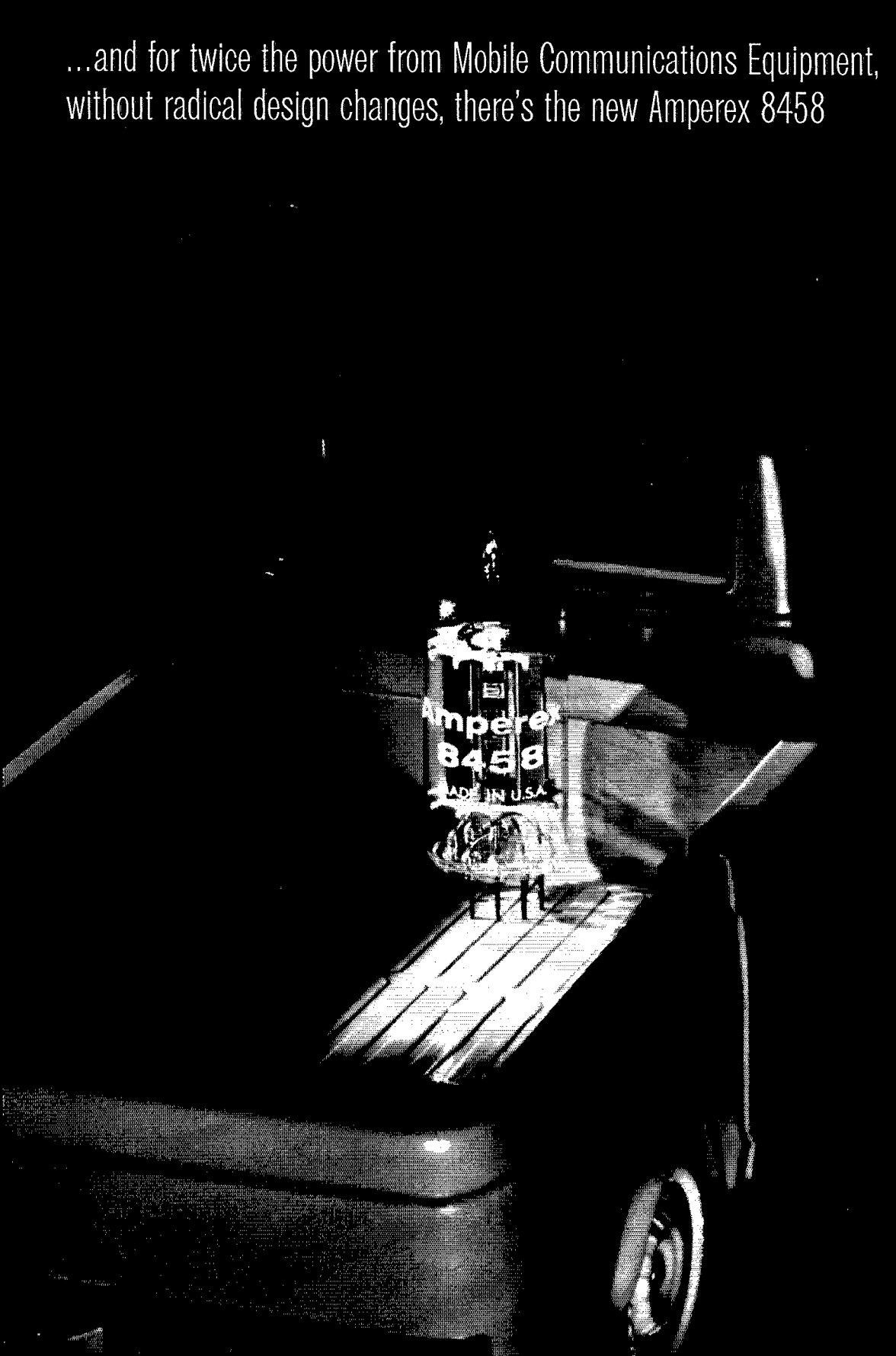
THERE ARE MANY MORE...Mobile Halos – Gain Mobile Whips – Gain Ground Planes – 1¼ and ¾ Meter Beams – Discones for 6 thru ¾ Meters...they're all pictured and fully described in Hy-Gain's 16-page Catalog No. 204.
Send for your FREE copy today.



HY-GAIN ELECTRONICS CORPORATION

8408 N.E. HIGHWAY 6 LINCOLN, NEBRASKA 68501

...and for twice the power from Mobile Communications Equipment, without radical design changes, there's the new Amperex 8458



If the world renowned Amperex 6360 is—as virtually all designers of mobile communications equipment agree—a truly great tube, its new derivative, the Amperex 8458 is an even greater one! For in addition to the great performance, great low-profile convenience, and great reliability of the earlier twin tetrode, the new 8458 can be counted on to deliver 30 watts of useful power at 175 Mc from less than 1.2 watts of drive power.

To drive the 8458, Amperex has developed a second new twin tetrode, the 8457, a 13.5 volt heater version of the 6360. It is ideally suited for use as a cascaded doubler-multiplier, driving the 8458 as a straight-through amplifier in the 150-175 Mc band. This combination of new Amperex tubes provides extremely stable power output under low voltage conditions, since more than sufficient drive is available. Because the profile heights of these two new tubes are identical with the older 6360, modification of existing circuit designs can be made with resulting improved power and performance.

Both tubes incorporate a 13.5 volt center-tapped heater; are internally neutralized and have indirectly heated oxide-coated cathodes.

8458
SIGNIFICANT CHARACTERISTICS
CLASS C RF AMPLIFIER AT 175 Mc

	CCS	ICAS
DC Plate Voltage	400	450 volts
DC Grid No. 2 Voltage	155	200 volts
DC Grid No. 1 Voltage	−59	−50 volts
DC Plate Current	85	110 ma
Useful Power Output	20	30 watts
Drive Power	1.0	1.2 watts

Both the 8457 and 8458 are immediately available in production quantities from stock. For complete data on these and other Amperex tubes for mobile communications applications, write: Amperex Electronic Corp., Tube Division, Hicksville, L. I., New York 11802.

Amperex®

IN CANADA: PHILIPS ELECTRON DEVICES LTD., TORONTO 17, ONT.

(Continued from page 108)

WA8KKE have a new Drake 2B. Tusco RC held an auction. Mt. Vernon ARC's *K8EEM Newsletter* heard a talk on Narrow Band by W8PEN. WA8KCB has a new Ameco 682. K8BAB joined the Silent Keys. W8DAE and W8UPH made the BPL in January. W8ANN has a new NCL-2000 amplifier. K3ISO moved to Warren. For information on the WTC Award send an SASE to K8-BXT. Don't forget the big Dayton Hamvention to be held Apr. 9 and 10. K8VBH reported that W8KFP joined the Silent Keys. Appointments made in Jan. were WA8KPN as OES and W8UJB as OO, Ohio S.S.B. Net: 746, QCT, 57 sessions, 13.0 ave. Traffic: (Jan.) W8UPH 573, K8DHF 445, W8DAE 275, WA8CXY 189, WA8KKE 179, K8VBO 172, W8RYP 168, K8VBH 163, WA8CFJ 148, W8BZX 128, WA8GYT 125, K8UBK 105, W8IJH 86, W8FSM 81, W8QCU 78, WA8HVR 65, WA8-AUZ 58, WA8FTX 54, K8VMH 46, K8YDR 45, W8DDG 38, W8MGA 34, W8BAA 33, W8IEP 30, K8PBE 30, K8ZCZ 27, WA8FKD 21, K8MTI 20, W8NAL 20, WA8-AJD 19, K8YWF 18, WA8BIF 17, W8LZE 14, W8ERD 13, W8CXM 11, K8DHJ 10, K8LGB 9, WA8MAZ 6, W8PZS 6, W8ILC 5, WA8AJZ 4, K8DDG 4, W8WEG 3, W8AEB 2, K8PJH 2, K8RXD 1. (Dec.) W8CHT 467, WA8CFJ 124, W8PMJ 4, W8EWP 2, K8BXT 1.

THIRTEENTH OHIO QSO PARTY
April 10-11, 1965

All Ohio amateurs are invited to take part in a QSO party, sponsored by the Ohio Council of Amateur Radio Clubs.

Rules: 1) The party will begin at 2300 GMT Saturday April 10 and end at 2300 GMT April 11. 2) All types of emission and all bands may be used, but a station may be worked only once regardless of mode. A maximum of ten stations may be worked in a single county. 3) The general call will be "CQ Ohio." 4) *Scoring:* Multiply the number of Ohio stations worked by the number of Ohio counties contacted. Logs should include calls of stations worked, time, date and the county in which the station is located. 5) Suggested frequencies are: 3550, 3740, 3860, 7100 and 7250 kc. On the other bands, take your choice. 6) A cup and four appropriate certificates will be awarded to the highest scoring stations. 7) All contest logs must be postmarked not later than May 8, 1965, and should be sent to the contest manager, Mrs. Marvel Tyson, W8HUX, 3325 Brock Drive, Toledo 13, Ohio.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,500 kc. Fri. at 0130 GMT. Appointment.: K2AVP as OBS. Endorsement: W2PKY as ORS. Congratulations to our two BPL winners for Jan. traffic, K2TXP and WA2UZK. New officers of the NYSPTEN elected in Dec. include WA2TUI, mgr.; WA2JWL, 1st asst.; K2MPK, 2nd asst.; WA2RLV, secy.-treas. WB2HZY and K2SJN are among those teaching code and theory at New Rochelle. K2LSX reports he soon will be on RTTY. The Schenectady AREC handled the sports car races on Lake George with 2-meter f.m. portable gear and base stations. WB2NKN reports a new quad for 10 and 20. Among new Navy MARS members is WA2WGS. W2KFB, of Singer Metrics, was speaker at the Westchester Club, which celebrates its 30th anniversary in '65. W1UDT, of Sprague, was speaker at the Albany Club while Navy MARS Director, W4SSN, was speaker at the Schenectady Club. Also at Schenectady, W2IR received an engraved silver bowl for his many fine contributions to the club. WA2SFP was among the top ten in the world-wide S.S.B. DX Contest. New officers of the Albany Club are K2BUF, pres.; WA2BLC, vice-pres.; WB2BZE, secy.; WA2-YRF, treas. K2DNR has 100 watts on 144 and 220 Mc. WA2ZPD is building a new 2-meter converter. WA2VYS was runner-up for the most valuable station on NYS during 1964. Traffic: (Jan.) K2TXP 764, WA2-UZK 522, WA2VYS 448, WB2NKN 140, K2SJN 98, W2-URP 51, WB2HYA 40, W2PKY 34, WA2JWL 30, WA2-VYT 30, WB2PEN 24, W2ANV 22, WB2FVD 18, WA2-WGS 18, WB2DXL 12, WB2ZPD 12, WB2FYP 10, WA2-HGB 7, K2HSI 6. (Dec.) WB2DXL 6.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—SEC: K2OVN. Section nets:

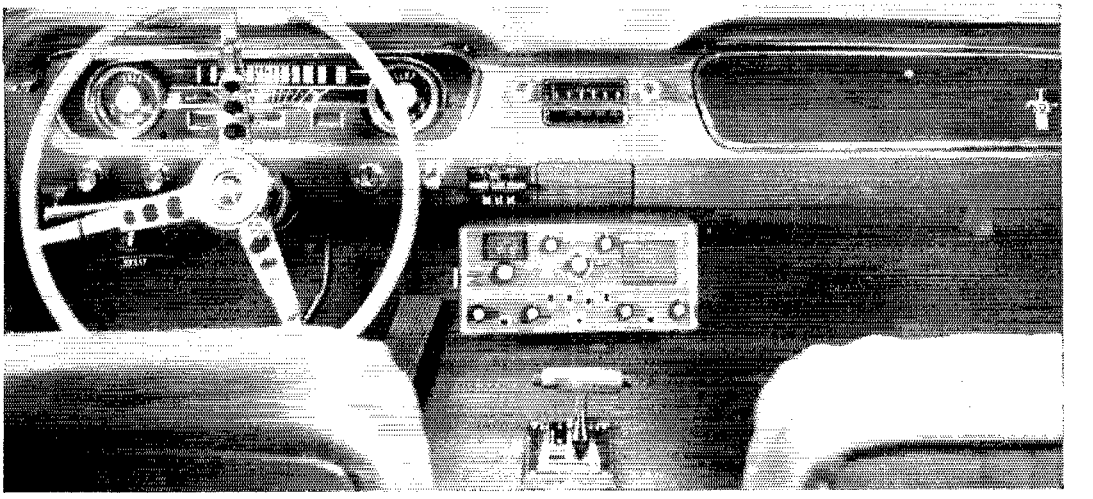
NLI	3630 kc.	1915 Nightly	WA2EXP-RM
VHF Net	145.8 Mc.	2000 TWTh	W2EW-PAM
VHF Net	146.25 Mc.	1900 FSSnM	W2EW-PAM
NYC/LIPN	3932 kc.	1600 Daily	WB2HWB-PAM
NLS (slow)	3630 kc.	1845 Nightly	WA2RUE-RM

NYC-LI AREC Nets: *See Dec. 1964 column for skeds.* Well now, guess who's burning up forty with an HX-50, a Thunderbolt and a brand new 75S-3B? It's none other than K2UMM! A new guy on 2 with a Twoer is WB2CSS. K2HTX, W2HAE, W2AFA, K2AAW, W2TY, WA2QXM, K2EWD and WB2IQG joined with Huntington Aux. Police in operation Co-op in a demonstration of the *AREC in action!* WB2CHC, Brooklyn AREC's code-happy chaplain, has been reassigned to Albuquerque V.A. Hospital. WB2NMN and K2RNC are new members of the "Nassau 10" AREC Net, which now holds mobile hunts every 2nd and 4th Mon. WA2-FUL passed his finals and then put a new keying circuit into the rig. WA2IMS, the son of WA2JKX and WA2LOZ, has joined the Marines. WA2GPT, WA2RUE, W2EW, K2UBG and WB2DXM made the BPL. WB2-ASR is talking it up with a Clegg s.s.b. speech booster on the Venus. W2PF kept skeds with W2KW/KV4, who was vacationing at St. Thomas, V.I. WA2EXP made WAC. WB2LUK got the keyer going by giving it a good dose of filtering. W2MAM is rebuilding his shack while WB2AOU is moving his from the attic to the basement. WA2ZCU is chasing DX on 20 with a home-brew rig. W2ISF is building a stand-by receiver. The new president of the RC of Brooklyn, K2JFL, sends code practice on 28.4 Mc. every Sun. morning at 9:00. W2MTD is on tour with a computer outfit. The keyer that WB2OTT built for the DX-40 doesn't work and now he can't decide which to modify! WB2AEK has put an SB-200 to work on the NYSPTE Net. By the way, that congenial group meets every Sun. at 1000R on 3925 kc. for an informal get-together. New officers of the HARC: W2GKZ, pres.: K2SJO, 1st vice-pres.: W2ZNE, 2nd vice-pres.; W2DID, secy.; WA2-CCF, treas. K2UAT moved to Rockville Centre. WB2-HWB has a new W9TO keyer. Looks like the DX bug is nibbling at WA2GPT after she snagged UH8AY and UA3FG. WB2DZZ is having disgusting results with the new vertical; it works only DL8s, UA4s, SM7s, SM6s and CTIs. New officers of the Staten Island ARA: K2EFB, pres.; WA2PMC, rec. secy.; WB2COA, corr. secy.; W2EUY, treas. An impertinent truck had the effrontery to stomp on WB2HLM's mobile so the new rig will have to wait. New appointments: WA2UCP as EC for Kings County; WA2VKK as EC for New York County; WB2MHT as ORS; WB2NSO as OBS and K2UMM as OO. New Officers of the Levittown ARC are WA2GFH, pres.; K2IWX, vice-pres.; K2SDN, secy.; K2UPA, treas. WB2AOV is building a summer QTH on a mountain top! W2GGU is now on 2-meter s.s.b. WA2UCP has a new first-class-type rotor up with a TA-33 Jr. on it! WA2CYY moved to sunny Long Island. Traffic: WA2GPT 888, WA2RUE 884, WB2HWB 440, W2EW 429, WB2EUH 370, K2UBG 345, WB2DBW 231, WA2QJU 165, WB2DXM 163, K2UAT 138, W2DBQ 131, WB2MHT 125, W2GKZ 122, WB2IQG 120, WB2AEK 112, WB2MLN 74, WB2OTT 62, WA2UWA 58, WA2LJS 51, WB2LUK 49, WA2OOL 49, WB2HYK 35, W4TRU/2 35, WA2EXP 25, WA2VZN 19, W2EC 16, WA2YLL 11, W2-PF 10, WA2UCP 10, WA2WAO 9, WB2BLH 8, WB2-EGV 8, K2KYS 8, WB2FTT 7, WA2DTY 5, WA2RMP 3, K2YQK 3, WB2BKS 2.

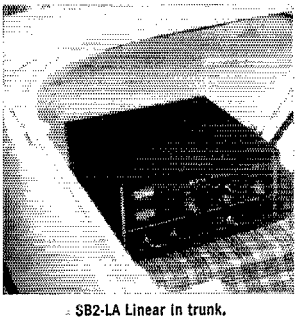
NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2-LQP. SEC: John W. Banke, K2ZFI. Official Bulletin schedules (condensed):

Station	*Freq.-kc*	*Time*
WB2ALF	3690	1815 Ex Sat.
K2UCY	7080	1830 M&F
K2UCY	145800	1930 TTh.
K2OKA	50400	2000 W&F
WA2YID	3900	1755 MWF
WA2ZKT	144700	2000 F&Sun.
WB2KLD	145242	0600 M&F
WB2KLD	145242	2230 Sun.
WA2YJV	144800	2045 Sun.
WB2DDA	145180	1930 WTh.&Sat.

Station	*Freq.-kc.*	*Time (local)*
WB2ALF	145,000	2000 Sat.
WB2GFY	7080	1835 ExMF
K2UCY	145.300	0900 Sun.
K2OKA	50,400	2300 M&Sat.
WA2ZKT	144,522	1900 Sat.
WA2ZKT	145,320	1900 Tu.
WB2KLD	145,242	1800 MWF
WA2YJV	144,800	2145 Tu&F
WA2ZKT	144,522	2000 Th.

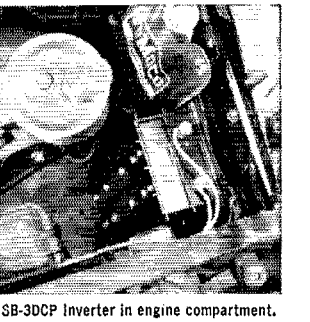


1000 watts...neatly tucked in

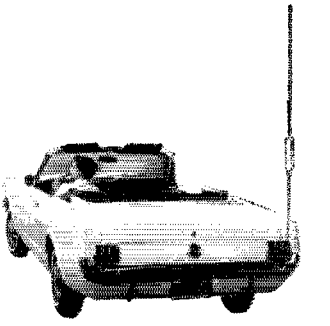


SB2-LA Linear in trunk.

The small size of the new **SB-34** four-band SSB transceiver really proves its importance when installed in the lively 1965 small cars. In fact, using only standard available SBE equipment, it's no trick at all to tuck in a complete 1000 watt p.e.p. station. Observe in the photo that the **SB-34** fits under the dash—and blends with the interior of this well-appointed car like it was specially tailored. The exceptionally compact **SB-2LA Linear Amplifier** arranges easily in a corner of the rear trunk. Happily too, the **SBE Inverter** that powers this linear finds a made-to-order—and well ventilated—mounting space in the front section of the engine compartment of this popular car. Need we mention that SB-34 has its own **built-in 12V DC and 117V AC universal power supply** thereby simplifying greatly the problem of finding mounting space in a compact car? And if you're wondering how to mount an antenna on that really snug, contoured bumper—don't. Band-spanner H-215 contour mount makes it easy, supports the short-column model of the Band-spanner "Topsider" with its KW coil.



SB-3DCP Inverter in engine compartment.



SB-34 and **SB-2LA** combo add up to the best KW p.e.p. value on the market!

SB-34 Transceiver
.....395.00

SB-2LA Linear Amp
.....249.50

SB-3DCP Inverter
.....249.50

HIGHLIGHTS: 135 watts p.e.p. input. (Slightly lower on 15). **Frequency range:** 3775-4025 kc.—7050-7300 kc.—14.1-14.35 mc.—21.2-21.45 mc. • 23 transistors, 18 diodes, 1-zener diode, 1-varactor diode, 2—6GB5's PA, 1—12DQ7 driver. **Speaker built in** (external speaker provisions). Pre-wired receptacles on rear of set accept VOX and 100 kc. calibrator—both items being optionally available. **Size:** 5" high, 11¼" wide, 10" deep. Weight, approx. 20 pounds.

SIDEBAND **SBE** ENGINEERS

317 ROEBLING ROAD, SOUTH SAN FRANCISCO, CALIFORNIA

Export sales: Raytheon Company, RAYTHEON International Sales & Services, Lexington 73, Mass. U.S.A.

Write to the SCM for complete schedules of OBS, nets and other information. New appointments: WB2KXG as RM of the N.J. Novice Net; WB2DDA as OBS and OES; WB2GFY as EC Highland Park and OBS. WA2VID and K2VNL have a back-up relay on 2 meters during sessions of the N.J. Phone Net on 3900 kc. WB2HLH and his XYL are the proud parents of their 3rd daughter. WA2GQZ has assumed a new position as editor of the *Long Branch Record* and has started a weekly ham column. W2EKU continues the ham column in the *Newark News*. WB2JWB received a Public Service Award for traffic work during Hurricane Cleo. WB2IYO is building a 2-meter receiver for net use. WA2CCF, FCC engineer, recently spoke before the Somerset AREC group. WA2ZKT has a new Ameco TX-62. WB2MWU has a new HX-50, an HQ-180 and a 14AVS. K2UKQ has 260 DXCC countries. WA2HGL took first place in N. J. in the Pa. QSO Party. WB2BCS is looking for a.f.s.k. skeds on 2 meters. SEC K2ZFI has remodeled his bedroom and radio shack. WB2FIT finds that the traffic game is a lot of fun. WB2KNS is putting up dipoles for 80 through 10 meters. New officers of the Shore Area Amateur Radio Club are WA2VSG, pres.; WA2LBC, vice-pres.; WB2FWO, secy.; WB2DWE, treas. The Keyport Area AREC meets on 50.7 Mc. Mon. at 7:45 P.M. local time. New officers of the State Line RC are WA2UGT, pres.; WA2ZTO, vice-pres.; WB2LDX, secy.; WB2LDY, treas. We were sorry to hear of K2UCY's injury. Good luck to WB2DXG and WB2DDB in the new QTH! WA2GQZ has a new 1-kw. linear. K2USA, Fort Monmouth, is now on 220 Mc. The NNJ Radio Assn. Net meets on 220.59 Mc. at 11 A.M. local time Sun. WB2GYX has 220-Mc. gear and WA2JVO is looking for schedules into Pa. and Conn. Traffic: (Jan.) WA2TEK 285, KEVNL 282, WA2VID 270, WB2AEJ 193, WB2HLH 117, WB2ALF 108, WA2GQZ 108, WB2GFY 79, W2CVW 74, WB2KSG 66, WB2ICH 62, WA2UOO 42, WB2FIT 40, WA2PWI 36, K2JTU 30, W2PEV 28, WA2WAJ 28, WA2BNF 26, WB2JWB 23, WA2CCF 18, WB2IYO 17, W2ZAL 17, K2ZFI 14, W2DRV 12, W2TFM 12, WA2WHZ 12, WA2ZKT 10, K2BEV 7, WB2KLD 7, WB2MWU 7, W2NAK 7, WA2TWS 7, WA2SRK 5, W2JDH 4, WA2KRC 3. (Dec.) WA2TEK 415, WA2BNF 202, WB2ALF 109, W2ZAL 71, WA2CCF 49, W2TFM 38, WB2FIT 22, K2JTU 13, WA2MYB 11, K2BEV 10, WB2KLD 7, K2VVL 7, WA2ZQH 7, K2EQP 6, W2JDH 6, K2ZFI 5, WB2BCS 4, WA2KVQ 4, W2EWZ 2. (Nov.) W2VMX 3.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. PAM: KØBBL. RMs: WØLGG, WØLSF (new), WØTIU. New ECs: WØGKN Taylor, WAØESG Cherokee, KØVQN O'Brien. Jones County AREC's new officers are KØLHH, pres.; WØHNA, vice-pres.; WØIPF, secy.-treas. This is a fine group and we expect much from it. KØRUA is heading for the Philippines for 18 months and will be looking for DX contacts. WAØDXZ reports from Iowa City that 2 meters is booming and interest is running high. WØDRE repotrs activity on 2 and 160 from Jasper County. Jones County reports 7 stations on 2 meters. If you are interested in organizing another Midwest u.h.f. net, contact Keith Schmidt, KØMST, Eldridge, Iowa. Net reports: 160 meter, QNI 1160, QTC 10, sessions 31. 75 meter, QNI 1358, QTC 158, sessions 26. Hamilton County, QNI 284, QTC 4, sessions 31. TLCN, WØTIU RM, will report next month. Traffic: WØLGG 1215, WØNTB 99, KØQKD 42, WØUSL 32, WØCQC 10, KØTDO 10, WØYDV 10, WAØDYV 9, WAØDXZ 6, WØGPL 6, WØQVZ 6, KØMST 5, KØEXN 4, KØKBX 4, WØNWX 4, WØBKR 2, WØONG 2, KØRAV 2.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: KØBXF. PAMs: KØEFL, WØBOR. V.H.F. PAMs: KØVHP, WØHAJ. The following are net reports for Jan.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave.*
KPN	3920	1245Z	M-W-F	9	15	185	20.5
KPN	3920	1400Z	Sun.				
HBN	3880	1605Z	Daily	21	104	707	6.8

Newly-elected officers of the Jayhawk ARS are WØLB, pres.; KØETD, vice-pres.; WAØBJN, treas.; WAØEMQ, secy. Congratulations. Needless to say, Field Day 1965 will be popping up in a couple of months. Don't forget that there will be another trophy given this year to the leading Kansas club. Details will be mailed to all clubs. Air Capitol ARA officers for '65 are WØEKZ, pres.; KØJQV, vice-pres. and treas.; WØHVC, secy. The Tee-Ni-Chat ARC elected WAØEHK, pres.; WØDKU, vice-pres.; WAØEQS, secy. Thanks for the many cards of encouragement received during my recent bout with the doctor. Should be in good shape by

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Regardless of the exciter you are now using—the HX-50, the HX-500, or any one of a host of compatible competitive units, you will TAKE COMMAND the moment you're hooked up to the incredible HXL-1.

The HXL-1 is so rugged, it can be held "key down" at a kilowatt for more than an hour . . . without damage. It delivers the full metered legal power of 1 KW CW input—1500 W PEP input. Here is a "no-nonsense" linear that delivers the power you pay for—the performance you want.

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FEATURES

- Complete coverage—80 to 10 meters
- Broad Banded Input Circuit
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- Built-in multi-purpose meter including linearity test
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- Efficient Ground-grid circuit using 2 high dissipation triodes (United 572A)
- Husky, self-contained solid state power supply with silicon rectifiers
- Only connection required between exciter and amplifier is a coax cable. All relay switching built into amplifier.
- Power packed performance on SSB, CW and AM. 1500W PEP* input; 1 KW CW input
- Designed for 115/230 volt operation
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the time you read this. Traffic: (Jan.) WØOHJ 929, KØGII 144, KØGHI 102, WAØCCW 20, KØJKA 10, WØBMW 7, KØBXF 7, KØEFL 1, WØFDJ 1, KØVQC 1. (Dec.) KØJDD 8.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. Appointments renewed: WØQWS as OO, KØJPL as OES. WA9JDR/Ø is a new OPS in Warrenton. The N.W. St. Louis ARC, KØAXU, is sponsoring the Mo. QSO Party again this year Apr. 24-26. New officers of the St. Louis ARC, KØLIR, are WØDSW, pres.; KØTOV, vice-pres.; KØKJX, secy.; KØHUO, treas.; WØUCK, editor. WA9JDR/Ø has started the MGC RC at the seminary at Warrenton. The listing of net schedules and managers is to help recruit new net members and remind the old ones. Periodically, the hard-working NCSs should be recognized for their devotion to a thankless job. NCSs for MEN are KØEQY, KØWKC, KØKUD, and WØBUL; for MINN, WAØFKD, WØOUD; for MON, WØKIK, WØOUD, WAØFKD, KØVDT; for SMN, WØOUD; for PHD, WAØFLL; for PON, WØHVJ, KØONK, KØWBD, WAØDGT. New members of MON are WØWGB and WAØIKK. WAØILQ has dropped the "N" from his call. The ARC of Central Mo., Sedalia, has a 10-meter net on Mon. at 8 P.M. with WØAZL as NCS. KØBDT is a new call in Sedalia. KØYGR has moved to Kirsville from Overland Park, Kans. WAØEMS is 149/99 for DXCC. WØGCL is in Arizona temporarily. Net reports for Jan.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F	13	293	52	WØBUL
MON	3580	0100Z	Tu.-Sun.	25	134	97	WØOUD
MNN	3580	1900Z	M-Sat.	25	90	24	WØOUD
SMN	3580	2200Z	Sun.	5	22	12	WØOUD
MoSSB	3963	2400Z	M-Sat.	24	530	68	WØOMM
PHD	50.4	1245Z	Wed.	4	48	5	WAØFLL
PON	3810	2100Z	M-F	19	341	111	WØHVJ

Traffic: KØONK 410, WAØFKD 105, WØOUD 102, WØHVJ 58, KØTCB 48, KØEQY 47, WØKIK 39, WØEEE 31, WAØEMX 27, WØBUL 23, KØTGU 23, KØAEM 16, WAØDGT 15, WØTPK 12, WØZLN 11, KØWOP 10, WØZBR 9, WAØILQ 7, KØYGR 7, WØBVL 4, WØOGC 4, WAØFLL 3, WAØCWV 2, KØJPL 2, WØGQR 1.

MISSOURI QSO PARTY

April 24-26, 1965

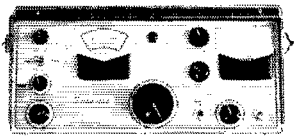
The Northwest St. Louis Amateur Radio Club, KØAXU, invites all amateurs to participate in the Second Missouri QSO Party.

Rules: (1) The contest period starts at 1800 GMT Saturday April 24 and ends at 0500 GMT Monday, April 26. (2) No time limit or power restrictions. (3) Missouri stations count 1 point per contact and multiply total by the number of states, provinces and countries worked. All others count 2 points per Missouri contact and multiply by the number of different Missouri counties. (4) The same station may be worked on more than one band (phone or c.w.) for additional credit. (5) Suggest frequencies 3525 3900 7025 7225 14050 14250 21050 21350 28650. V.h.f.ers are welcomed. (5) The general call will be CQ Mo c.w. and calling Missouri on phone. (6) Information required to exchange: QSO number, signal report, Missouri county (or state province or country outside Missouri). (7) Certificates will be awarded to the 5 high Missouri stations and, additionally, to the highest scoring individual in each state province and country (5 QSO minimum). Awards will also go to the 5 highest clubs in the world. (8) Logs and scores must be postmarked no later than May 30 and sent to: Rich Zysk KØGSV, 3457a Humphrey, St. Louis, Missouri 63118.

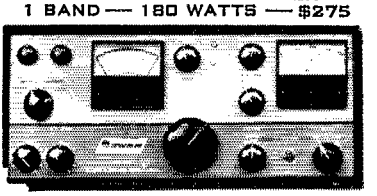
NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Appointment: KØEZA and WØVRE as ECs; WØNIK as OES. Monthly net reports:

Nebr. Morn. Phone Net	3982.5	1330Z	QNI 557	QTC 44	
West Nebr. Net	3850	1400	QNI 628	QTC 44	Wx 313
Nebr. Emer. Phone Net	3982.5	1830	QNI 1366	QTC 122	
Nebr. Storm Net	3982.5	2330	QNI 590	QTC 22	
		0030	539	14	

IT'S THE SAME LITTLE OLD BOX



1962 SWAN SINGLE BANDER —
1 BAND — 180 WATTS — $275



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but we've put a LOT MORE *in it!*

NOW THE *SWAN-350* TRANSCEIVER

5 BANDS—400 WATTS AND ONLY $395

- 3.5 - 4.0 mc, 7.0 - 7.5 mc, 13.85 - 14.35 mc, 21.0 - 21.5 mc, 28.5 - 29.0 mc (10 meter full coverage kit available.)
- Transistorized VFO, temperature and voltage stabilized.
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- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 11 in. deep.
- 400 watts SSB input
  320 watts CW input
  125 watts AM input
- Sideband suppression: 40 db
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  Third order distortion: 30 db
- Lower sideband on 80M and 40M.
  Upper sideband on 20M, 15M, and 10M.
  (Opposite sideband kit available.)

WITH THE SAME RELIABILITY AND PERFORMANCE WE'VE PUT IN ALL OUR LITTLE BOXES

ACCESSORIES:

- AC power supply, matching cabinet with speaker. Model 117-C.....$ 85
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AREC Phone Net	3982.5 Sun.	1430	QNI 145	QTC 2
Nebr. CW Net	3525	0100 0400	QNI 194 129	QTC 27
Nebr. AREC CW Net	3782.5	0000	QNI 48	QTC 1

New officers of the Tri-City Radio Amateur Club, Scottsbluff: WAØHRX, pres.; WØPHA, vice-pres. Upcoming events in the state include: Chadron Picnic, Chadron State Park, June 6; Scottsbluff picnic June 20 and Central Nebr. Radio Club Steak Fry at Anselmo July 25. The new net manager of the Nebr. Emergency Phone Net is WAØBID, succeeding WØFIG. Traffic counts and reporting to the SCM have been increasing steadily. Keep up the good work. Traffic: WAØDOU 116, WØLOD 115, WAØGHZ 77, WAØBID 47, KØRRL 47, WØNIK 42, WAØAES 37, WØZJF 34, WØBFN 26, KØFRU 25, WØHYD 25, KØJFN 25, WAØBIE 23, KØDGW 23, WØMTI 22, WØAHB 21, WØFIG 20, WØNYU 20, WICJP/Ø 19, WAØBOK 19, WAØEUM 17, WØFQB 16, WØZHV 15, WØEGQ 14, WAØEEI 13, KØBRS 10, WØFTQ 10, KØQVN 10, WØFOM/7 9, WØBFV 8, WA7AZI 7, WAØIXF 7, WAØDFS 6, KØHNT 6, WØHOP 5, WØNOW 5, WAØCEZ 4, WØDDT 4, KØFJT 4, WAØKQA 4, WØLDO 4, WØRJA 4, KØUWK 3, WAØERN 2, WAØJCI 2, WØWK P2, KØBYK 1, KØULQ 1.

NEW ENGLAND DIVISION

CONNECTICUT QSO PARTY

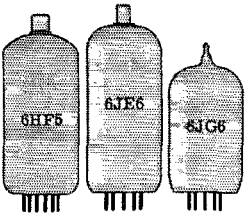
April 17-18

The Candlewood Amateur Radio Club invites hams throughout the world to take part in the 3rd Connecticut QSO Party.

Rules: 1) The contest begins at 2300 GMT April 17 and ends at 0400 GMT April 18. 2) Phone and c.w. are considered the same contest, but a station may work another station twice, once on phone and once on c.w. 3) Call "CQ Conn" on c.w., "CQ the Connecticut QSO Party" on phone. Connecticut stations sign "de Cn . . . ." on c.w., "this is Connecticut calling" on phone. 4) All bands may be used. Areas suggested for working the contest are: 3540 3840 7040 7240 14040 21100 kc., 50 and 144 Mc. 5) *Exchanges:* outside Connecticut stations give QSO number, RST, and their state, province, or country. Connecticut stations send QSO number, RST, and their county. (See RULE 6) 6) *Scoring:* Each complete contact counts 5 points; outside Connecticut stations multiply their total contact points times the number of Connecticut counties worked; Connecticut stations multiply their contact total times the number of states, provinces, or countries worked. There are 8 counties in Connecticut. Connecticut stations may work other Connecticut stations, but it only counts as a contact with the state of Connecticut, that is, among Connecticut stations, the counties do not count and are not given. 7) *Awards:* 1) A certificate to the highest scorer in each state, province, or country, excluding Connecticut. 2) Certificates to the *two* highest stations in each Connecticut county, excluding C.A.R.A. members. 3) A certtificate to the highest scoring Novice in Connecticut and a certificate to the highest scoring Novice outside Connecticut. The same goes for Technicians. 8) *Logs:* Logs must show dates, times, band, mode, numbers, RS(T), and QTH. Tell the class of your license, your address and do your score figuring somewhere on the log. Send all logs before May 24 to: Connecticut QSO Party, Candlewood Amateur Radio Assn., Tom O'Hara, W1DDJ, 7 West Wooster Street, Danbury, Connecticut.

CONNECTICUT—SCM, Fred Tamm, K1GGG—SEC: W1EKJ. H.F. PAM: W1YHH. RM: W1ZFM. Traffic nets: CPN, Mon. through Sat. 3880 kc. at 1800, Sun. at 1000. CN, daily 3640 kc. at 1845. CECN, EC Net Sun. 3880 kc. at 0900. CTN, Sun. 3640 kc. at 1800. W1RFJ, manager of the reactivated Conn. Training Net, reports increasing interest and activity by newcomers to the traffic game and any station wishing to learn the finer points of message-handling is welcome to report in CTN Sun. evenings. K1RQO is pushing traffic on c.w. during the early afternoon hours and reports the Meriden RC Two-Meter Net on 146.0 Mc. welcomes new members. K1LAW has been appointed Communications Officer by the Stratford CD. W1LE

New TV horizontal deflection tubes as final amplifiers



Homebrewers and manufacturers, alike, have been quick to take advantage of types 6DQ5 and 6GJ5 beam-power tubes as finals. And for good reason. These horizontal deflection tubes are mass-produced for the consumer market, and therefore cost less than equivalent power amplifier tubes designed for commercial service. Besides, these tubes as used in TV sets are required to handle high peak currents under continuous service conditions. Which makes them just about ideal for both CW and SSB.

Recently, Sylvania introduced three new types that should be of special interest to the amateur field. With this thought in mind, we ran a series of evaluation tests under ICAS conditions at a frequency of 30 Mc. The setup was a conventional RF amplifier with a pi network tank circuit.

The first tube to undergo evaluation was the Sylvania 6JG6, designed for horizontal deflection service in black and white TV sets. Plate and screen volts were 450 and 150 respectively. In Class C operation, the tube readily handled a plate input of 91 watts without showing color. In Class AB1, the peak envelope power was 37.8 watts.

The next two tubes evaluated under amateur service conditions were the new Sylvania 6HF5 and 6JE6 beam-power tubes. These types were designed for color TV service where higher peak currents are required. In fact, these tubes have a plate dissipation rating in the neighborhood of 30 watts.

The 6HF5 was evaluated at plate and screen voltages of 500 and 140 respectively. In Class C operation, with a grid No. 1 voltage of -85 v., plate input was 116 watts. In Class AB1, with a grid bias of -46 v., the peak envelope power was 57.6 watts.

The 6JE6 was operated with plate and screen voltages of 500 and 125 respectively. In Class C operation, with a grid No. 1 voltage of -85 v., plate input was 111 watts. In Class AB1, with grid bias of -44 v., the peak envelope power was 46.8 watts.

Considering the relatively low supply voltages required for optimum performance, these three tubes are particularly attractive for economical CW, SSB and narrow-band FM transmitters and compact linear amplifiers. Naturally, where higher power is desirable, two or more of the tubes can be operated in parallel.

If you're interested in putting any of these new tubes to work and would like more detailed information, just send a note to the Electronic Tube Division, Sylvania Electric Products Inc., Emporium, Pa.

73,

Bob Lynch

K2RMN

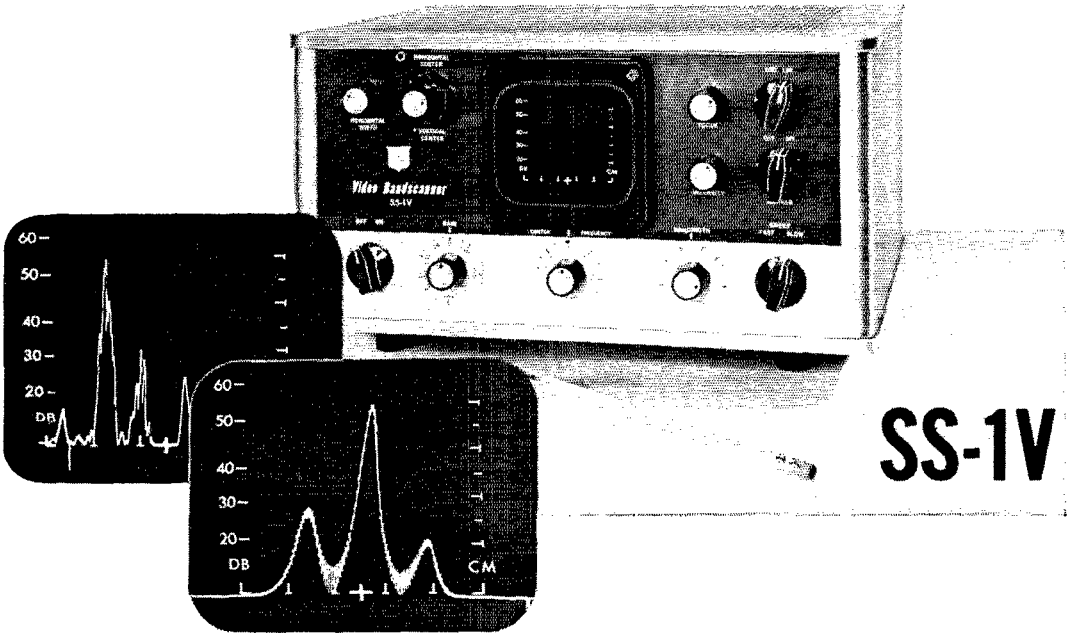
SYLVANIA

SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS GT&E

is on s.s.b. and c.w. from Wilton with a new 200-watt rig. W1BGD worked 5 new countries the same afternoon he got his new 20-meter dipole up. Stratford RC will participate in the Bridgeport 1965 Barnum Festival with W1CRS/1 on the air from the exhibition site. Welcome to new ARRL affiliated groups: Bloomfield ARC and Canaan ARS. An OES report was received from K1QNF. K1FTY, K1QFX, WA1BWP and W1-DQR are active in the Hartford area. BPL certificates were issued to K1WKK for Nov. and Dec. traffic and to W1BGD for Jan. traffic. CN reports for Dec.: 34 sessions, 291 messages, high QNI W1ZFM, K1OQG/1 and W1CTI. For Jan.: 31 sessions, 224 messages, high QNI W1ZFM, K1STM and W1RFJ. Conditions were below average with the added problem of RTTY QRM. Traffic: (Jan.) W1BGD 502, K1LFW 302, W1ZFM 196, K1-OQG/1 106, K1GGG 74, W1CTI 61, K1RQO 60, W1RFJ 38, W1LUH 32, K1WXN 17, W1YBH 17, W1GKF 16, K1NTR 12, K1WKK 12, W1QV 8, W1OBR 7, W1BNB/1 6, W1BDI 4, W1CHR 4, K1QNF 1. (Dec.) W1YBH 48, W1OBR 23, K1AQE 14.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received many annual reports from ECs. New officers of the So. Eastern Mass. ARA, W1AEC: K1IBR, pres.; K1INO, vice-pres.; W1LAZ, secy.-treas. The club will be on s.s.b. with a new HW-12. W1EPE and K1WUB are Silent Keys. New officers of the Malden ARA: K1CKS, pres.; W1RZE, vice-pres.; W1NXG, treas.; W1KSB, secy.; W1s AMO, BAB, THT, NXE, HKG, directors. The 6-Meter Crossband Net reports 21 sessions, 329 QNIs, 17 traffic. W1LOS moved to Norfolk. W1OOP spoke at the Norwood Club. W1ALP visited the Sharon group at K1ICJ's QTH. W1BGW is DXing on 40. W1s ZQQ and THT and their XYLs are taking a Caribbean trip. W1NXE is a newlywed. W1HXK is going to have a movie on ham activities. K1OJQ, W1AOG and W1LZW are on 10. EM1OMN reports 4 sessions, 35 QNIs. W1-HIL had a heart attack. WN1DOD is new in Quincy. The T-9 Radio Club met at W1MVQ's. K1TIV/1, at Otis AFB, is on 2- and 20-meter s.s.b. W1YCV says the Milton Club will hold an auction in April. WA1-AWJ is on several bands. The Needham Emerg. Net held 5 sessions, 29 QNIs, 7 traffic. K1TNW, W1KBN and KZ5KG 1 were on during the V.H.F. Contest. K1VGM has WAC. WA1BOS is very active on 6-A2. K1-NAY was in the hospital. W1YQM was in the hospital and W1s JBI and ACV put a rig on 2 for him to talk with the Melrose group. EM2MIN held 23 sessions, 243 QNIs, 199 traffic. K1ERO is on 6. W1PEX made the BPL. W1OFK visited him and W1ELP. WA1CRK has a IRN certificate. K1PNB worked So. Africa on 20 and says the VE phones bother our Novice Net on 3733 kc. W1JDP is doing some traffic work. K1YRF is on 75 and 20. W1AUQ likes his new SX-100 receiver. K1BIF is on MM on the training vessel *Bay State*. K1OFV has a Drake TR-3. K1FEV is on 6. W1QV, our N.E. Director, was guest speaker at the Quannapowitt RA. The net celebrated "Trail Blazers of the Air Waves" with 10 Cub Scout packs visiting with members. K1UAQ is on several bands, also K1OIC and W1TSN, and mobile on 75. The Fall River ARC, W1ACT, meets the 1st Tue. of the month. WA2WOR wants skeds on 40-meter c.w. to work all Mass. counties. K1NFW is on 80, 75 and 10. K1IYZ is building fully transistorized rigs for the car and home. The Wellesley ARS had Mr. Hallenstein, of FCC, speak. W1MRQ is working DX. W1MB and W1ALP had a QSO celebrating their first one in Jan. 1925. W1AQE is on the air some. W1VUO Salem and K1ZQL Stoneham are new ECs. Appointments endorsed: W1s BB, AQE, PEX, MRQ, EMG, JYH, K1WJD as ORSs; W1s BB, JYH, MRQ as OPSs; W1s TZ, VAH as OOs; W1s TZ, VMD, BHD as OBSs; W1s BHD, MRQ, KZW as ECs; W1BHD as OES. W1AQE as RM for 15. EMNN, on 3733 kc., held 11 sessions, QNI 34, 27 traffic. K1PNB sent out a nice bulletin. W1VIS's XYL is on with the Winthrop C.D. group. W1BB sent out quite a bulletin for 160-meter DX. WA1DLY is the call of the Marblehead HSRC. The Yankee RC held a penny auction and had a talk on antennas and lines. Hope W1MJ is better after his heart attack. K1GLD is editor of *QRA News*. W1PUO, U. Mass. Club, has a new B&W 6100 on the air. K1NHM has his pilot's license. W1s LUE and JFS are on 10. WN1DRK, a XYL, is in Natick. Traffic: (Jan.) W1PEX 1347, W1OFK 362, WA1CRK 314, W1EMG 147, K1ESG 84, K1VPJ 79, W1ZSS 75, W1LES 72, K1PNB 69, W1DOM 56, W1AOG 55, K1LCQ 35, K1ZSA 29, W1JDP 25, W1CTR 23, K1-GKA 22, W1SIV 20, W4YAC/1 18, K1FZE 17, WA1CLR 13, K1WHM 9, WA1CEV 8, WN1DEC 5, W1IJP 4, K1-YOK 4, K1YRF 4, W1AUQ 3, K1BGK 3, W1AKN 2. (Dec.) W1LES 256, K1WHM 123, K1BGK 30, WN1DEC 15, K1WJD 13, WN1DED 2.

NEW Dimension in Amateur Reception from SS



THE SS-IV Video Bandscanner adds a completely new dimension for enjoyment of amateur reception, while simultaneously providing a capability for operating efficiency and precision that has heretofore been possible only through the use of extensive laboratory equipment.

Used with the SS-1R, the SS-1V shows all signals in the band in use. Alternatively, any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A unique feature is that the signals displayed do not move as the receiver is tuned, but a marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier (see inset).

A turn of the SS-1R bandswitch allows monitoring of "dead" bands at a glance without de-tuning the receiver. DX chasing can become almost a science — "pile-ups" can be detected visually; with practice it is possible to "work" one DX station while observing the behavior of another (or several) at different frequencies. The motor tuning feature of the SS-1R is a real aid in moving up or down the band quickly to copy signals detected with the SS-1V.

In addition to providing these unique operating advantages, the SS-1V is truly a precise instrument capable of many oscilloscope measurements both with the SS-1R and alone, including complete monitoring of a transmitter (RF envelope, "Christmas tree", trapezoidal patterns, etc.) analysis of received signals (overmodulation and distortion products, carrier shift in both amplitude and frequency, audio harmonic distortion, intermodulation distortion, parasitics, etc.) as well as use of the SS-1V as a general purpose oscilloscope.

In this case, one picture is worth a thousand words! Operators' who have once used the Bandscanner "don't know how they got along without it." See the one picture at your favorite distributor.

SPECIFICATIONS

Frequency Coverage: Same as SS-1R, 500 kc segments
Dispersion: (display bandwidth) 500 kc max. 4 kc min.
Resolution: less than 2 kc; nominally 1 kc in slow sweep and min. dispersion
Sweep Rates: Nominally 30 and 15 cps.
Sensitivity: With SS-1R, less than 1 μv for 1/2 cm. deflection
Dynamic Range: Log 60 db, Lin 20 db
Input Frequency: 5.0 - 5.5 MC (SS-1R first i.f.)
Acceleration Potential: 2,500 V., dynam. regulated
Auxiliary Inputs and Outputs: (all connectors phono)
a) 6.0 - 6.5 MC (SS-1R VLO) for marker
b) Vertical plates
c) Envelope detected horizontal R.F. input
d) Vertical video amplifier input
e) Video out (for aural monitoring)
Size and Weight: 7½" H x 13¼" W x 13" D; 18 lbs.
Power Input: 50 W 115 VAC 50/60 cps
Tubes and Diodes: 14 tubes, 5 silicon diodes, 4 germanium diodes, 1 Zener diode, 2 varactor diodes

AMATEUR NET $395.00

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MAINE—Acting SCM, Herbert A. Davis, K1DYG—SEC: K1DYG. PAMs: K1BXI, K1ZVN. RM: WA2-NPU/1 V.H.F. PAM: K1QIG. Traffic nets: Sea Gull Net, 3940 kc. 1700 to 1800 and 2000 to 2100 local time Mon. to Sat. Pine Tree Net C.W., daily on 3596 kc. Two-Meter Phone and Traffic Net, 145.08 Mc. Thurs. 1930 to 2030, C.D. nets Wed. and Sun. New officers have been elected for the PAWA, K1KVI: K1OYB, pres.; K1VBG, vice-pres.; K1MTJ, secy.; K1RQE, chief op.; W1BTR, treas. The club meets every Tue. Many county AREC nets and groups meet weekly and are open to all who are interested. Traffic: (Jan.) K1TVT 42. (Dec.) K1NAN 180, K1MZB 4.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-SWX/K1DSA SEC: W1ALE/W1TNO. PAM: K1APQ. RM: W1DYE. The Granite State Phone Net meets on 3842 kc. (alt. 3845) Mon. through Fri. at 2330Z and Sun. at 1430Z. VTNHN meets on 3685 kc. Mon. through Fri. at 2359Z. Please note the change in VTNHN frequency as of Apr. 1. Don't forget that GSPN will start at 1900 EDST when the time changes. New appointments: W1JB as OO, W1TA as OBS and W1RCC as OPS. Yours truly enjoyed a very fine visit at a meeting of the Concord Brasspounders. K1UHE is experimenting with RC planes. GSPN report: 320 stations and 28 traffic. VTNHN had 78 and 23 traffic. K1VLX has a new NCX-3. The Nashua Mike & Key Club had a fine banquet with 85 in attendance. W1BXM has a new NC-303. Concord Brasspounders new officers: W1EAW, pres.; W1DYE, vice-pres.; W1YED, secy.-treas. K1CXP/W1BHV is now active from Connecticut. W1CNX's fine a.m. signal is heard on GSPN often. K1WKP was active in the CD party. K1PCY put up a new antenna and has a good signal on 75 now. Traffic: (Jan.) W1ALE 38, K1BGI 21, W1DYE 21, W1EVN 13, W1SWX 13, W1AIJ 4, W1RCC 2, K1DWK 1. (Dec.) W1DYE 103, W1EVN 11.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. Section Net certificates were issued to the following RIN members: W1BTV, W1YNE, W1YKQ, K1BRJ, K1YYI, K1USD, K1YVN and K1QZW. R1SPN reports 31 sessions, 680 QNI, 99 traffic. RIN reports 21 sessions, 124 QNI, 85 traffic. The W1AQ Club of Rumford issued WRI certificate No. 59 to K1ZGH, K1QLM, who recently was discharged from the Air Force, has been reinstated to membership in the club. He recently obtained his 1st-class ticket with radar endorsement. The Fort Butts High School of Portsmouth has started a new radio club. The club has for its advisor, W1VQP a. teacher at the school. In a recent election WN1DJJ was elected pres. and WN1DOJ was elected vice-pres. WN1-DOJ's father, W1RDH, is an engineer at the Raytheon Sub. Sig. Plant and is pres. of the Sub. Sig. Radio Club. The R.I. Emergency Net meets Mon. at 2000 local time on 51.5 Mc. The R.I. AREC Rag Chew Net meets at 2030 local time Mon. on 51.0 Mc. Licensees who wish to join the AREC may send applications directly to the SEC or SCM. Traffic: W1TXL 372, W1BTV 87, W1YNE 83, K1USD 72, W1YKQ 65, K1YYI 42, K1TPK 34, K1YEV 34, K1BRJ 18, K1SXY 14.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM:W1WFZ. Green Mt. Net meets at 3855 kc. daily at 2230; Vt. Fone Net on 3855 kc. Sun. at 1400Z; VTNH Net on 3685 kc. Mon. through Fri. at 2330Z; Vt. C.D. RACES Net on 3993 kc. (a.m. and s.s.b.) Sun. at 1500Z. Please note the new frequency of VTNH, 3685 kc., effective since Mar. 1, which we hope will prove better than 3520 kc. Perhaps some of the rigs will load better at the new frequency. The Vt. Trading Post is now being held immediately following the Vt. Fone Net on Sun. mornings. OES W1AIM/1 reports being on 2 meters and is working on 432-Mc. equipment. Net check-ins for Jan.: Green Mt. 402, Vt. Fone 147, VTNH 78, Vt. Trading Post 45. Traffic: (Jan.) K1BQB 425, K1UZG 45, K1LLJ 23, K1YMY 12, K1MPN 5, W1KJG 3. (Dec.) K1UZG 82, W1WFZ 16, W1KJG 5.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—C.W. RM: K1JV. Hampden County 10-Meter Net Manager: K1PKZ. K1IJV reports that WMN (3560 kc. daily at 7:00 P.M.) handled 93 messages during January. The following stations were active in the net (arranged in order of attendance): K1IJV, W1ZPB, W1DVW, K1SSH, K1WZY, W1BVR, K1YMS, K1LBB, W1DWA, W1QKX ,W1MNG, WA1AEV and K1LNC. W1DWA has moved from Dalton to Hinsdale, and has a CHC-50 sticker. K1LNC is active on 20-meter s.s.b. W1LVQ, Secretary and General Manager of ARRL, was the speaker at the Hampden County Radio Association. The speaker at the Berkshire County Club was George Burgoon, Chief Engineer for the Greylock Broadcasting Company. W1PFD is now at 512 Filbert Rd., Oreland, Pa. W1GTO's latest on 80 was UO5PK. W1AEW has a confirmed total of 276. W1EG and K1-CPG are active on 6. Short report, ain't it? But, did

Here is what a Ham thinks about the new 6 meter base station antenna . . .

"I do a lot of 6 meter work since I act as net control for the Michigan, Ohio, Pennsylvania SSB Net and in addition, stations from other midwestern and eastern states check in. My 10 element commercial beam with a 24' boom has met with several accidents due to high winds."

"Recently, I purchased and installed your new Coveya-6 beam antenna. To make a comparison with my previous 10 element beam I went on the air without revealing the change. You'll be glad to know that the results surpassed the performance of 10 element beam and besides, I obtained these additional advantages:

1. *Better front to back ratio for receiving — at least 25 DB.*
2. *An improved forward pattern.*
3. *Much wider coverage of forward pattern on transmit, thus eliminating moving the antenna often.*
4. *Very low VSWR — 1.1 to 1 across entire band.*
5. *Completely weatherproofed assembly making weatherproofing spray unnecessary."*

"My greatest satisfaction was the ability of the Coveya-6 to reach out and get the long distance ground wave stations. All comparison checks in the log book were very favorable to the Coveya-6."

Elmer D. Sauers, WA8AUZ, Akron, Ohio

this is just one of numerous favorable comments we received about our COVĒYA-"6" see it at your distributors or write for literature

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you send in any news about *your* activities? Traffic: (Jan.) K1SSH 168, W1BVR 89, K1LJV 71, K1LBB 27, K1WXY 7, W1DVW 4. (Dec.) K1LNC 631.

NORTHWESTERN DIVISION

IDAHO—SCM, Raymond V. Evans, K7HLR—The Idaho Falls gang expects $750 worth of s.s.b. gear to be used in c.d. work. W7DHD and W7DMP are both building full-gallon linears to use with their SB-33s. K7KBV expects an SB-33 soon. The local club is moving communications from 10 to 160 meters. W7DQU and his XYL, K7PGG, are teaching about a dozen would-be Novices both code and theory. The Twin Falls group holds code and theory classes under the direction of W7NGA. K7LCW invited the Canpus School second-graders to his shack to hear over the air the code they had learned in their classes. Traffic: K7HLR 84, K7NEY 5, W7GGV 4, K7OAB 4.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7KUH. PAM: W7YHS.

Montana S.S.B. Net	3910 kc.	1800 MST. M-F
Missoula Area Emergency Net	3895 kc.	0900 MST.
Montana PON	3885 kc.	0815 MST. Sun.

Endorsements: K7CTI as ORS. It's coming time again for the annual ARRL Field Day in Montana. Stations having a message for your SCM for Field Day points, look for W7TYN/7 around 3910 kc. on late Sat. afternoon and all day Sunday. We have lots of news from down Bozeman way, thanks to W7NPV. It looks as though the club is in high gear. The club directory shows 22 hams going to MSC. K7IQI and K7KBH live on the top floor of the new Hedge Hall, the tallest building in the State of Montana, but have been unable to secure permission to put up an antenna. The location seems a natural for a 2-meter location. K7YEM is looking for some help getting traffic moving between the MSN and the RN7. The Butte, Missoula, Whitefish and Anaconda groups are going to use 144.450 Mc. as a standard inter-city frequency to try and get 2-meter communications paths between these areas. We are still in need of more ECs in a lot of Montana counties, so if you think you can do the job, please write your SEC or SCM. The SCM is now moved into the new house and is getting back on the air. The new address is 1916 Haggin Ave., Anaconda. Traffic: K7EWZ 172, K7SVR 44, K7UPH 36, W7FIS 29, W7NPV 24.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. Net reports: K7IWD, mgr. OSN, reports Jan. sessions 20, attendance 93, high 8, traffic 32, high 7, average 1.6. BRAT awards to K7IFG, K7IWD, W7ZFH. OSN records for 1964 show total sessions 266, attendance 1675, traffic handled during session 851, average high attendance 9.75, average high traffic 11.75, traffic average per sessions 3.17. BRAT totals W7ZFH 564, K7SGX 368, W7AJN 159, W7BVH 145. The activity of this net is excellent, because 7 regulars have contributed to the activity of this net. The main rig at W7JHA is a B-W 6100, with a 4 811A GG, Ranger stand-by and an HQ-170 receiver. He also is active on RN7 and OEN. K7IWD, W7ZFH and K7SGX also are active on RN7. K7DVK has rebuilt his triband beam and says his XYL now is WN7CHE and is on the air with a Twoer. W7DEM reports that W7ADF is Asst. EC for Josephine County. WN7CGW is a new Novice. K7BLG is working portable out of Grants Pass. K7WPC sends in his first activity report. His rigs are two Ranger 2s, an SX-110 and Mochican receivers. He also is active on 2 Army MARS nets. RN7, OSN and OEN. OO W7KTG sends in another long report as to his observations. Traffic: (Jan.) W7ZB 170, K7IWD 128, K7WPC 39, W7ZFH 36, W7JHA 16, W7DEM 12, K7DVK 10. (Dec.) W7GUH 515.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMQ. RM: W7AIB. PAM: W7LFA. Washington traffic nets are as follows: WSN, 3535 kc. 0100Z; WARTS, 3970 kc. 0130Z; NTN, 3970 kc. 1930Z; NSN, 3700 kc. 0500Z. The LCARA group hangs around 53.1 Mc. When passing through Longview or Kelso why not try that frequency for contacts. W7ULT has a new Valiant. The Northwest Slow Speed Net reports 183 QNIs and 69 QTCs during January. The WSN had 31 sessions, 292 QNIs and 173 QTCs. Those in attendance at K7PIY's recent wedding were WA6UJT, W7EQY, K7MCA, W7HMQ, W7WHV and W7MCU, who was the picture-taking specialist on the occasion. K7JPS works his son W7VLC, in KH6-Land, daily with a new TR-3. The Second Section (QCWA) Dinner will be held May 1 at the Lewis and Clarke Hotel, Centralia. The following are on the dinner committee: W7TZ, W7ECX and W7BX. The annual meeting of the Northwest Chapter QCWA will follow on June 12

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and 13 at the Lakeshore Inn, located on Lake Union in Seattle. The chairman of this committee will be W7QA, assisted by W7LQ, W7AGV and W7MEA. The following members of the Basin Amateur Radio Club participated in the March of Dimes Marathon: W7GYF, K7s USE, UWL, YGL, HGF. The Noon Time Net (NTN) had 31 sessions with 866 QTCs and 1373 QNIs during January. K7JHA and W7JEY renewed their ORS appointments. K7IAE is QRL changing the keying system on the DX-40. W7AIB reports he is too QRL with other things to QNI WSN as he would like to do. W7AMC thinks he is better in his bout with arthritis. New England Division Director W1QV and Northwestern Division Director W7PGY attended a Bremerton Amateur Radio Club meeting. W7NPK received his fourth BPL certificate. Jack was inadvertently listed as W7NPL in the October report; it should have read W7NPK. W7AJV is planning on new 6-meter operation soon. The Annual Hamfest of the Skagit Amateur Radio Club will be held on Apr. 24 at the Bryant Grange Hall, Bryant, Wash. The club also made a trip to Harrison Hot Springs Feb. 13-14. This will be my next to last report as SCM for the Washington section and I again wish to express my thanks for the wonderful cooperation shown me during these past seven years as SCM. In resigning as SCM it will enable me to give more time to your wishes and desires as Director for the Division. Be sure to vote for the SCM of your choice in the forthcoming election. Traffic: (Jan.) W7DZX 727, W7BA 716, K7JHA 654, W7NPK 320, K7TCY 206, K7CTP 185, W7APS 80, K7-URU 61, K7ZPM 59, W7BTB 58, W7AMC 36, W7AIB 21, W7GYF 13, W7JEY 10, W7EVW 9, K7IAE 2, W7AJV 1, K7WVQ 1. (Dec.) W7GYF 27.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—Following are appointments as of the first of the year: SEC: WA6OLF. ECs: WA6FFF and K6TFT. RM: WA6WNG. OESs: WA6VAT, W6NDR, WA6MXI, K6-SPP. OPS: K6TFT. OBSs: WA6VAT, K6GK, W6DUB, W6LGW, W6UB, WA6FBS, K6TFT. ORSs: WB6ETY, WA6WNG/WB6CRC, WA6MIE, W96FBS, WB6ILH, W6IPW. OOs: W6OJW, K6GK, W6CBF, WA6FKN, K6-LRN, WA6KLL, K6TFT, W6TYM. If your call does not appear check your ARRL membership or your activity reports. Many clubs seem to be designating Technician licensees as club ECs. I have no control over club activities but only SCM-appointed ECs have authority to issue or sign AREC identification cards. Club-designated ECs will not receive regular EC bulletins from ARRL Headquarters. If any club-designated Tech. licensee is willing and able to do the work, he has two choices (1) to get a General Class licensee or above to work with him or (2) to get a General Class ticket of his own. I am hoping you all will cooperate so we can get our AREC organization in shape. WA6KLL reports that the Livermore C.D. Net meets Mon. night at 7:30 PST on 147.12 Mc. and will listen from 146.5 to 147.2 for calls. WB6ILH is ORS and received his Code Proficiency certificate. W6CBF is working on a new terminal unit and getting KWS-1 on 40 and 80 meters. W6OJW is temporarily off the air rebuilding and reports a new ham in Dixon, WA4GNZ. K6GK is monitoring on 40 and finds some hams as low as 6997.5. K6JZR has established a 20-meter sked with VE3AHO and continues his regular sked with W2ETY. WA6DOO does a bit of ragchewing on 40. New officers of the Skyriders are W6ELP, pres.; W6ACN, vice-pres.; the XYL of W6MNK, secy.; W6KSP, treas. WB6ETY has his SB-300 working well and is moving to Livermore. New officers of The Silverado ARS are WB6AMB, pres.; K6VXK, vice-pres.; WA6OGB, secy.; K6RZR, treas.; WB6FMN, sgt. at arms; K6BYQ, W6ZF, W6NOP, K6VXK, board members. The LARK operated in the V.H.F. SS from Patterson Pass and worked 133 v.h.f. stations in 6 ARRL sections including Nevada. WB6EIU is on 420 with 250 mw. to 9-inch vertical. New officers of the MDARC are WA6FBS, pres.; WA6ANE, vice-pres.; WA6MIE, secy.; K6IMV, treas.; WA6DKG, EC; W6LGW and WA6NFF, board members. According to my figures our traffic count for 1964 is doubled over 1963. More people are reporting with more traffic which is a good sign. Keep up the good work and let's double that this year. Don't forget NCN, 0300Z daily on 3635. Traffic: (Jan.) WA6MIE 250, WA6NFF 144, K6GK 75, K6JZR 58, K6LRN 32, WB6ILH 8, WA6QZA 5, WA6KLL 3, W6CBF 2, WA6PTU 2. (Dec.) W6IPW 74.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. Acting PAM: KH6ATS. RM: KH6EWD. What does it take to make Hawaii an outstanding ARRL section? A little hard work is the answer. I am not getting the most out of ARRL you say! Are you putting any effort into the support of your ARRL section? A little support by many will add a lot. Just an hour a week on a phone net or

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c.w. net will convince you how easy it is to forget the proper procedures. The Honolulu ARC and the Emergency ARC are busy working over commercial-type 2-meter f.m. transceivers and have a network of mobile stations that check in throughout the work-day hours. All persons interested in getting their "feet wet" in this project should contact either KH6GG, KH6CUP, or KH6AFM. KH6ATS, our PAM, reports the 50th State Phone Net still is active. KH6EXI, on Maui, Mon. night NCS, is quite active and welcomes all new/old-comers alike. KH6DEH holds down Wed. nights. W6FB was in town visiting relatives. He was most kind to shoot me a landline call and nice QSO. Lists of new club officers for the coming year and news of activities should be forwarded to me. The Honolulu ARC already has started Field Day plans. Traffic: KH6ATS 13, KH6BZF 7.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU. W6FB/W7OX again is QSLing from the Silver State. WN7BOQ is doing an FB job handling traffic. W7KOI reports no activity from the Elko area. K7OLQ says he's ready for some c.w. contacts on 80 meters. W7FBL is installing a $40,000 rig. W7RBV is on RTTY with a Model 15 and Twin Cities TU. K7YXX and K7TNY each have an HB linear. WA7CFS is active with a DX-40. SNARC certificates Nos. 86 and 87 have been issued to WA6ZLO and KØHUU. K7ZLS's new QTH is Elko. W7YDX is on the air again from Wells. W7AMI has given up s.s.b. for a.m. W7BJY recently received the Operator of the Month award from MARS. W7PBV is mobile with a TR-3. RTTY is becoming very popular in Southern Nevada. W4CJD/7 reports that because of lack of activity the Nevada C.W. Net, on 3660 kc., is securing. Thanks, Vernon, for a job well done for the past several months. Traffic: (Jan.) W4-CJD/7 83, WA7BAV 35, W7FBL 13, W7JU/K7JU 8, W7PBV 4. (Dec.) WN7BOQ 18.

SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6-HYU. Communications for the Annual Camellia Festival Children's Parade will be provided by the Camellia Capital Chirps. K6GU and W6ESZ entertained the Chirps at a pot-luck dinner, celebrating the 9th anniversary of the club, W6ESZ was the "master chef." Sacramento ARC's repeater station receives on 145.02, transmits on 146.98 Mc. WA6DQO, a member of W6AK, will speak on "The Art of Grinding Crystals" at the next meeting. The new editor of *Mike & Key*, W6AK's monthly newsletter, WA6ZCA, would warmly welcome news as early in the month as possible. RAMS' event-of-the-month will be a trip, mobile caravan, to the famous Winchester Mystery House in San Jose. RAMS enjoys a "token membership" in the repeater club SV2MRC. W6SMU and WA6PBI are on the air with their Christmas Twoers. K6SEA and K6SBL are monitoring 2 meters. Mike Murray, of Product Training Staff, Aerojet-General, Sacto., spoke at a recent McClellan ARS meeting on "The Advantages and Disadvantages of Liquid vs Solid Propellant." This club assisted with communications during the Northern California Disaster in Dec. 1964 and Jan. 1965. The Yolo County Civil Defense ARC, with 20% of the net's members having RTTY capacity, held daily meetings throughout the Northern California flood disaster. WA6TQJ, net mgr., says the 2-meter net acted primarily at the "grass root level" taking traffic from and dispersing to 80-meter c.w. and phone nets. K6YBV, net mgr. of NCTN, also is active on MCAN and NCN. OO W6ZJW is sporting a new SB-400. The Nevada County ARC, which meets the 2nd Wed. of each month, has applied for ARRL affiliation. Secy. K6RHW would appreciate contact with hams in the Nevada County vicinity. Please address communications to Joe Blake, 423 East Ridge Rd., Grass Valley. W6AF, for Oroville ARS, extends an invitation to licensed hams and those interested in becoming hams to attend their club, which meets the 2nd Fri. of each month at the Municipal Auditorium, Oroville. ORS K6YZU checks into NCN 3 times weekly. WA6HYU is active with the West Coast Radio Amateur Emergency Net operating 7225 kc. from K7FER, Net Control K7UDG, Reno, Nev. Daily check-in time is 12 noon. It is with regret your SCM, W6BTY, because of the pressure of business, had to withdraw as a candidate for the SCM post for the next two years. My deepest appreciation to Asst. SCM/SEC WA6HYU, all appointees and those who, through their splendid assistance and cooperation, made my terms of office a most pleasant experience. May I request all members in the Sacramento Valley section to support and assist your new SCM, John Minke, WA6JDT, to the fullest extent of your capabilities. Traffic: K6YBV 101, WA6HYU 68, WN6MAE 24, K6YZU 5.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6KZF. The following new officers of the Tamalpais Radio Club at Novato were installed at the January meeting: WA6RWH, pres.; WA6UTD, vice-pres.; WA6PKX, secy.; WB6MFL, treas. K6OJO was

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This is the performance that K4KXR of Gotham can demonstrate, using his Gotham V-80 antenna with 35 foot feed-line connected to the coil at the antenna's base, and his HT-40 transmitter. Neither the antenna nor the coil is touched. Without worrying about the standing wave ratio on various bands, Bob merely switches his rig to the desired band (80-40-20-15-10-6 meters), plugs in the crystal, tunes grid drive, plate tuning and plate loading, and he is on the air. No TVI at any time even with TV receiver in the same room. Contacts vary from local ragchews to DX thousands of miles away.

elected president of the Greater Bay Area Hamfest for 1965 and it may be held in Marin County this year. K6LHN, who is studying at the U. of Calif., put up a new all-band vertical but is having trouble getting it to work. WA6ROJ is back to a normal schedule after a hectic time during the flood emergencies maintaining communication equipment for the state agencies, a lot of it on top of mountains in the Coast Range. WA6IVM is the new secretary of the Northern California DX Club. Ray had his 40-meter beam come unglued during a January storm. WA6NDZ is completing a fixed frequency receiver to help in his OO work. W6UDL and WA6ALK are getting new antennas up and plan to be ready for Oscar III. The Marin AREC was alerted for the tidal-wave alert early in Feb. and stood-by during the night at W6SG, the Marin Club station. W6GQA, OO in San Francisco, detected a Ø-land station out of the band speaking in German. Al sent an OO notice in German and received a reply and Christmas card, all in German. The Santa Rosa Club held its election for the year in March. The March auction of the San Francisco Radio Club was its usual success. Earl Parker, of the S.F. Club, was appointed Field Day chairman for this year. The HAMS Club provided communications during the Chinese New Year Parade in February, suppiying six 6-meter mobiles and a base station. A section newspaper is mailed to all club officers and section appointees in the San Francisco section. K6OJO is the new pres. of the Marin Amateur Radio Club with WA6UTE, vice-pres.; WA6FJY, treas.; WB6KHI, secy. The Marin Club is buying s.s.b. equipment for the club station. W6SG. Traffic: (Jan.) WA6IVM 12, K6LHN 1. (Dec.) WB6GVI 221.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—WB6EBO, OES and now located in Bakersfield, Calif., is interested in 6-meter Moonbounce. He is using an HE-45 and a three-element beam on 6. W6QFR has an SB-400. K6PBL lost his 80-ft. tower, beams and all in a recent windstorm. K6OZL is on his way to Africa and will be operating as DX. K6OLN is studying in Austria. WB6IXE has an SB-10. WB6JQT has a G66-76 combination and hopes to be mobile. WA6NAB has a Model 15 RTTY. WA6FFJ is on 160-meter mobile and working out very nicely. W6QON was heard on 160 using a Command transmitter. WB6GIT has a new SB-300 receiver. WA6ZGQ has a Heath Panadapter. W6DUD has moved to Dinuba on the ranch with lots of room for antennas. W6BJI went skiing in Badger Pass, looped the loop and ended up in the hospital with a broken leg. Get well soon, Gib. W6ADB reports that traffic conditions on 80 are bad, and wishes that they were on 160. W6PFV, an ex-Fresnan, now in San Mateo, was a recent visitor here. W6JPU has a Model 28 RTTY. W6JPS is rebuilding his kw. rig into a rack and panel. The Fresno Amateur Radio Club meets the 2nd Fri. of each month in the PG&E Building on the 10th floor. Please send in your reports. I need them! Traffic: WA6VPN 154, W6ADB 136, K6MPM 68, W6ILR 13, W6ZKH 4.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO, SEC: WA6HVN. RM: W6QMO. The Santa Clara Valley Section Net reports five sessions, 20 check-ins and traffic of 2, by acting manager WA6RXD. WA6RRH, former V.H.F. PAM, is now back in the section and active again. The Foothills Amateur Radio Society enjoyed its annual dinner meeting in January with Mr. Don Cohne, from SRI as guest speaker. The Santa Cruz Radio Club Jan. meeting featured discussion of feedline and antennas as well as other technical topics of interest to amateurs in general. The club now has 56 members with four new in January. *Standing Waves*, the club bulletin of the South County Amateur Radio Society, featured a layout of pictures of the club's Christmas Party in the January issue. The West Valley Radio Club has moved its meeting location to Cambrian School and the club meets the 1st Wed. and 3rd Thurs. The Jan. meeting of the Santa Clara County Amateur Radio Assn. featured a talk by W6CBK on antennas. W6SAZ was featured speaker at the Palo Alto Amateur Radio Assn. January meeting, giving an informative talk on the construction of KTEH, channel 54, Santa Clara County's Educational TV station. W6VZE, Burlingame EC, NCSed on the Red Cross Emergency Net during the California Christmas floods and operated 18 hours per day for a period of 10 days. W6RSY reports that traffic is in a post-Christmas slump. K6EQE reports that skip is making traffic work difficult on 75-meter phone. W6JXK is working on a BC-610 for 20-meter operation and hopes to de-TVI it. W6DEF originates traffic on NCN, thereby helping in traffic operation. W6AGR is now using a vertical and is heard on NCN. K6DYX now has a Boehme keyer. W6PLS handled traffic in the recent California floods. Gene reports that 17 attended the HMA potluck. W6AUC is handling traffic with KH6

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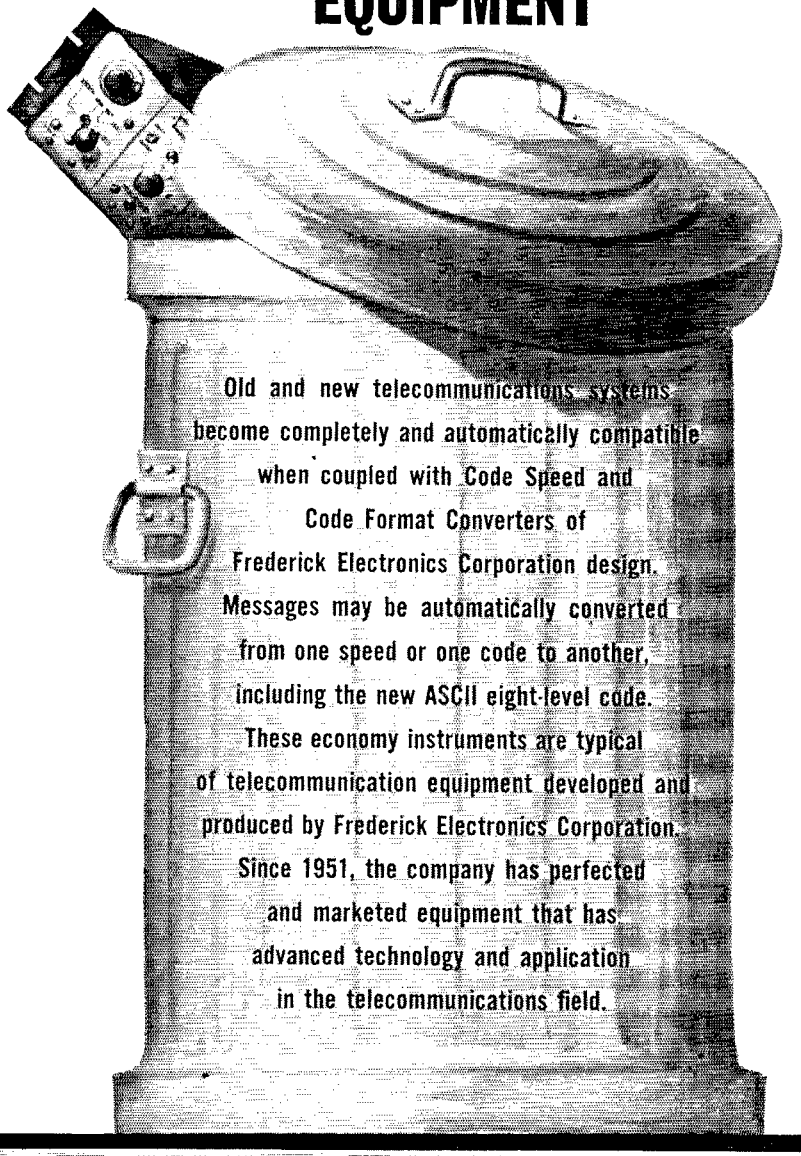

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and KL7. W6HC is getting better signal reports with his new antenna. WA6TKE is sporting new trap dipole. W6QMO reports that NCARTS has finished delivery of 32 pieces of TTY gear and is making plans for the National Convention. W6OH works MTN. K6YKG worked in the recent CD Party. W6SAW is active handling traffic to Navy Radar picket ships. W6JSA RTTY's autostart gear cross-county. Traffic: (Jan.) W6RSY 503. W6JXK 225, W6AIT 134, W6DEF 114, W6AGR 99, K6DYX 98, W6VZE 56, W6PLS 52, W6ASH 28, W6ZRJ 23, W6AUC 16, W6HC 16, WA6TKE 10, W6QMO 9, W6OH 7, WA6RRH/6 6, K6YKG 4. (Dec.) K6EQE 12.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4-MFK. RM: WA4FJM. PAM: W4AJT. V.H.F. PAM: W4HJZ. W4AJT writes: "After lengthy discussion with N.C. League Officials and net managers concerning the establishment of a calling frequency for all North Carolina amateurs, it has been decided to try using 3875 kc. for this purpose. This is the National Calling Frequency in the 75-meter phone band, and there is not any net using this frequency. It is hoped that all N.C. hams, when in the shack and not in QSO, will monitor this frequency, particularly during the daytime, when there might be a mobileer in trouble." W4EVN has a Novice class started with ten boys age 15-16. K4QIF worked Missiouri on 2-meter M/S, and W4VHH got Ark. and Wisc. on the same meteor shower. W4BDU says he had FB fun in his first CD Party. From WA4FJM: "Was in the 160 contest this week end—130 QSOs, from VO1 to VP7, and out to Colorado. New 2-meter exciter is on the air, now for a final in the 50-100-watt class! 80 meter DX has been FB lately." WA4LWE made both DXCC phone, and WAC all s.s.b. during Jan. '65. Net traffic: (Jan.) NCN (E) 238, NCN (L) 72, SSBN 57, THEN 21. (Feb.) CCEN 32. Traffic: (Jan.) W4LEV 2712, WA4PDS 406, W4LWZ 236, W4IRE 229, W4EVN 201, W4BNU 81, K4CWZ 60, K4CDZ 51, WA4LWE 46, WA4BVF 45, WA4ANH 32, WA4FJM 31, WA4PYJ 28, W4BDU 22, K4EO 17, K4GNX 16, W4ACY 13, K4QDO 7, WA4ICU 6, W4VON 1. (Dec.) W4LEV 2707.

SOUTH CAROLINA—SCM, Charles N. Wright, W4-PED—SEC: K4HJK. RM: K4LND. PAM (a.m.): K4-OCU. PAM (s.s.b.): K4LNJ. Nets: C.W., 3795 kc. at 0000Z, 0300Z daily. A.m., 3820 kc. at 0000Z daily and 3930 kc. at 1330Z and 2030Z Sun. S.S.B.: 3915 kc. at 0000Z daily. The Florence Club was accepted for membership in the State Radio Council. There are now eight of the known thirteen clubs in the state which support the council. The first new project for the council is increased publicity to insure that all eligible hams apply for call letter license plates this year. So few have taken advantage of this recently that we are in danger of losing the privilege. The council trophy for 1964 Field Day will be presented to the Spartanburg Club for 2328 points with one transmitter. The Union and Hartsville group are both sponsoring very successful code and theory classes as reported by K4LNJ and WA4RUB. WA4PFQ reports 105,270 points in the Jan. CD party. Net traffic: S.S.B. Net 187, A.M. Net 19. Traffic: K4-LNJ 121, WA4PFQ 75, W4PED 61, W4WQM 55, K4OCU 45, K4BMI 32, W4YOH 10, WA4QKQ 8, W4NTO 6, WA4LPV 5.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: H. J. Hopkins, W4SJH. PAM: W4DKP. RMs: W4ZM, WA4EUL, W4SHJ, W4QDY. VSBN mgrs. W5VZO/4, W4OKN. VSAM: WA4UXL. K4PVY is back with W4NTR after about a year and a half. He plans to retire in Sept. W4RHA, received a Public Service Award for work in "Cleo." WA4EUL is proud of his TARC Award as outstanding amateur of the year; K4JDK received the other award. K4SCL received his Amateur Extra Class license and A-1 Operator certificate. W4MXU says it's surprising what 15 watts and a quarter-wave antenna will do on 160! W5VZO/4, mgr. of Early VSBN, received an A-1 Operator certificate. The Blue Ridge Slow Net (BRSN) is getting off to a slow start, says Mgr. K4GRZ. The following participated in the CD Parties and had a ball: W4ZM, W4JUJ, W4-MK, W4YZC, W4PTR, K4ITV has a new job as Radio Officer for Basic RACES-C.D. W4DVT is putting together a Heath k.w. amplifier. WA4DAI is a newcomer to VSBN with 6 QNI in one month! We see that K4LMB, Ethel, is now checking into 4 nets—VSBN, VN, AREC and MEPN. W4TE, her other half, reports that either he or Ethel will meet VN each night. W4NVX is relearning to use a Vibroplex after using an electronic keyer for 10 years. He likes both and says the monster makes the cleaner keying. Old trafficker K4JKK plans to be back on the air as soon as he can rig antennas at the new QTH. K4BAV says he enjoyed reading the *Virginia Ham* while the train on which he was riding waited for the tracks to be cleared of a freight wreck. Former EC W4ZMT is now sporting a new HT-37, a new

keyer and a tri-band beam. PAM and DXer W4DKP worked a new country for 308 and 307 confirmed! It just shows that traffic and DXing *will* mix. Hi. W5VZO/4 acquired a PE-75 slightly-used generator. Traffic: (Jan.) W4DVT 205, W4NTR 192, K4LJK 186, W4RHA 171, WA4EUL 158, WA4UXL 152, W4NIXU 138, K4SCL 118, W5VZO/4 83, W4NLC 62, K4GRZ 53, W4OKN 50, K4ITV 39, W4ZM 39, K4FSS 37, W4SHJ 37, K4YCH 32, W4JXD 28, K4MXF 23, W4DKP 20, WA4JRY 19, W4JUJ 18, WA4DAI 16, K4LMB 16, W4TE 14, W4ZAU 14, K4VCY 11, W4MK 10, W4NVX 9, W4YZC 9, WA4JXO 6, W4PTR 6, K4BAV 1, W4KX 1. (Dec.) W4VZO/4 105, W4DKP 44, W4DLA 42, K4SDS 15.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: W8LMF. PAM: K8CHW. S.S.B. Net Mgr.: W8EEO. West Va. nets meet on 3570, 3890, 3903 and 3905 kc. All West Va. amateurs desiring their call letters on their license plates and not familiar with procedure, should contact your SCM now. WA8KJX is away out in front in the V.H.F. County Contest with 14. WA8FJA, from Hardy County, makes county hunters happy. W8HZA worked 99 stations in 26 states during the 160 Contest. Winners of the West Va. QSO Party: C.w. WA8EUC, phone K8BIT. Officers of the Black Diamond Radio Club for 1965 are K8NNF, pres.; K8ZDY, vice-pres.; W8SSA, secy.-treas. Those active on 6-meter RTTY from the Huntington area are WA8KZU, WA8FVI, W8DUW, W8FJJ and WA8NJB. West Va. PON Net reports 20 sessions, 83 stations and 184 messages; WVN Phone Net 19 sessions, 376 stations and 56 messages; WVN C.W. Net 19 sessions, 101 stations and 72 messages. WA8BUM is a new OPS and K8HID renewed as ORS. The East River ARC has a new certificate called "55 County Club" and W8HNK is editor of the club paper *Static*. West Va. RACES Net meets at 2 P.M. Sun. on 3549.5 kc. Everyone is welcomed. State Radio Convention, Jackson's Mill, July 3 and 4. Traffic: K8TPF 263, WA8GRE 68, K8WWW 61, W8CKX 44, K8HID 23, W8HZA 23, K8EEJ 14, K8KST 12, WA8CPY 9, K8WMQ 9, WA8DAU 4, WA8CRW 3, W8CZT 2, K8EPI 2, K8ZPN 2, K8ZWM 2, K8SDH 1, W8TGF 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM: Donald Ray Crumpton, KØTTB—SEC: WØSIN. PAM: KØFDH. TWN: WØHXB. I am wondering if the AREC, like the sunspot cycle, has finally hit a low. At least there is much more interest and a desire to do things in this part of the woods. The radio clubs in Pueblo are going to find a new EC for that county. KØEDK sent in an annual report and has asked that we find another as EC for Montrose. Some new ECs are to be appointed and then we will see if conditions improve. Here in Denver the ECs got together and helped out the Leukemia Society Telethon. We used both 6 and 10 meters and had WØGVT as a coordinator for that purpose. The amateurs had a hot line from the hotel headquarters to our operating control at WØUI in the Red Cross Building and handled many, many calls for cars to pick up donations. I would judge that we had at least 50 mobiles out and some amateurs took calls at their home stations and then went out. Everyone seems well pleased with the operation. Our EC, KØLPI, was in charge. Skip is beginning to shorten up on the Columbine Net and we have moved down below the jammer station. Slim really likes the Columbine Net certificates. High Noon Net traffic: 181. Traffic: KØZSQ 147, KØDCW 100, WØSWK 25, WØCBI 22, KØLCZ 12, KØMIC 4.

NEW MEXICO—SCM, Newell Frank Greene, K5IQL—Asst. SCM: Kenneth D. Mills, W5WZK. SEC: K5QIN. The Breakfast Club meets week days at 0700 MST on 3838 kc. NMEPN meets Sun. at 0730 on the same frequency. The first of May both nets will go to summer schedules, one-half hour earlier. Your SCM journeyed to Artesia and met with the new club. W5ROH has rounded up a fine enthusiastic group. Dr. Woodlee had just taken his Conditional Class exam. A friend of the doctor, who is a technician with the telephone company, and a budding ham, has designed audible metering equipment for the sightless doctor. W5BWV is proud of his new Swan. W5WZK also has joined the s.s.b. ranks with a new National rig. WN5s LVL, LVN and LVO are products of the Los Alamos code and theory classes. Incidentally, W5ROH's code practice skeds have been changed to Tue., Thurs. and Sat. at 2100 MST on 3562 kc. Tiny is getting fine reports. Traffic: W5UBW 56, W5LUX 26, K5HTS 8.

UTAH—SCM, Marvin C. Zitting, W7MWR/W7OAD—Asst. SCM: Richard E. Carman, W7APY. SEC: W7WKF. The 1965 officers of the Ogden ARC are W7VSS, pres., K7RGY, vice-pres., W7LKM, secy., W7GPN and W7NPU dir. New appointments are K7TEO and K7RAJ as OBSs, W7BAJ as ORS, K7SAI as Utah County EC and

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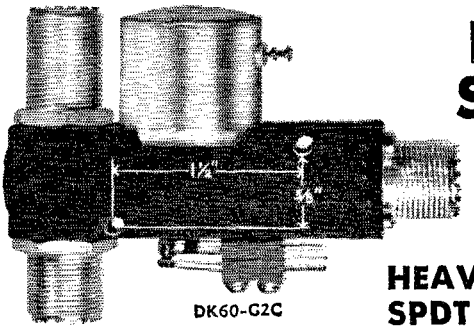

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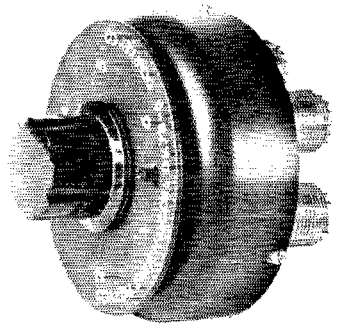

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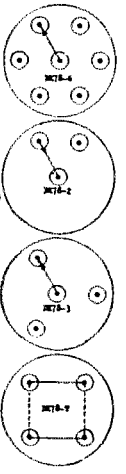

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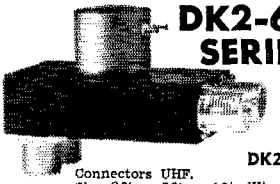

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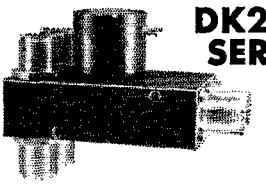

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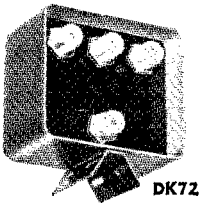

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WA7ADK as Davis County Asst. EC. The UARC AREC members joined in a TV March of Dimes Telerama. The Salt Lake and Logan Clubs are conducting theory and code classes for beginners. W7OCX advises that W7RQT has a Moonbounce project at U.S.U. and would like to hear from others engaged in Moonbounce. W7POU is working DX with a new homebrew 15-meter beam. W7EHX spent the holidays with her family and is now busy at U. of Calif. K7PRJ advises that K7LUM has been in the hospital and is getting better. Traffic: W7OCX 111, W7LQE 102, W7VTJ 37, K7SDF 21, K7OCM 12, K7PRJ 7, W7MWR 6, K7SAI 1.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: K7IAY. PAMs and OBS: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830; YO Mon., Wed., Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920. Wyoming was saddened by the passing of W7FLO. Bill was one of our old-time hams and well liked and respected by all. New appointments: W7GOJ as OO, W7TEL and W7KHI, as ECs, W7YWE and W7-TEL as OPSs. During January W7DW and his XYL, W7-IDO, traveled from Cheyenne to Casper through a severe snow storm and were able to keep the highway department informed of road conditions and assisted in an auto accident. K7IAY is working on the 1965 hamfest and it is decided to have it on Casper Mountain July 3 and 4. Literature will be mailed to all at a later date. Traffic: K7IAY 43, K7POX 40, K7SLM 21, K7WRR 10, W7NKR 8, K7VTM 5, K7SDK 4, K7TFW 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—Asst. SCM/SEC: W4NML. RM: WA4EXA. PAMs: K4-NSU and K4WHW. Thanks to all AREC members for helping Alabama place second in the 1964 SET. Remember the Montgomery Hamfest in April and the Birmingham fest the 1st Sun. in May. New officers of the Montgomery Club are W4GDU, pres.; W4DPX, vice-pres.; W4AUP, secy.-treas.; WA4RMY, PR officer. AEND is back in business on 3725 kc. Novices especially are invited to call in. W4OXU is the new NM of AENO. There was lots of activity in the VHF SS. New equipment: K4JLE, HW-12; WA4HKZ, SB-10; K4WHW, HW-12; WA4FYO, Galaxy 300; WA4SBD, SB-400; W4-WGI, 75-A3 and three-element 20-meter beam, WA4-OGT, 60 ft. tower; W4RLS, HX-20 and Bandit 1000A; W4YRM, four-element 2-meter beam; K4PHL, mobile SR-150; K4HJX, mobile; WA4MYE, 150W transmitter. WA4LAL is working on ham TV. Jan. net reports (GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Avg. Tfc.*	*Avg. QNI*
AENB	3575	0100	Daily	31	3.3	7.8
AENM	3965	0030	Daily	12	2	42.4
AENO	50.55	0115	T/T/Sat.	12	1.16	24
AENP	3955	1230	Mon-Sat.	27	2.3	16
AENP	3955	2400	Daily	33	1.4	15.5
AENR	50.55	0115	Wed./Fri.	8	.25	23.7
AENT	3970	2230	Daily	35	.71	5.2

Traffic: (Jan.) WA4AVM 130, WA4JWS 102, WA4EXA 101, W4NML 50, K4BSK 36, WA4EXB 36, K4NUW 35, WA4FJF 30, W4YNG 23, K4KJD 21, WA4HFE 19, K4WOP 18, WA4GLX 9, WA4HKZ 8, K4NSU 8, K4-WHW 7, W4CIU 6, K4GXS 6, WA4MGI 6, K4ANB 4, WA4FYO 4, WA4SMA 3, K4WWP 3, WA4EBS 2, W4YER 2. (Dec.) WA4SSB 287, WA4EXA 267.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD—At the Jan. 7 meeting of the CZARA the following were elected: KZ5WC, pres.; KZ5PW, vice-pres.; KZ5-WI, treas.; KZ5TT, secy.; KZ5VG, act. mgr. KZ5VR collected the annual fees for the license plates for 1966. KZ5MQ was back in the Canal Zone on leave from the U.S. Navy. Young Mike has 195 DXCC countries on c.w. to his credit. He is now stationed in Pensacola, Fla., attending school. KZ5AB, KZ5EC and KZ5-TD picked up some RTTY converters. KZ5EV will be rotated to the U.S. in the next few weeks. KZ5TD worked HC2LX on 20-meter s.s.b. when he was calling for anti-rabies medicine for a child bitten by a mad dog. The U.S. Air Force was able to provide the medicine. The assistance of Mr. Barratta and Mr. Moultrie, of the FAA Air Route Traffic Control Center, in arranging the quickest available flight via Panagra for delivery of the medicine at Quayaguil, Ecuador, completed the request for medical assistance. KZ5BX was very active providing radio communications during the recent Boy Scout hike through the jungles of Panama. The Army MARS held a luncheon dinner at the NCO Club at Fort Clayton. The KZ5TDs had another baby girl in January. KZ5TM is on the air with a TR-3. KZ5AW is working on a kw linear. A 10-meter c.w. net has been started by Army MARS.

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EASTERN FLORIDA—Acting SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. Asst. SEC: K4KRG. RM CW: W4LUV. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAM 40: W4SDR. PAM 80: W4TUB. PAM V.H.F.: WA4BMC. Congrats on the election of W4SDR and W4TUB, as Mgr. and asst. mgr. of FMTN. The selection of V.H.F. Asst. PAMs is coming along nicely and results are already visible in increased activity. The change in the starting time of the TPTN from 1730 to 1700 EST has resulted in increased QNI and QTC. There is nothing sacred about net times and frequencies and they should be changed if deemed necessary to improve operation. W4LUV, our FB RM, now is the proud possessor of an A-1 Operator certificate. It goes without saying that we are all delighted to see W4TRS back in the saddle after a very tough heart operation. The recent opening on 2 meters sure stirred up some much-needed activity there. Now the "Voice of Ft. Lauderdale," WA4RMG, can really be heard with that new 1200W p.e.p. linear. VHFTN recently was revived under the able management of Tandy Way. All phases of reporting are getting better but there is plenty of room for improvement. Why hide your light under a bushel? Help your section. Traffic: (Jan.) WA4BMC 527, W4URX 332, K4YSN 329, K4KDN 224, K4ADD 221, WA4NEV 221, K4BY 214, WA4LHK 214, WA4OAO 169, W4CZA 142, WA4CIQ 126, W4DFU 125, WA4OBG 123, W4TUB 115, K4SJH 112, WA4BGW/4 108, K4COO 108, W4LUV 92, W4SDR 85, W4OGX 77, W4IEI 65, WA4AFP/4 61, WA4COR 57, W4EHW 56, WA4AKB 51, WA4FGH 46, W4FP 33, K4ILB 32, WA4RXG 32, K4DAX 31, W4FWZ 29, W4IE 27, W4IYT 26, WA4IJH 25, W4QBY 21, W4SVB 18, W4AYD 16, WA4KJF 15, W4MVB 15, WA4PWF 15, K4EBE 14, K4MTP 14, WA4PDM 11, WA4MKE 8, WA4DEV 7, W4TJM 6, K4VNF 4. (Dec.) WA4IJH 516, W4CZA 255, W4QBY 22, W4LVV 12, WA4IYG 11.

GEORGIA—SCM, Howard L. Schonher, W4RZL—The Georgia QSO Party will begin 2300 GMT May 15 and end 0500 GMT May 17. Certificates will be awarded for high scores in each state, province and Georgia county as well as plaques for the highest non-Georgia score, high Georgia club score and a special plaque for the high Georgia s.s.b. score. Congratulations to W4OKL, recently elected bank director. W4MLA and W4DDY earned Public Service awards for work during "Cleo." The Georgia Training Net (c.w.) is operating and looking for more participation. If interested, contact K4FLR at Box 150, Gainesville, Ga. WA4JSU is looking for a mobile antenna that can handle the big wind from the driver's seat. WA4PSA would like to know of other hams starting at U. of Ga. in the fall. Our director attended the Tropical Hamboree in Miami. WA4VMV has a new rig and beam for 6 and 2. Plans are being formed to reorganize the section AREC program into an active rather than passive unit. Those of you who are interested, please drop me a line with your ideas in order that they may be consolidated with those of the SEC and ECs in forming an active AREC. A bulletin and announcement of a meeting will be issued soon. Traffic: (Jan.) W4DDY 197, W4SAZ 169, K4MCL 93, W4NSO 44, WA4CJN 39, WA4LLI 36, W4RZL 35, WA4GAY 26, WA4JSU 25, WA4UYT 20, K4DKJ 16, WA4VMV 7, K4YZE 7, WA4VMF 4, K4FRM 3, K4KHH 2, WA4PSA 1. (Dec.) K4FLR 245, W4DDY 221.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE, PAM: K4NMZ. RM: W4BVE. Tallahassee: K4DAD, EC and TARC pres., has moved to the Cape Kennedy area. Port St. Joe: W4WEB is active on RTTY and is looking for contacts around the section. Let me know if you are interested in RTTY. Panama City: K4VFY ran up over 200K score in the recent CD party. The PCARC helped with the March of Dimes fund drive. WA4NRP, EC, has the 2-meter net perking again. Fort Walton: The Whipsnappers Club is sponsoring a code and theory class, directed by W4UXW. WA4NRJ completed a station control unit for the TR-3. A 10-meter WBFM net is being organized using surplus commercial units. Milton: K4NMZ, WFPN mgr., put out another fine edition of *QRV?* Pensacola: Section LOs held a meeting at Corry Field to discuss ways of improving net operation and traffic-handling during emergencies. Key City ECs will push the use of v.h.f. intercom between local h.f. net stations. Some new calls in town: K4RSH, WA4NRS and W4GGS. W4AXP is in Sacred Heart Hospital. Traffic: (Jan.) W4BVE 96, K4NMZ 95, K4BDF 74, K4VWE 73, WA4EOQ 29, WA4NVG 12, WA4NRP 11, WA4JIM 7, K4SOI 7, WA4NRJ 4. (Dec.) K4NMZ 137, K4BDF 120, WA4JIM 14.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7TNW. The new officers of the Arizona Amateur Radio Club are K7SXQ, pres.; K7PLO, vice-pres.; K7TNW, secy.; W7UXZ, treas.;

K7ZSO, act. mgr. Our sympathy to W7RJJ on the loss of her mother. W7BXR has been bitten by the DX bug; he worked his first CX and ZS stations on his first try on 20 meters. WB6FHH/7 is a new call in Scottsdale. W7QHC has been modernizing his NC-240D. K7CMH is now an KCCer. K7EWS built a linear using four 6DQ5 tubes with 700 watts p.e.p. Appointment: K7OFL as OES. W7AYY, OES, sent in a fine activity report. Congratulations to W7VKO on finishing in the top ten of the annual RTTY World-Wide Sweepstakes. Our compliments to K7RUR on his fine OO performance. Traffic: K7VTY 98, K7NHL 84, K7UXB 73, WB6FHH/7 51, W7FKK 23, K7UTF 16, K7RUR 1.

LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: John Vaidean, WB6JGA/W4FOR. SEC: K6YCX. PAM: W6ORS. RAMs: W6BHG, W6QAE, WB6BBO, K6EPT, W6GYH, WB6BBO, W6ZJB and W6WPF made the BPL. WB6BBO says there is going to be a whizzbang of a Traffic Breakfast and get-together at the National Convention July 4th week end in San Jose. Drop Lou a line about details. Our section now proudly sports fifteen well-qualified and active Official Observers. WA6GAG reports speedy progress on the new AREC 2-meter f.m. repeater. This will really be an asset to EC K6BPC, hq. command communications. K6MDD reports the Salvation Army Disaster Net is expanding operations to include the Santa Barbara section in its 50.25-Mc. Net. WA6TWS is attempting 80-through 2-meter mobile installation. WB6JGA complains that paperwork keeps his traffic count down. K6GIL has an APX-6 for anyone who will use it. Phone 391-2500. W6MLZ presented a complete station to the Braille Institute on behalf of the SSBARA of New York with accompanying TV and news coverage. K6HV still is visiting a lot of clubs. WB6GXI reports the Harmonies YL Club is quite active. W6USY is off on a boondoggle to KH6- and XE-Land. K6EA is in port after a slight tangle with a buoy cable that laid the ship up. K6EA signs KUCL on the maritime frequencies. W6AM is thanking Edison for adding a 16-kv. reflector/director in front of the rhombic farm. W6FB says that the Desert RATS and the Indio Club are manning a booth at the Date Festival. W6ZJB is monitoring 3905 kc. for mobile visitors in the Barstow area. WA6YMY/OO is busy keeping track of all the chirpy Novices. W6IBD is putting together a report on c.w. checking standards for OOs. W6YRA/UCLA is establishing a link with W6BB/UC, Berkeley. New appointees are W6FSJ, WB6NMO, W6PUZ, WB6BWZ, WB6IWF and K1GUD/6, aboard the USS Valley Forge as OOs; W6JNX, W6FD and K9-ELT/6 as ORSs; K6UMV, WB6KGK and WN6NPF as OESs; WA6WOY as OBS; W6MLZ as OPS/EC. New officers: Inglewood ARC—WA6OKZ, pres.; WA6BNB, vice-pres.; K6ZTI and WB6GHM secy. So. Cal. V.H.F. Club—WA6GAG, pres.; K6YUL, vice-pres.; WB6IBZ, secy.; K6LDM, treas. The ARA of Long Beach—W6BRT, pres.; W6KQI, vice-pres.; W6JCA, secy.; WA6YYN, treas. The Southeast RC—K6LOP, pres.; W6SAU, vice-pres.; K6MHE, secy.; WB6CIX, treas. The So. Cal V.H.F. Club reports an estimated 35k aggregate score in the Jan. V.H.F. Sweepstakes with K6BPC/WA6AJT, WA6DJB opr., K6JQB, WB6ITG, K6-RVF, WA6KIK, WA6VHC, KH6EVT/6, WA6WIZ, WA6ARC, WA6TAW, and W6FNE/6 with K6YUL and WA6GAG oprs. Support your AREC! Write K6YCX, 2041 South Benson, Ontario, for details. The Southern California Net (SCN) operates on 3600 kc at 0300Z daily holding down the NTS for this section. Traffic: (Jan.) KCEPT 757, W6GYH 503, WB6BBO 561, W6WPF 529, W6ZJB 529, WA6WTK 474, K6MDD 290, K6IWV 248, W6QAE 241, WA6TAW 137, W6FD 125, WA6TWS 122, WB6JGA 87, WB6FPQ 74, K6GIL 70, K6YCX 46, WB6-KGK 43, W6BHG 41, W6MLZ 40, WA6WKF 36, W6CK 34, K6HV 27, WB6BBH 25, WB6IWF 18, K2PHF/6 17, W6PCP 12, WB6GXI 11, WA6CXB 9, W6USY 8, K6EA 6, W6SRE 5, WA6KVA 4, W6VOZ 4, W6AM 2, W6FB 2, W6FNE 2, W6LVQ 2. (Dec.) W6ZJB 761, WA6WKF 133, W6VOZ 7, W6VUZ 2. (Nov.) W6ZJB 230. (Oct.) W6ZJB 44.

SAN DIEGO—SCM, Don Stansifer, W6LRU—W6-VNQ, ORS in Solana Beach, is now using a transistorized home-built v.f.o. WN6MAI got up to 22 states in January. Silent Keys in Orange County include past-pres. of the Orange County Club, W6BVI/W6FIO, and W6WCI. New San Diego DX Club officers include W6-RCD, pres.; WB6LZI, vice-pres.; WA6LBP, secy.-treas. The San Diego V.H.F. Club has a recent list of members and others who are on 146.84 Mc. on f.m. This net meets at 2000 PST Sun. with new check ins welcome. The V.H.F. Club officers are WA6ZXJ, pres.; W6NLO, vice-pres.; WA6SKT, secy.-treas.; WA6TAD, information officer. This last mentioned office, in the humble opinion of your SCM, is an important one and should be found in every club. Does *your* club have one? New officers of the San Diego Council are WA6-

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MJC, chairman; WA6OSB vice-chairman; W6NLO, treas.; WA6TAD, secy. If your club is not represented in the council, contact any officer to find out how your club can have a vote and be heard in council matters. This is our only clearing house for San Diego County amateur problems. Support the council. A new ORS in Imperial Beach is WB6KNN, a regular on SCN nightly on 3600 kc. at 7 P.M. Your SCM visited the Orange County and Newport Clubs in February. All Orange County ARRL appointees are reminded to notify their new SCM of their station activities prior to the 7th of each month. For the San Diego gang, my deadline is the same. Traffic: K6BPI 3484, W6LOT 413, W6VNQ 391, WB6JUH 359, W6LRU 159, K6IME 71, W6BKZ 67, W6WRJ 40, WA6UUO 37, K6LKD 26, WB6KNN 16, WA6ROF 11, WA6TAD 7, WA6ZWR 4.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—RM: W7WST/6 We are sorry to report that K6DXW's XYL is in the hospital. W6BJM is awaiting arrival of a hot sports car which has no room for a mobile. WB6NCS is a newcomer in the Thousand Oaks area. W7WST/6 is running code practice on 145.176 Tue. and Thurs. at 5:45 PST. K6AAK is working on a tower to support his tri-bander and cliff dweller. K6BUD has been transferred to Vandenberg. Two-meter f.m. is the thing in Santa Barbara and W6KZO is well supplied with a fixed station, a mobile and a walkie-talkie. WA6KVS has a new 2-meter base station and is one of the more active stations on the v.h.f. bands. W6YK continues to attempt Moonbounce on 2 meters and is interested in skeds. WA6JBE has the 7-ft. hole dug for his tower and is ready to pour cement. Traffic: W7WST/6 168.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—If by chance your interest in amateur radio should wane, I would suggest that you attend one of the many hamfests in or near your area for a shot in the arm. I have just returned from the Lawton, Okla., Hamfest and must say I enjoyed every minute of it. W5UYQ and W5QKF, as well as the SCM of Oklahoma, gave fine talks on the doings of the League. K5KTW and SEC K5DLP spoke on the operations of the ARPSC. These meetings serve as a common meeting place for the exchange of ideas on operating procedures of interest to all amateurs. The Tyler amateurs worked with TV station KLTV in the March of Dimes Telethon. The following hams took part: K5EIX, K5JTE, K5KKM, K5LQM, K5QQB, K5WZU, W5NYW and WA5FAC. K5CKO and K5QQB should receive special recognition as they spent more than 19 hours continuous duty in this operation. Thanks to the Dallas ARC for the informative bulletin. The DARC Novice class started Feb. 5 in the basement of the Red Cross Building, 2300 McKinney, 8 P.M. Fri. with W5QJW as code instructor and K5GHS, W5EJV, K5ADV, W5LLK, W5GH and W5OQO as theory instructors. For further information call Jim Land, W5KP, FE 1-1607. The Amarillo Hamfest will be held May 1 and 2. Traffic: K5DBJ 104, W5VFM 60, W5EGZ 54, WA5EVS 33, W5CVB 28, W5LR 28, K2EIU/5 15.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX. SEC: K5DLP. The Electron Benders AREC had its first emergency call since moving into the Red Cross Building when it was called out at about 1 A.M. to provide communication from a housing development which was on fire and the Red Cross, which was sending first aid, blankets, coffee and other needed supplies. The fire took four lives and did over one million dollars damage. Those who provided the communications were K5ZCJ Tulsa County EC, WA5BPS, WA5DBM, K5GMP, WA5KTL and K5RJI. The Red Cross was well pleased and proud of the way that the communication problem was handled. K5OCX has the new Heath SB-300 and SB-400. WA5KFT received his General Class license. W5JSP has a new Drake 2-B. W5EHC advises that the QCWA is establishing a newspaper for all "old-timers" in the West Gulf Division and it will be mailed to members each month. W4SKI/5 replaced his DX-40 with a Collins 32V-3. W5NML is a new ORS. The new club officers for the Northfork Amateur Radio Club at Carter are K5JCH, pres.; W5KLH, vice-pres.; K5QNT, secy.-treas.; W5FRB, custodian of the club station. W5EXC. W5NML advises that the Batlesville ARC will have its Swap Night Mon., Apr. 19. All are invited. Traffic: (Jan.) W5PPE 554, K5TEY 220, W5NML 94, K5KTW 51, WA5BTQ 33, K5DLP 30, K5CAY 26, W5DRZ 17, W5EHC 12, K5CBA 11, W4SKI/5 8, K5OCX 4, K5MTC 3. (Dec.) W5PPE 841.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5RDP. PAM: W5ZPD. RM: K5ANS.

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SX62A	249	HALLICRAFTER		99er	109
SX99	79			THOR 6DC	99
SX110	97	DRAKE & SWAN		POLYCOM PC6	239
SX111	159	*equipment.*		POLYCOM 62B	279
SX140	79			DX35	39
S38E	39	*Used gear*		DX40	47
S108	79			DX60	77
S118	69	*accepted in*		GR91	37
S120	47			RX1	179
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HT32	289			HX20	139
HT33	279	TRIGGER *for*		HW32	119
HT37	279			HP13	57
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The new EC for Galveston County is K5EFH, Texas City. Congratulations to the Central Texas Amateur Radio Club in Waco, now ARRL affiliated. Watch for W5NUD/5. Corky will be in Pasadena Bayshore Hospital for several months as the result of an auto accident Jan. 22. K5ANS is figuring how to go mobile with the new motor scooter with only a magneto. W5ACK is NCS for the RTTY traffic net on 7140 kc. at 1830Z every Sun. Here is a chance to pass your traffic and have fun too. K5DBJ is doing a real job as liaison between TEX and NTTN. We need more operators like Morris. WN4JUM is waiting for his General class license to arrive. See you on the traffic net. The Corpus Christi Amateur Club provided communications for the Southwest Divisional Sports Car Drivers School and Races Jan. 30-31 at Cabaniss Field and used 3.855, 50.6 and 146.880 Mc. for complete coverage. K5PNC and WA5LNV provided telephone relays into Corpus from their fixed stations with mobiles W5AQK, W5GTW, W5HQR, W5ARY, W5INN, WØEBM/M5, K5LNC, W5PC, W5CRO, WA5BEY, WA5AUB, W5QEM, WA5GWT, K5WQF, WN5KUF, WN5LHM, WA5CYU, WA5LOO and WA5AUA under the able leadership of EC W5AQK. K5OME of Houston, passed away Jan. 23. His radio signal will be missed by many. The Houston Amateur Radio Club held its Annual Old-Timers Night Feb. 19. Old-Timers all over Southern Texas had a gay old meeting with plenty of tall tales. Traffic: K5ANS 84, W5AC 53, K5PNC 24, W5AIR 23.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM: VE6PV. ECs: VE6s SA, SS, AFJ HB, ALL. RM: VE6AEN. ORS: VE6BR. OPSs: VE6s CA, PV, HM, SS, BA, ADS. OOs: VE6s HM, NX, TW. OBSs: VE6HM, VE6AKV. OESs: VE6DB, VE6AKV. Don't forget the International Hamfest July 17 and 18 at Waterton National Park. For preregistration up to July 7 write to P.O. Box 223, Red Deer, Alta. The Calgary AREC did a very fine job in January for the Boy Scouts and Girl Guides at their winter camp with bad roads and the temperature down to 25 below. The only communication back home was by amateur radio. Nice going, fellows. The Vulcan County Radio Club is putting things over in a big way this winter; some of the other clubs should follow their progress and learn a thing or two as it is the youngest club in the province. At present we are trying to get an international s.s.b. net going on 3803 kc. at 1900 MST every Sun. The purpose is to meet the boys on both sides and for long-haul traffic. Everybody join in and make some new friends. How about some news from the Red Deer, Edmonton, Medicine Hat and Lethbridge Clubs? Don't forget the Calgary AREC exercise on Apr. 3. Traffic: VE6FK 18, VE6SA 17, VE6SS 17, VE6ALL 9, VE6TG 7.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —VE7LP is now operating teletype. VE7GR and VE7DH are the only 2-meter stations in Nanaimo. VE7BOQ is moaning the facts of moving. VE7BBA is looking for 2-meter contacts. His DX so far is 385 miles. VE7BIM is at Endaco Mines. VE8CH was VE7BCC and VE7BDH, his XYL, also will be a VE8. Vancouver ARC's Christmas Party held in January on the North Shore was a big and enjoyable affair. It also is reported the club again has won the Windsor Club Field Day Plaque. VE7BEX still is waiting for Daystrom so he can get back on again. Form 1s are reporting antennas down from the heavy snow. The SCM's 80-meter beam is up but the 10-meter beam is all wrapped up in the 80-meter dipole. VE7OM, our SEC, is looking for Emergency Coordinator reports. His QTH is 13733—62nd Ave., No. Surrey. Also our RM reports the 0100 GMT session of BCEN on 3650 kc. is looking for check-ins. The BCARA's annual picnic will be held at Bear Creek Park, Aug. 22. VE7ALD has left for VE6-Land to work, but has made sure that VE7ANE has a transmitter to save on phone bills. For those not in the know, he is engaged to Bob's eldest daughter. VE7SJ is on again after a long absence. VE7TF has moved the shack to the kitchen. Traffic: VE7BHH 70, VE7OM 67, VE7BBB 65, VE7QQ 21, VE7AC 15, VE7BOQ 13, VE7AMW 10, VE7BHW 7, VE7DH 2.

MANITOBA—SCM, William H. Horner, VE4HW—New ARLM executives are VE4MP, hon. pres.; VE4CZ, pres.; VE4LU, vice-pres.; VE4SK, secy.; VE4UD, treas.; VE4ZX, tech. chmn.; VE4XO, pro. chmn.; VE4SN, mem. chmn.; VE4GA *Satellite* editor. Jim Daly's talk on the Tokyo Olympic games and the 1967 Pan-Am games at Winnipeg highlighted the ARLM January meeting. VE4BJ, with 7100 points, finished second in Canada in the fourth annual RTTY World-Wide Sweepstakes. New appointments include VE4RE as ØES; VE4QX as ORS. VE4JT now is RM only. VE4SR is holidaying in Arizona and California keeping skeds with Winnipeg. VE4VJ also is getting through from

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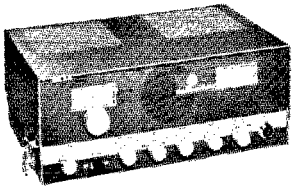

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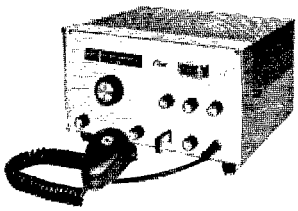

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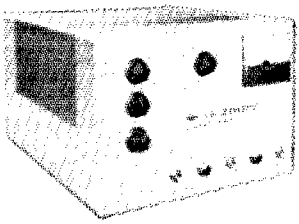

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Deerfield Beach, Fla. VE4AN is doing well from Portage with his quad. VE4DQ enjoyed a vacation trip to the Barbados and visited several of the VPs. VE4MA has been building a new shack and changing over equipment. Our AREC group has been transmitting simulated emergency tests on 3760 kc. and 50,280 Mc. and requests everyone hearing these to report to the transmitting station. VE4JT reports the Manitoba Traffic Net (MTN) for Jan. had 30 sessions, QNI 158, QTC 27, VE4NE, VE4QX, VE4UX, VE4DL, VE4JT and VE4SC are NCSs. VE4LG and VE4EI have been awarded MTN certificates. VE4NV is back on the air from Kenton after a stay in Hamiota Hospital. VE4YW is doing some operating on 20 meters. We need an OBS and 2 more OOs. Applications for these will be appreciated. Traffic: VE4JT 74, VE4JY 17, VE4QX 15, VE4DL 13, VE4XA 12, VE4HW 9, VE4SW 8, VE4NE 6, VE4QD 6, VE4EG 4, VE4IW 4, VE4JA 3, VE4AN 2, VE4LT 2, VE4ON 2, VE4SC 2, VE4QJ 2, VE4EI 1, VE4EP 1, VE4EX 1, VE4LG 1, VE4UX 1.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A. E. W. Street, VE1EK. New appointments include VE1MO as EC. Congratulations to VE1IF and his XYL on the new arrival. Best wishes to VE1BY on his retirement. Al held the post of Chief Radio Inspector, Saint John Branch, Dept. of Transport. Congratulations to VE1ACJ and his XYL on the new arrival. Finished planning that vacation? We hope you haven't forgotten to include the hamfest at the Digby Pines! Six-meter activity in Cape Breton continues on the upswing. The latest list includes VE1s KP, PS, NV, JA, JD, QD, ET, ZE, ZO, CI, AJP, AAK, WI, AJ, AKC. Bill Wilkes, formerly stationed with the RCAF at Halifax, Greenwood and Sydney is now VE4WO and stationed at Winnipeg. VE1s EK, OM and ZZ were active on 1.8 Mc. in the recent WW-160 contest. So we are slow in handling messages? VE1RT reports receipt, relay and delivery of message to addressee plus reply delivered (U.S.A.), all within 18 minutes! Traffic: (Jan.) VE1AX 44, VE1HE 13, VE1AEB 11, VE1DB 10, VE1ABS 5, VE1OM 3. (Dec.) VE1RT 230, VE1DB 53.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The OQN is holding its own these days but it does not get the support from the VE3 operators it deserves. New recruits, get in touch with VE3CYR. VE3EIG was again tops in the recent Frequency Measuring Test. K9ZNK, in LaPorte, Ind., is looking for v.h.f. contacts with our Windsor boys on 2-meter c.w. Your SCM was a visitor to the Timmins ARC in January. A warm welcome by the club offset the cool 30-below-zero weather. VE3DUU is in the hospital again. Also our QSL Mgr., VE3UW, is recovering from some body work. The Cornwall gang elected the following: F. Dixon, pres.; R. Cole, vice-pres.; B. Rowbottom, treas.; B. McDonald, secy. (Seems like all are SWLs, no calls were listed.) The Ontario DX Assn. meets the 1st and 3rd Mon. at 8 P.M. in Toronto at the West End YMCA. Toronto AREC put on a fine display at the Sportsman Show held in the Coliseum. This is the 17th year that your SCM has arranged this show of ham radio. Officials assisting were VE3DRF, VE3CWR, VE3HE, VE3BOF and VE3EWM. The call used was VE3CNE. Ottawa Valley Mobile ARC elected VE3YC, pres.; VE3CQD, vice-pres.; VE3BPT, secy.; VE3CGP, treas. The Ft. William gang had a bang-up dinner in Jan. VE3FW is on s.s.b. around 3773 kc. VE3IB is now residing in G-Land. His QTH is c/o Mr. H. Darlston, II Sandhurst Ave., Ward End, Birmingham, England. Drop him a note. VE3DFA was in sick bay with a back injury caused by an accident at a fire. VE3BSY was installed as master of his lodge. Twelve hams were in attendance. VE3DLC became a Silent Key in Jan. He was a

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member of the Grey Bruce Net. VE3CWW is now in Carrying Place. VE3BBQ has moved to Frankford. VE3NF is hot on RTTY in Kingston. A new ham in Galt is VE3DXU. Traffic: (Jan.) VE3DRF 151, VE3NG 119, VE3CYR 109, VE3BUR 64, VE3DPO 62, VE3BZB 53, VE3EBC 52, VE3AWE 47, VE3EHL 42, VE3TT 41, VE3DMU 34, VE3FGV 34, VE3GI 34, VE3BC 27, VE3EAM 26, VE3DWN 17, VE3WW 17, VE3BLZ 15, VE3DVE 10, VE3VD 10, VE3AKQ 9, VE3BTV 8, VE3DU 8, VE3DH 5, VE3ETM 5, VE3AUU 3, VE3FOA 2. (Dec.) VE3DU 23, VE3EIG 15.

QUEBEC— SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BSZ. Good news! The big summer do, the RAQI Convention, will be held at Louisville, July 23-25. Also, RAQI's popular "Bottin D'appel" again will be issued in early spring. VE2BE and his XYL enjoyed the sunshine at Daytona Beach and were kept well informed by local hams on home-front matters. The 2-meter band is now restricted to c.w. only in the first 100 kc. which will allow better low-power work during projects such as the launching of Oscar III. Our sympathy to VE2AXT, who lost his mother. VE2ATU is going in for DX seriously with a new TA-33 beam. VE2HV had to relinquish his Asst. SEC appointment and VE2ABV is taking over. We owe VE2HV gratitude for a job well done. VE2AUH succumbed to s.s.b. VE2ACF wants to try RRY on 80 meters. VE2BMS and VE2AGQ are very busy studying but soon will be back in the traffic swing. VE2OY is always ready to handle emergency communications with his FB 2-meter mobile. AREC members handled some 600 messages during the S.G.W. College Winter Carnival rally. Some 16 Montreal area members assisted. VE2VV and VE2WY landed into the same hospital. We are happy to report good progress. More reports from outlying districts would be welcome. Traffic: VE2FY 136, VE2DR 134, VE2OJ 42, VE2TA 35, VE2BEZ 30, VE2BRD 27, VE2EC 19, VE2AUU 18, VE2BG 15, VE2WM 6, VE2HV 5, VE2UN 5, VE2BMS 2.

SASKATCHEWAN—SCM, Mel W. Mills, VE5QC— Your writer had the very good fortune to attend the Tropical Hamboree and ARRL Convention at Miami, Fla. in January with the XYL, Peg. Attended an LO meeting which included W6ZH, our president; W1ICP; Southeastern Division Director W4HYW; and about a dozen SCMs, SECs and ECs. I was very impressed with the meeting and have an even greater faith in the officers of the ARRL and the future of amateur radio. Sat down at one meeting and a tap on my shoulder revealed the presence of VE5LD and VE5LG and their XYLs! At midnight VE5QC became a member of the Royal Order of the Wouff Hong! Don't forget the Hamfest '65 to be held in Saskatoon at the Bessborough Hotel July 2, 3 and 4. This Western Canadian Hamfest and ARRL Convention will have the biggest display of equipment ever seen in Western Canada! There will be events for the XYL and kids as well as the big Saturday night banquet and entertainment. Don't forget this Western Canada Hamfest is a must on your summer activities calendar. Write Box 801, Saskatoon, for the full program. VE5CU, your SEC, is on s.s.b. and a.m. with an HT-37. The Western Canada ham world was rocked recently when VE5OB appeared suddenly on s.s.b. with an SR-160 transceiver! Traffic: VE5HP 117, VE5LM 41, VE5BO 11, VE5NX 10, VE5OB 9, VE5HQ 7, VE5KZ 7, VE5IL 4, VE5VD 4, VE5EE 3, VE5CB 2, VE5TP 2.

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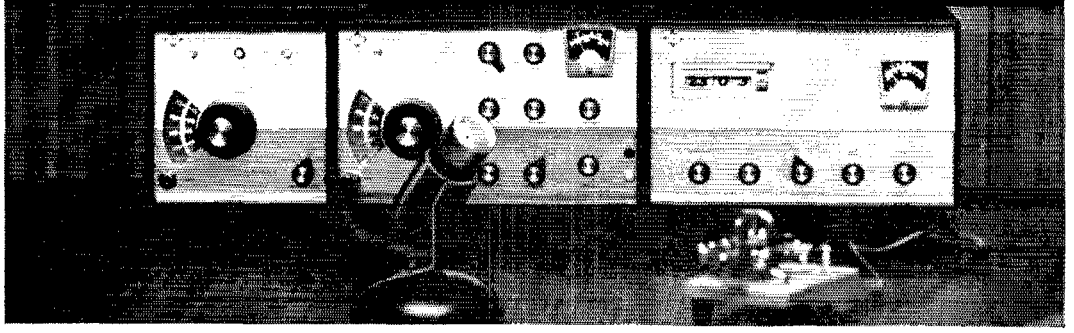

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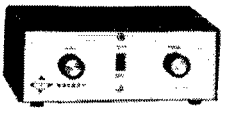

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W1AOX, John E. Dwyer, Hartford, Conn.
ex W1AXW, Homer H. Richardson, Dover, N. H.
W1BI, Willard H. Northrop, Bloomfield, Conn.
W1DC, Arthur Curran, Watertown, Mass.
W1DQW, Nicholas Prestera, Whitinsville, Mass.
W1EPE, John A. Dupont, Sr., North Easton, Mass.
K1LVG, Harold Hart, Lynn, Mass.
K1SNS, Philip A. Trickey, Newcastle, Maine
K1WUB, Charles A. Huston, Monponsett, Mass.
W2AKI, George E. Matthias, Runnemede, N. J.
W2KHW, Walter W. Wien, Maple Shade, N. J.
W2KTZ, Peter F. Dankovic, Yonkers, N. Y.
K2VOM, Michele Caggianelli, Utica, N. Y.
W2VPJ, William Maldonado, Pennsauken, N. J.
W3AEM, Russell Freed, Pottstown, Pa.
WA3AIC, Alan S. Young, Wheaton, Maryland
K3AOD, William V. Byron, Sr., Charleroi, Pa.
W3DNW, Fredrick Dunn, Takoma Park, Maryland
K3EIB, W. Russell Widenor, Havertown, Pa.
W3LIN, Edmund H. Simpson, E. McKeesport, Pa.
W3MEU, Donald Doxsee, Silver Spring, Md.
W3NB, Frank A. Dunan, Washington, D. C.
K3RLQ, Hugh F. Fry, Whitaker, Pa.
W3SXA, William E. DeForest, McKees Rocks, Pa.
K3YIV, C. Reese Hocker, Bedford, Pa.
W4AU, James K. Clapp, Englewood, Fla.
ex 4AZ, Philip C. Bangs, Spartanburg, S. C.
K4CZU, William A. Pharr, Thomaston, Ga.
K4IQV, Harold Keto, Hampton, Va.
WA4POH, Tom Williamson, McLean, Va.
W4VCX, Guy A. Stewart, Brandon, Fla.
W4VQ, Albert B. Pitts, Charlottesville, Va.
W4ZSA, Beamon S. Cooley, Birmingham, Ala.
W5KGC, Nicandro Elizondo, Jr., Pharr, Texas
W5KNM, Grover C. Kenyan, Ganado, Texas
W5SZJ, William M. DeFoe, Cabot, Ark.
W5ZXY, Robert W. Russell, Jr., El Dorado, Ark.
W6JBE, Gene R. Walker, San Jose, Calif.
K6GZ, Robert F. Mead, Belmont, Calif.
W6SRD, Gentry B. Carpenter, Garden Grove, Calif.
W6VC, John H. Nutt, Beverly Hills, Calif.
K8BAB, Nicholas J. White, Mansfield, Ohio
W8FXU/K9WEU, Robert E. Mosier, Dexter, Mich.
W8HOU, Russell W. Cripe, Utica, N. Y.
W8KFP, Owin W. Burna, Steubenville, Ohio
W8LKO, Felix Spencer, Cleveland, Ohio
W8LU, Clarence A. Breninger, Detroit, Mich.
K8NCW, John Hanzel, Maple Heights, Ohio
W8WRT, Ervin H. Hill, Wellston, Ohio
W8YMV, Stanley Stein, Cleveland, Ohio
W9HTN, Leo Biemer, Wisconsin Rapids, Wisc.
W9HZB, Elmer V. Minnicar, Garrett, Indiana
W9TCN, Arthur E. Conrad, Logansport, Indiana
W9TT, Harry Smith, Indianapolis, Indiana
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VE3DEM, Albert D. Thompson, Dryden, Ont., Canada
VE3TR, Harry C. Way, Port Credit, Ont., Canada

(Continued on page 156)

A 64-page cumulative index to *QST* is available for 25¢ postpaid, covering the years 1950–1962. 1963-1964 inserts are included with your purchase. Request your copy from ARRL Hq., 225 Main St., Newington, Conn.

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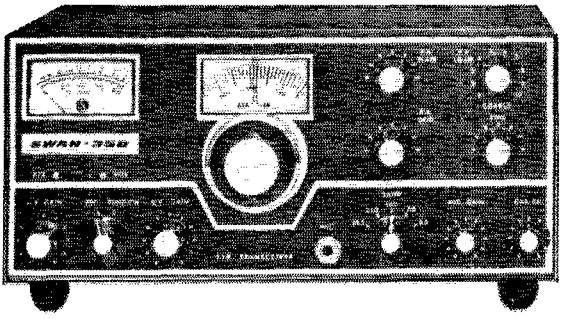

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James K. Clapp, W4AU

The name of James K. Clapp, W4AU, whose death is reported in Silent Keys in this issue, is familiar to practically every amateur through his series-tuned oscillator circuit, used in innumerable ham v.f.o.'s. A pioneer in precision frequency measurement, he had been with the General Radio Company from the late 1920s until his retirement several years ago. He was an early experimenter with high-C oscillator circuits and the author of a number of *QST* articles in the late '20s and early '30s. In earlier years he had held the calls 1OB (pre-WWI) and W1BYX.

Raymond A. Heising

Another radio pioneer recently passed away — Raymond A. Heising, of "Heising modulation" fame. For many years associated with the Bell Telephone Laboratories, he was one of the group that conducted the first transatlantic radiotelephone experiments from old NAA. Not a licensed amateur himself, although well aware of amateur activities, his series of articles on radiotelephony in *QST* back in 1921 is a classic — and well worth reading today, over forty years later.

How's DX

(Continued from page 99)

who illegally fail to identify themselves are scoffed at by W8ZCQ. . . . W7WLL takes to task the ill manners of some 20-meter sidebanders who seem more bent on preventing DX contacts than working the stuff themselves. . . . K2CPR, W8ZCQ and others protest excessive CQ-DXing, especially near the crowded low edges of 40 and 80 c.w. . . . KP4YT chides DX men who fail to file sufficient s.a.s.e. with their local bureaus, thus harrassing QSL managers with heaps of storage. . . . K7SPH (ex-F9AP-ON4BU-XEØAP) wants to team up with an enterprising DX man or two for a new DXpeditionary assault on remote Clipperton island. . . . K6VVA relieves W6WX at the switches of NCDXC club station W6TI, disseminating DX bulletins on 14,002 kc. most Sundays at 1600 and 2130 GMT. . . . W1ECH reports that WN4SGF earned a WAC diploma on 21 Mc. between August 15 and October 30, 1964. He's now WA4SGF. . . . VP2MJ managed a Montserrat maneuver during the second week of February . . . K2OLG has 102 countries worked as a 28-Mc. mobile but still needs a few cards to prove it. . . . WA4PSA votes for DXpeditionary pile-ups by call area — Ones, then Twos, etc. — to help cut down on big-signal repeaters. . . . K1MOD credits W6FAY with a smooth pile-up technique that quickly worked down to the lower power levels. . . . W6OZ and WA6YKT check north-south 160-meter conditions by monitoring Guatemala beacon RAB on 1513 kc. . . . The joint January meeting of Northern and Southern California DX Clubs turned up a flock of noteworthy personalities including Ws 2GHK 6HC 6QJW 7PHO 7ZC (ex-W5CA), W9WNV and ex-WØDEA-KZ5LC. "Many thought it the best meeting ever," declares W6AM. Don is busy stacking 75-foot telephone poles to the 140-foot level at Rhombic Acres. . . . Local lore via DX organizations here and abroad: WA6TGY points up the fact that the current sunspot shortage went far toward advancing gear and sharpening the techniques among DXperts. It's an ill wind, etc. . . . VP2KT can be helpful in lining up a.m. or c.w. contacts with VP2s SC and SM of St. Vincent. . . . KP4 country-hunters are cognizant of the fact that FCC just beefed up its San Juan field office facilities. W/Ks better pay heed, too, when the skip isn't out quite so far as it seems. . . . G3NFV, KP4s ALA CKX, SM3BNV, VK3RJ, VO2NA, W1DYE and WA4FAZ qualified for DXCPR's popular 8X8X8 certification. . . . KP4BCL found Colombian point-to-point station HKO26 responsible for most of the broadband 14-Mc. noises plaguing Caribbean DX hounds lately. Bruce apparently talked them into cleaning up their parasitics, so HKO26's 14,455-kc. multiplex RTTY rig undoubtedly gets out better now — on the right frequency. QST

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21,000 Mc. Record

(*Continued from page 27*)

In 1961, an unsuccessful attempt was made to communicate from Mt. Greylock to Schenectady, New York, a distance of 40 miles line-of-sight. The chief reasons for failure were as follows:

1) There was no certainty in the direction of the beam because the parabola and feed were not integrally mounted.

2) It was found that the antennas used then were spheroidal sections instead of parabolic sections.

3) A nearby TV station blocked the field-strength meters, making them impossible to use in tune-up operations.

A second attempt was made in late fall of 1962 from Whiteface Mountain, New York to points north. Failure was encountered in this instance because of the dense fog at the top of the mountain, causing moisture condensation on the high-voltage leads. Unsatisfactory one-way communication was made. A third attempt was successful from Schenectady to the Helderberg Mountain, a distance of 15 miles, which just broke the old record. At this point, it was decided to add the telescopic bore sites to the equipment.

After a number of short-range QSOs, where the sights of the antenna dishes were aligned and checked for no parallax, the standing amateur distance record for this frequency band was broken on October 24, 1964. Two-way communications on both voice and tone-modulated telegraphy were held between W2UKL/2 and WA2VWI/2 from a high point in Schenectady New York to Mt. MacGregor, a distance of slightly over 27 miles.

Contact first made at 1605 GMT was terminated at 1810, because of the chattering of teeth due to the cold winds. With W2UKL/2 centered on about 21,900 Mc. and WA2VWI/2 on about 21,957 Mc., Q-5 copy was achieved in both directions and modes. With a calibrated flap attenuator then applied to the transmitter waveguide at W2UKL, it could be predicted from theory[2] that the distance might be doubled again under the same atmospheric conditions.

The author would like to thank the following radio amateurs who assistated at various times during the course of these experiments:

Charlie Bleichner, W2NOY; Bill Bridgham, W1WF; Don Bulger, WN2QLN; Elearnor Freeman, K2QEN; Milt George, W1BKG; Bill Haven, K2ZLX; Jim Houldsworth, W1KVN; Bob Jefts, K2BST; Bob Johnson, WA2VWI; Max Long; Phil Noble, W2UKA; Bob Ralston W1DPY. Without their help these experiments would not have been possible. QST

What The ARRL Means To Me

(Continued from page 49)

to the public interest when emergency communication becomes necessary.

After fifty years of amateur radio I have developed a very comfortable feeling about the ARRL. When some fellow tells me he doesn't belong and proceeds to expound at length as why, it doesn't bother me any more. The complaint is always a strictly personal peeve. He shouldn't belong feeling as he does, nor should we wish him in the ARRL.

Besides these universal reasons for belonging to ARRL it is a pleasure to be associated with an organization which has done so well through the years from every standpoint. Individualists that we are, we have seen fit to put together and stand behind an association we need so much and one which has paid off so well. We can be proud of our solvency, our new building, the staff at headquarters and the program generated there. We can be proud of the fact that ARRL has withstood the hard test of time. I think we should be doubly proud of our choice of directors and the fine men who have served as president. It is because of these men that the ARRL is what it is today. QST

World Above 50 Mc.

(Continued from page 93)

when he heard WA8EIC on s.s.b. A K9 and a W2 were also heard but were too weak for good copy. Russ noted a visible aurora in the northeast on January 21st but no signals were heard. Nice to receive reports from up your way, Russ. Keep 'em coming.

KØGIC and WAØDZI both report from Kansas. Dot, KØGIC sez the only skip observed was on January 9th at 11:30 P.M. when WA2BAH was pounding into Wichita 5-9. However, Dot was unable to get him. Ray, WAØDZI, observed that the three skip stations he worked during December and January were all in North Carolina. He is planning on concentrating all efforts on coming v.h.f. contests. WØAMO in Missouri noted good ground-wave conditions on 50 Mc. on January 5th, 9th, 10th and 18th; skip to New York on the 10th. From Georgia W4BCL sends word of an opening on 50 Mc. the night of February 8th at 2230 EST into Pennsylvania, then Nebraska, Iowa and Kansas. The last Pappy heard was Arkansas coming through about 0015 on the 9th. QST

Technical Correspondence

(Continued from page 53)

intended as an instructive example has been reduced to a riddle.

Further on, the sky temperature at two meters, which I wrote as 300°K, was printed as 3000 degrees K.

Perhaps you could correct these errors in a "Feedback" some time. — *Alan T. Moffet, 550 Ladero St., Pasadena, Calif.* QST

Happenings Of The Month

(Continued from page 87)

CLUB IDENTIFICATIONS ARE NOT CALL SUFFIXES

K3LLR has passed along for the information of amateurs an answer he received from the Commission concerning the practice of following one's call with the slant bar and the name or initials of a club (i.e., "K3LLR/QRP").

"The Amateur Radio Service rules, Part 97, do not specifically provide for, or prohibit, the practice you describe. However, to avoid any possible confusion with required portable or mobile designators, it is recommended that use of the slant (/) character following the amateur station call sign be confined to the purpose of indicating that the station is being operated away from the fixed location (Section 97.87). [signed] Ben F. Waple, Secretary." QST

YL News

(Continued from page 89)

YL Clubs

Officers for CHC Eyewink Ch. 33/73 for 1965 are — Pres., W4ZDK; 1st V.P., K8BIT; 2nd V.P., K8MZT; Secy., K7KSF; Treas., WA2PWI; Membership; W7GGV; Award Cust., K8BIT; Hon. Wily Winker, K4JIG; Twinkle Winker, TG9BC; Double Winker, WA4FIJ/FJF.

Coming Events

April 24-25 — New England Div. Convention at Swampscott, Mass. A WRONE meeting is planned for the 25th, plus added YL activities for all YLs attending on both days. QST

FEEDBACK

In the "New Books" section of *QST* for March, 1965, the price of *Radio Operating Questions and Answers* was listed as $825. A note from author McKenzie, W2SOU, points out the book may be purchased by amateurs at the bargain price of $8.25.

—•••—

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

ARPSC

(*Continued from page 79*)

Forty SEC reports were received for December. This is one more report than last year, and the 18,911 AREC member figure represents another slight increase over last year's figures. Those sections reporting are: Wis., Wyo., Sask., W. Va., Nebr., E. Pa., Miss., Los A., N. Mex., Hawaii, Iowa, S. C. V., S. Tex., Mo., Ariz., E. Fla., R. I., Utah, Ont., Mich., Kans., Tenn., N. N. J. S. Dak., NYC-LI, Ark., Va., Okla., Me., Ohio, Alta., Ala., Ind., Nev., B. C., N. C., Wash., Minn., Colo., E. Mass.

At the end of another year of SEC reporting, we find that 22 SECs had a perfect reporting year (same as last year). During 1964 we received 456 reports from 50 different sections as compared with 472 and 54 for 1963. The following are 100-percenters (number of consecutive 100-percent years): E. Fla. (13), NYC-LI (11), Mich. (6), Ind. (6), S. Tex. (6), Wash. (5), S. Dak. (5), Nev. (4), E. Mass. (3), Alberta (3), Utah (3), N. C. (2), Ala. (2), Ariz. (2), N. N. J. (2), Iowa (2), R. I. (2), Colo., B. C., Okla., Ark., Mo.

If you think you should be on this list and aren't, we will glady tell you what reports we are missing, and you can send them in for credit. At the bottom of Form 8 (soon to be revised) there is a request that additional comments be put on the back. In the future, please make any additional comments, reports for the "Diary" and the like on a separate sheet of paper. This way there is less chance of your report being misplaced.

RACES News

The Des Moines, Iowa RACES plan got a literal "trial by fire" when flames raced through a century-old hospital forcing evacuation of over 100 patients into sub-zero weather. Radio Officer WØSVD and Asst. RO WØUDO were notified while at work, and they immediately went to the hospital in WØSVD's car while the call-up of other members of the Hospital Emergency Net began on 2-meter FM. KØALD was dispatched mobile to stand by at still another Des Moines hospital not yet equipped with the permanent 2-meter FM station. The RACES members handled dispatches for doctors, nurses, medicines, linen and other supplies to the burning hospital and arrangements for transfer of patients from the evacuation scene to hospitals standing by for their care. Several times WØSVD's services enabled doctors at the scene to talk directly with doctors at other hospitals. The RACES net was the only means of communication between hospitals because the telephone lines were jammed with calls from the public.

Other amateurs known to have participated are: *WØs* LRY OCG PKW ANC JCR AUL, *KØs* SWE BMJ QXT CVT TEK ALZ JRV, WAØBSW. — *WAØJOG.* QST

"A Complete Two-Band Station for the V.H.F. Beginner" — a reprint of four articles that appeared in July, August, September, and October, 1961 *QSTs* — is still available for 50¢ (no stamps, please) from the ARRL, 225 Main Street, Newington, Connecticut 06111.

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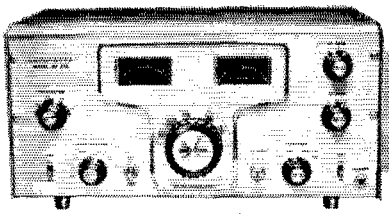

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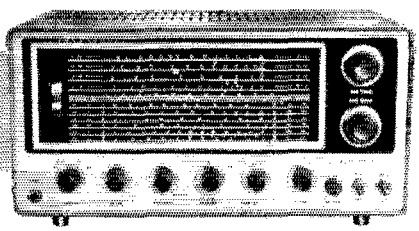

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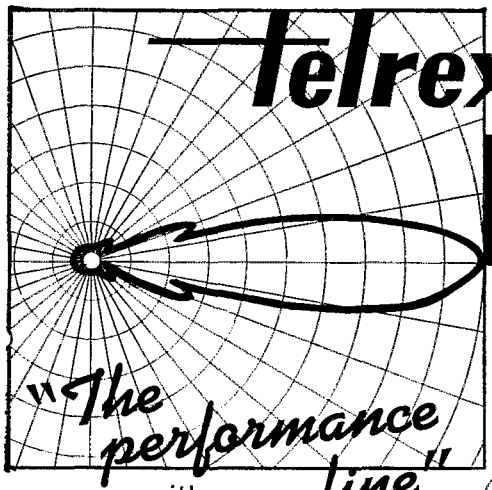

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(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.
(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.
(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. **An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.
(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

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

HAMVENTION Notice: The Dayton Amateur Radio Association invites you to the 14th Annual Dayton Hamvention, Friday evening, April 9, and Saturday, April 10, 1965, Wampler's Ballarena, Dayton, Ohio. Banquet Speaker—Bill Leonard, W2SKE, Vice President, News, CBS. Forums: VHF, DX, SSB, Antennas, RTTY Army MARS: Hidden Transmitter Hunt: Homebrew Contest; Exhibits; Women's activities; General Class FCC Exam—Make examination application in advance with 8th District Engineer in charge at Detroit. FCC will issue examination papers. Registration and Exhibits—Friday evening and Saturday. Saturday: Forums 09:00-17:00; Banquet 19:00. For information write: Dayton Hamvention, Department G, Box 44, Dayton, Ohio.

S.R.R.C. Hamfest: June 6, 1965. See Hamfest Calendar in May QST or write for details after April 1, 1965. Starved Rock Radio Club, W9MKS/W9QLZ, RFD #1, Box 171, Oglesby, Ill. 61348.

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

MOTOROLA used FM communicaitons equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WANTED: military or Industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. 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.

WANTED: All types of aircraft on ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX, Collins linear amplifier, Type 204; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

SELL swap or buy ancient radio set and parts, magazines. Laverty, 118 N. Wycombe, Lansdowne, Penna.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts: 617-598-2530 for the gear u want at the price u want to pay.

WANTED For personal collection: Benwood Bakelite Rotary Gap: antique gear dating back to 1915 or earlier. Spot cash! W0ZAB, 4 Williamsburg, St. Louis 41, Mo.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

CASH For Callbooks. For private collection, U.S. Government Callbooks before 1927, Radio Amateur Callbook Magazine 1942 wanted. W8EF, 801 Lake Shore Road, Grosse Pointe 36, Mich.

304TL tubes wanted. Also other xmttg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

WANTED: Collins Parts, BC-610, GRC-27. Autodyne, Bethpage, L.I., N.Y.

Homebrew 2BPI monitor-scope. $13. K1IIK.

CRYSTAL Bargains. Free List. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

QSLS? WPES? Personalized made-to-order, one-day service! Largest variety samples 25¢. DeLuxe: 35¢. (refunded). Sakkers, W8DED, P.O. Box 218, Holland, Mich. (Gospel QSL samples, 25¢).

QSLS. Twenty exclusive designs in 3 colors. Rush $3.00 for 100 or $5.00 for 200 and get surprise of your life, 48-hour service. Satisfaction guaranteed. Constantine Press, Blandensburg, Md.

QSLS. Samples 20¢. QSL Press, Box 281, Oak Park, Illinois, 60303.

QSLS "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

SORRY Fellas, recovery slower than I had hoped. Keep watching my ad for progress report. Thanks to all for patience. C. Fritz, C Fritz QSLS.

QSLS-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

DELUXE QSLS. Petty. W2HAZ. Petty. P.O. Box 5237, Trenton, N.J. 08638. Samples. 10¢.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXK, 1994 N. M.-18, Gladwin, Mich.

QSLS, SWLs XYL-OMs (sample assortment approximately 9¢) dovering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!). Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSLS-SWLS 3-colors, 100 $2.00. Samples dime. Bob Garra, 414 Mahoning St., Lehighton, Penn.

QSLS. 100 for $3.00. 28 new drawings. Samples 10¢. Brigham, Colson St., North Billerica, Mass.

QSLS. Samples 10¢. Wildcat Press (W6CMN, Bill), 6707 Beck Ave., North Hollywood, Calif. 91606.

QSL, SWL, cards that are different. Quality card stock, Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

QSLS Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLS until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSL, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS: Economy, 2 color, 125 for $3.75. Samples Free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLS. Samples Free. Blantons. Box 7064. Akron, Ohio 44306.

ZIP Code Rubber Stamp. Call, name, address, with ink pad. $1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SUPERIOR QSLs, samples 10¢. Ham Specialties. Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLS 300 for $4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples Thomas St., Riegel Ridge, Milford, N.J.

QSLS Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agent for Call-D-Cal decals. K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

½" Call QSLS $2.40/100, $2.90 (2 sides). Samples. Gariepy, 2624 Kromer, Ft. Wayne, Ind.

3-D QSL Cards have that prestige look, with glittering colors and metallics in raised space-age designs fused to brilliant plastic finishes. Cost so little more than mere mediocrity! Samples 25¢ (refundable), 3-D QSL Co., Monson 2, Mass.

QSL Specialists. Distinctive Samples. 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois, 60639.

QSLS-100 3-color glossy $3.00: silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64114.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

CREATIVE QSL Cards—25¢ for catalog, samples, 50¢ coupon. Personal attention given. Wilkins Printing, Box 787-1, Atascadero, Calif. 93422

CUSTOMIZED QSLS with your autographed photo. Dime brings sample. Pic-Ur-QSLs, Rice Lane, Baltimore, Maryland 21207.

RUBBER Stamps, 3-line, $1.00. Andrew Travis, 2002 West 8th, Austin, Texas. 78703.

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

PICTURE OF your self, home equipment, etc. on QSL cards made from your photograph. 250—$7.50 or 1000 $14.99 ppd. Samples free. Write to Picnic Cards, 129 Copeland Ave., La Crosse, Wis. 54603.

QSLS New cartoons. Top quality, fast service. Samples 20¢. Ed's Press, 3232 LeMoyne, Chicago, Ill. 60651.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSLS, Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE, W2JME) Edgewater, Fla. 32032.

SELECTED QSL samples 10¢. Tom, W6OHE, P.O. Box 2411, San Bernardino, Calif.

PLASTIC Holder frames and displays 20 QSL cards, 3 for $1.00 or 10 for $3.00. Prepaid. Tepabco, Box 198, Gallatin, Tenn.

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

QSLS. WA6QAY Press. Box 17112, San Diego, Calif. 92117.

QSLS. 18 samples 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio.

QSL-SWLs. Special types, photo, art and standard. Samples 10¢. K. Kidd's, Rd 1, Box 254, Telford, Penna.

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

"STANDOUT" QSLS with 1½" high call-letters. $2.40/100, $2.90 (2 sides). Samples free. Gariepy, 2624 Kroemer Rd., Fort Wayne, Ind.

QSLS, SWLS, 3 and 4 colors, 100, $2.00 samples dime. Bob Garra, Lehighton, Penna.

"GOLDEN Call" QSLs. (Only QSL) crafted by Samco for 1965. Sample 10¢. Samco, Box 203, Wynantskill, N.Y. 12198.

CANADIANS: Sell National NCX-3 with AC supply, $550; Mosley TA33 Jr, Delhi 40-ft. tower, CDR rotor, complete, $125.00. Johnson 100 Kc calibr., $12.00. Johnson 250 w. Matchbox built-in SWR, $90.00. Electro-Voice 729SR ceramic cardiod mike, $20. Louis Joe, VE3BJR, 1029 Laurier Cresc., Sarnia, Ont. Canada.

CANADIANS! Wanted, a 2-meter transceiver or transmitter with or without VFO. No less than 15 watts input. Write M. Picov, VE3FIA, 283 Betty Ann Dr., Willowdale, Ont., Canada.

CANADIANS: Johnson Valiant I, in excint condx, $325.00. VE3AUC, RR #1, Niagara-on-the Lake, Ont. P., Canada.

ELECTRONIC Tubes Top Brands Sold at substanital savings! (Minimum Order $15.00). Authorized GE, Amperex, Dumont & Eimac Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only-Commercial Quantities). Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016, 212-MU 6-2834

TUBES, Diodes, transistors wanted. High cash prices paid. Astral Electronics, Box 636, Elizabeth, N.J. Tel: 354-3141.

WANTED: For personal collection: QST, May 1916, WICUT, 18 Mohawk Dr., Unionville, Conn.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc. 74 Willoughby St., Brooklyn 1, N.Y. 11201. Tel. UL5-2615.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

COLLINS Amateur equipment bought, sold and serviced. Paul A. Reveal, W2DC, 129 Midland Ave., Glen Ridge, N.J.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. GArfield Area code 201-471-2020.

CASH For Your Gear. We buy, sell and trade. Send for free bargain list. H & H Electronic Supply, 506 Kishwaukee St., Rockford, Ill.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., P.O. Box 516, 199 Front, Hempstead, N.Y.

WANTED: C.E. MM-2, receiving adaptors; HRO-60 E, AA, AB, coils, accessories; Japanese, Collins, RCA mechanical filters; FT-241 Channels 326-30; old electronics catalogs. LP-5, LM-10 manuals. WB2FIL, RD-1, Box 315, Old Bridge, N.J.

SELL TR-3 and D.C. supply. W9BIU, Fred-Gwyer, Box 236, La Grange, Ill.

FOR Sale cheap, QSTs or CQs, any quantity. Send your list for quotation. Cash for Callbooks before 1942. Want early radio gear and publications. Erv Rasmussen, Box 612, Redwood City, Calif.

WANTED: 60 ft. crank tower wind load 10 sq. ft. W2UGM, 66 Columbus, Closter, N.J.

WANTED: FR-2409 bandpass filter. State price. Pete Chamalian, W1BGD, 111 Buena Vista Road, West Hartford, Conn. 06107.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. PL-172 and socket, $95; CDR TR-44, $50; SR-160, $290; Hy-Gain Th-4, $85. Used less than 5 hours, HW-12 with HP-23 and HP-13, $195. F.o.b. HDH Sales Co., 170 Lockwood Ave., Stamford, Conn.

HW-12-22-32 owners inexpensive Triband conversion. Complete plans. $4.00 postpaid. Plans, Box 17, West Bend, Wis.

TELETYPE Model 15 sync. w/table, p.s., worked Germany, Africa, etc. $100. Faxsimile transceiver, $150; 75A-4, $425; electronic switch for VOX or Autostart w/p.s., $10; HT-33, $300; (Sell or trade): Yashica 1l-Matic 8 mm zoom, $65, Bolex H16 3 lenses, $115 F.2 SLR Kineflex F-X, $50. All perfect. K2DCY, Perera, 410 Riverside Dr., N.Y.C. 10025.

SELL: Morrow 5-band mobile receiver 5BRF/FTR, manual, 12 volts, $55. W1MIJ, 58 Felch Rd., Natick, Mass.

NO Time to ham. HT-32A, D-104 mike w/ptt stand; NC-103, make offer. Singly or package deal. W7PMC, Vietor, Rocking Chair Ranch, Philipsburg, Montana.

COLLINS 75A owners, tuning knob, 6 to 1 reduction, $7.00 postpaid. Julius W. Wenglare, W4VOF, 1517 Rose St., Key West, Fla.

HQ-110 C, $150, HT-40, $90; BC-453, $12. William Blaine, 4132 Haverhill, Atlanta.

COLLINS KWM-2, $750. 516-F2, $75. High serial, like new, original cartons. Will ship. WA2AVW. Tel: 212-BU-70970.

KWM-2 and 516F-2 power supply, like new condx, $850. W3-WNC, 1-215-EL-6-0831.

COLLINS Owners! AM adapter, $5.00! State model! KWM-2 2 Kc inde pendent receive adapter, $15.00. No circuit changes! Soldering! Holes! Easy installation! Kit Kraft, 104 Mound, Harlan, Ky.

NOVICE Crystals 80-40M, $1.05 each. Others, 75¢. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784

SR-150: AC and DC supplies; mobile rack. Never used, $650. K2VFW, 47-25 215th St., Bayside, L.I., N.Y. Tel: BA-9-2313.

KWS-1 Collins KW. Serial No. 1030. Excint condx. Will deliver within 300 miles. $650. L. M. Harris, W5RKE/4, Box 67, Lynn Haven, Florida. Phone 265-5479.

KWS-1, No. 1295; top condition, recently overhauled. All modifications. $650.00 or best offer. Heath 6er. $35.00. Hy-Gain H-Tower, $75.00. K2MGE, 12 Elm St., Lynbrook, N.Y. LY 9-2356.

TELETYPE Machines, converters, R-388, R-390, R-390A receivers, mechanical filters for R-390A (455 IF). Alltronics-Howard Co., Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

LOOKING? Shopping? Trading? Trying to save money? Write Bob Graham for special deals on new and reconditioned used gear. Cash or Budget. Graham Radio, Dept. A, Reading, Mass. 01867. Tel: 944-4000.

WILL Buy pre-1925 QSTs, etc., etc. State condition and price. W6ISQ, 45 Laurel Ave., Atherton, Calif. 94025.

MUST Sell: NC-155, mint condx, $125.00. Best offer. Eico 723, $35.00. Best offer. WB6FPP, Frostholm, 5912 Wood Dr., Oakland, Calif.

FOR Sale: Apache xmtr, in excint condx, you make offer. Must sell and local sale preferred. Bob Aberle, W2QPP, 33 Falcon Dr., Hauppauge, N.Y. 11788.

POLYCOMM 62B 6 & 2 meter transceiver, just returned from the factory for alignment, in perf. condx. Repair order will be sent with transceiver. $250.00/spare final or reasonable offer. Gonset Mod. 3357 VFO, 6 & 2 & 1¼, $40. K9GNR, Roy E. Pellegrini, 21 W. 215 North Ave., Lombard, Ill. 60148. Phone after 8 PM. Code 312-627-3475.

SELL: SBE-33 and matching SB1-LA linear, less than one year old and in like-new condx for $500. Will throw in SBF mike. W. J. Shaw, Box 248, Winnsboro, S.C. Tel: 635-4452.

HEATH Comanche and Cheyenne AC and DC p/ss. DC supply needs work, $135.00. Heath DX-100B, $125.00; Heath 6-meter conv., $10. Globe DSB-100 and 755 VFO, $40; Eico 400 'scope, $20; HQ-145C and speaker, $170. WA2OCL, Hamburg, N.J. 827-6329.

KWM2, 516F2/P.S., 312B3 spkr, 1 year old, just checked OK by factory authorized service. $1300 worth of same-as-new for $925. Also 30L1 (still in warranty) for $475 if purchased with above. Will ship in original cartons to first certified check. Dr. B. Morris, WA8JCD, Ripley, W. Va.

MUST Sell: Elmac PMR-6A, $35.00; A54H, $30. Hallicrafters S106, $25, etc. SESE for full list. Best offer. Leslie Mathews, WB2DQV, 12 E. Howard St., Clayton, N.J.

COLLINS 312B-4 console and 516F-2 power supply. Make offer. R. G. Paige, 4615 Shoreline Dr., Salem, Oregon.

WANTED: Regency ATC-1 converter. Lavern Smith, 3104 Catherwood, Indianapolis, Ind.

RME 6900 receiver, new condition. $225 or close offer. K2POE, 1152 Park Ave., Vineland, N.J.

SALE: Interpolation oscillator, General Radio, original cost: $1000. Now $100. For Precision frequency measurements. I need other equipment. H. Lowry, 915 Madison St., Manchester, Tenn.

TO Trade: Pair of 4-1000s pulled from military class C final for linear. Will consider clean homebrew linear. Please send specifications to Les Smith, 440 North Main, Empire, Oregon.

FOR Sale: Ranger I, $140.00; Hallicrafters S-40B, $50; Globe Scout 65-B, $40; NCX-3 with NCX-A, $350. All in excint condx. K1APA, 3 Sunny Acres, Brattleboro, Vt.

FOR Sale: R-390A receiver, 55-32 Mcs., like new, used only two hours. Shipped PP ur QTH, $850 (firm). Two 4-400A, $20 ea. Jennings VAC var. cap. 12-300 mfd. 10 Kv., $30; Jennings 1500 mfd. loading cap 10 Kv., $100. Ephraim Johnson, 994 Greenwood Ave., Clarksville, Tenn. WA4KWA/4.

TR-3 in first-class condx. Used little. With DC supply and new AC supply. First certified check for $625 takes. L. R. Shackelford, Box 544, Pollack Pines, Calif.

SELL: Gonset GSB-101 linear, $130; William Madigan, WA-4RPA, Apt. 5-D, 200 E. Lucerne Circle, Orlando, Fla. 425-7930.

NC-300, DX-100, Knight VFO, 750-watt linear. Sell to highest bidder and reply to all bids. You won't find equipment in better shape. K5RXH, 914 Woodbine, Houston, Texas.

SELL: Johnson Viking 500 transmitter, National NC-303 receiver. Like new condx, used vy little. Will sell as a package deal or individually. Make an offer. Will ship. S. U. Berger, P.O. Box 182, Schleswig, Iowa.

ESTATE OF WA6OAO: TR-3, RV-3, AC-3, DC-3, HT-18 ant., complete fixed and mobile station equipment. Cash and carry only. Dick, WB6KUK, 363-2492, 3076 Ramsgate Way, Rancho Cordova, Calif.

COMPLETE Elmac mobile station, SWR Bridge, PMR6A and lots of goodies. All postpaid. W9WTY.

COLLEGE: Complete station, $100; Heathkit Mohican, 6-meter 30-watt A.M. transmitter, transistor converter, all accessories. Paul Pannell, K1OTP, Box 641, 10904 Euclid Ave., Cleveland, Ohio.

SELL: Apache xmtr, WAS, 32 confirmed countries, WAC with this rig. Only $155. HE-45B, 6 meter transceiver with HF 61A VFO, $85; Saturn 6 with bumper mount, $10. All in perfect condx, w/manuals. Will demonstrate. Len, K1TAX, 74 Turtleback Rd., Wilton, Conn. Area code 203 (762-7865).

NEW Collins KWM-2A and p/s. Your best offer. Mrs. G. Gagnon, 1833 Baylor Ct., Cocoa, Fla.

TV: New RCA Vidicon deflection and focus coil assembly. $35.00. W3BKY, 1681 Bellemead Dr., Altoona, Penna. 16602.

MOVING: Mohican receiver, $60; BC-348 and P/S, $50; 58 ft. tower, $90; TR-4 rotor, $25; 6 ft. rack, $30; 14 tape trans., $90; 14 typing reperf, keyboard, EOL, $100; 14 receive only typing reperf, $50. AN-FGC-1 rack only $25. W3BKY, 1681 Bellemead Dr., Altoona, Penna. 16602.

SELL: SX-110 w/spkr, $120; D.S.B. 100 and VF-1, $75. Complete station $180. WA2UBH, Mark Shurr, 3900 Kings Highway, Brooklyn, N.Y. 11234.

SALE: 7 ea. CQ binders, 6 ea. QST binders, $1.50 ea. Miscellaneous panel meters. Write for list. W2UPJ, 20 Ash Drive, Neptune, N.J.

HANDIE-Talkies URC-4, $17; URC-11, $25; both less xtal, clean. BC-348J, gud, $60; SX-28 gud, not too clean, $50; Super Pro, not too clean, $50; Viking Mobile with VFO, xmtr doesn't work; $35. Telemetry xmtr, 1001A, 223 Mc, $12; CEC 1 in. instrumentation tape transport, best offer, model 5-701A. P/S PP748, about 100V, 1 amp, unused w/spare rectifier, $20. Western Electric multiplexer, unused, $10. About 500 pounds of new, mostly sealed, resistors, caps, connectors, tubes, relays, switches, transformers, etc. $200. RF test set, in case, $10; Teletype mixer, unused $10. D. Bryant, W4PZQ, Box 1043, Merritt Island, Fla.

FOR Sale: NCX-3 with a.c. power supply, $350. W6BLZ, 528 Colima St., La Jolla, California.

CRANK-Up tower, 72 ft. high (4-20 ft. sections) base section 18 in. on a side, $100. Ham-M rotator mounted inside top section of tower, with 16 ft. of 2 in. seamless steel tubing, rotator only $75. One 5-element Telrex beam for 10-meters, $80., and one 5-element Telrex beam for 20-meters, $100. All installed on mast 10 ft. apart at top of tower. Complete package with 200 ft. coax, $325.00. Bob Juda, 7423 Harris, Raytown, Mo.

75A4 ser. #5349, in mint condx, also Apache and SB-10 professionally wired, one of the latest made. Package deal only. Total $650. Have homebrew final 4-1000A linear, 5000 volts, 1 amp, untuned input through choke to filament, bandswitch 10 thru 80 vacuum variable, 5 panel meters, all in 4 ft. cabinet. Sparc 4-1006A, $150. Picture on request. Heathkit OL-1 'scope, $35.00, 2 pair selsyns, $10 per pair; Telrex rotator $35.00, JT-30 Mike, $5.00. 1 amp. choke 10,000 volt insulator, $15. Filament transformer 5 VCT-30 amp., $7.50. Forest Sailors, 7509 E. 99th St., Kansas City, Mo.

COLLINS, all in mint condx and guaranteed, 75S-3, $469; 30L-1, $389; KWM-2, $849; 312B-4, $139; 516F2, $85. The whole works: $1800. Hallicrafters, all mint and guaranteed SR-150, $445; ACPS, $95; M. mob. p/s $105; mount, $20, all four $575. Homebrew: 4-1000A Linear, bandswitching, vacuum variable, roto-coil, variac controlled 6000V solid state power supply with brand new 4-1000A $435. K4OEI, 1055 Heards Ferry Rd., N.W., Atlanta, Ga. 30328. Phone 255-0495.

WANTED To Buy: Collins 399C-1, external PTO or Collins 312 B-5 VFO console. Kindly quote to Bob Anderson, W1LBA, 428 Central Ave., Milton 87, Mass.

APACHE Transmitter, $150; SB-10 SSB adapter, $65. Both for $200. Excint condx. Going transceiver. J. L. Sielke, K3HLU, Box 6000, Torresdale, Philadelphia, Penna. 19114.

ESTATE of W5ABZ; RME 4350, $150; DX-100B, $160; both units low hours use due to ill-health. Must clean out my shack. Apache, low hours, many miles: $165.00; PMR6A receiver with 12VDC and 110 VAC power supplies. $95; BC34RN receiver, $65. Want: 2-meter F/M police unit, unmodified. All prices F.o.b. J. E. Beistle, K5VYY, 3623 So. Gary Pl., Tulsa, Okla.

TRADE: DX-40 exc. 7 xtals, and Globe V-10 VFO mint, for T-150(A). WA1AWJ, Koolkin, 18 Bosworth Rd., Framingham, Mass. Tel: 875-1914.

LETTINE 242.6 meter transmitter, VFO separate, Filter-King converter, all for $125.00 complete. LW-51 Deluxe 6 and 2 transmitter, separate power supply, C.W. adapter, complete $125.00. Will ship c.o.d. on freight charges only. Lettine modified with line fuse. First check for either group takes it. Low price for Technician to start. T. A. Cowperthaite, Barrington, N.J. K2TZH.

SELL: Heath Mohawk, 6M converter, spkr, E-V 7295 mike; Cush Craft 6M halo, new, all equipment in excint condx. Best offer on sep. pieces or entire lot. K. Kaiser, 19 Mott St., Arlington, Mass. 0174.

GALAXY 300, mobile mount, AC supply, $290. Collins 516E-1 D.C. supply, 351D-2 mobile mount, $180. W8GQE, Fairmount, W. Va. Phone 363-6509.

FOR Sale: Hammarlund HQ-170-A rcvr, perf, condx, factory carton, with matching speaker, $250. Royal W. Wilson, P.O. Box 32, Newton Grove, N.C. Phone LY 4-3611 9 AM to 5:30 PM.

FOR Sale: Late model Johnson Challenger xmtr with built-in PTT and co-ax antenna relay, 1 yr. old, $69.00; Central Electronics MM-2 with RM-455 adapter, $59. Jones MicroMatch 376BA directional coupler, 100-200 Mc., 0-120 watts and 412S5 direct reading r.f. power and s.w.r. indicator, $40.00. K7JUS. P.O. Box 5695, Tucson, Arizona.

SELL: NCX-3, xtal calibrator, NCX-A, and Heath HP-13, all in excint condx, $395.00. R. Duntley, K1EVU, 1002 Durgin Park, Kittery, Me.

FOR Sale: Hallicrafters HT-40, $75; Heath HG-10 VFO, $30; HT-40 is 10 mos. old, and the HG-10, 2 weeks old. Please write to WA4TJS, Zach Bruce, Box 387, Morehead, Kentucky.

HAM-Radio Counselor, male, for co-ed camp in the Berkshires, Massachusetts. Able to instruct campers in fundamentals of ham radio. Equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Ave. New York 24, N.Y.

FOR Sale: 75A-4, No. 4118, spkr, choice of 3 filters, $500; 31ZB5, $275; 30L-1, $375; 32V-3, xclnt, $225; Ham-M rotator, $75; Penfon tape recorder, $75; Heath IM-11 VTVM, $25; Heath IG-42 RF generator, new, $50; Simpson "260" VOM, $30. Accordion Renow 120-bass sell or trade (cost $250 new). James Craig, 1646-B Sycamore, Blytheville AFB, Arkansas. Tel: A.C. 501-532-8559.

SELL: Fimac 4CX1000A, SK-810, SK-806, all together: $150. B&W 852A, $30. All new. Watkins, WA4NPA, Rte 1, Box 118, Melbourne Beach, Fla.

HAM Auction: May 3, 1965. Check gear in at 6 PM. Auction at 8 PM. River Park Amateur Radio Club, 5100 North Francisco Ave., Chicago, Ill.

HE-50 Lafayette 10-meter 12-watt transceiver. 12 VDC or 110 VAC $50. K1UEZ, 12 Kristin Dr., Chelmsford, Mass.

SELL Or trade: DX-100, SB-10, SP-400-X Want: Kever, 12V P/S for HW-12. Will ship. Best offer, K4JSZ.

WANTED: R9 Bandmaster receiver manual containing alignment data. State price wanted. W9PWQ, Ellis, RR #1, Wanatah, Indiana 46390.

SALE: Drake 2-B in excint condx with 2BQ, 2AC, $210; also FB Novice transmitter, Eico 723 with key, coax, relay, dummy load, $55. Both for $250. WN2ITQ, 268 South Main St., New City (not New York City, please note!) New York, Tel: 914-634-7302.

WANTED: Transceiver SSB. Have cash. Meade Johnston, W4-ALG, 2625 Broad St., Tuscaloosa, Ala.

SBE-33, DC supply, mobile antenna, 40M and 80M coils, $295. HQ-170C with speaker, perf. condx, $220. R. Klausner, 1339 Shanabrook, Akron 13, Ohio.

SALE: Excellent 75A-4. KWS-1 intercabling, antenna relay, spares, 3.1/2.1 kcs 200 cps filters, $950. K6UYT, 19622 Mobile St., Reseda, Calif.

HALLICRAFTERS: SX-117, mint condx, $260.00; L. F. Tuner HA-10, $20; ART-13 with p/ss in 7 ft. rack; $150.00. Steven Schor, 518 Beach 126 St., Rockaway Park, 94, N.Y.

SELL: Hallicrafters HT-44 xmtr with PS-150-AC supply and Drake 2B rcvr, both in excint condx; $610. Hallicrafters SR-160 xcvr, used vy little and in perf. condx with homebrew AC supply, $295. John Stoltenberg, 770 South Evergreen, Kankakee, Ill.

ATTENTION KWM-2 owners! All set up for mobile. 1962 Olds Cutlass convertible, straight stick, Royal Master tires, garnet red with white top and matching custom tonneau cover, Hustler antenna, 4 resonators, stainless mount, heavy-duty Collins 516E1 supply Box 222, Newington, Conn., or call 203-232-3763.

SELL: Viking II with model 122 VFO, HQ-129X with spkr, D-104 mike, $200. Wickens, Box 783, Montauk, N.Y.

304TH (pair) spares, KW rig W1SL. Will swap for best all-band receiver offer. No junk, please! K1RXH, Raymond, N.H.

HEATHKIT Apache and SB-10 SSB adapter. In perf. condx: $250. WA6FMD. 970 Chattanooga Ave., Pacific Palisades, Calif.

SELL: Complete parts for KW linear 10-80 M, 2-813s, 2-866As. Cost $1754. Pick up deal only, sry. New: 2-speed Wen drill w/acc. Superior Instruments Mod. 79 Super-Meter, accurate instruments Mod. 156 Genometer, V-80 (pick up), TT-31, D-104 w/ptt. Monitor 'scope 73 Sept. '63. Preamp. CQ May 1963, Coyne 7 vol. set (TV), 6146B 6M HB linear, Lionel trains (trade?) MA-3, Stephen Clifton, WA2TYF, 800 West End Ave., N.Y., N.Y. 10025.

CASH For Callbooks U.S. Government Amateur Callbooks wanted. W8EF, 801 Lakeshore, Grosse Pointe 36, Mich.

SELL: 1922-1963 QSTs, CQ, Radio, Handbooks, SASE for list. W2ABL, Edwards, Apt. 37, Gables Apts., Neptune, N.J.

SALE: SX-96, $100. Cheyenne, Comanche, mobile power supply, mike, $125.00. HT-37, $295. Fred Fest, 970 William, Washington, Penna.

SELL Or Trade: Two Model 15 RTTY, GE 5" scope, Collins ARC-2 2-9 Mcs., DB-20 Preselector, RME HF 10-20, 810s, 805s. Want: Heath HO-10, D-104 mike, G-stand or similar mike, Tri-Band beam, DC supply. D. Woolweaver, 1017 Beachview Apt. 101, Dallas, Texas.

AMAZING Bargains! Johnson Pacemaker $135; SX-71, $65; GR-91, $25. Ron Milliman, K8HSY, 611 Emmet, Ypsilanti, Michigan.

MOBILOCK! Incomparable theft protection now available exclusively to KWM-2 owners. Write Transistics Co., 4452 N. 20th Rd., Arlington, Va.

DXER Beware: A real bomb. York 5000 transmitter, 1 kw. using 4-1000A, bridge power supply, vacuum tuning condenser. Size 33" wide, 24" deep, 6 ft. high. Further details. Bill Brown, W0SYK, 28 Marine Lane, Hazelwood, Mo. Tel.: HEmpstead 4-5440.

JOHNSON KW with desk and chair to match: SX-101A rcvr with matching speaker; Johnson Ranger FW; D-104 mike, Knight SWR bridge; TA-33; Spaulding 40 ft. tower; Johnson lo-pass filter; Advance coax relay. All equipment purchased. New November 1962 and will ship collect. Frank A. Tomanek, 17140 Evans Ave., Southfield, Mich. W8WAL.

HQ-170C, $200; HQ-10 VFO 80-2 mtrs. $25. Mark Wharton WB2JID, 3 Valley Rd., Sparta, N.J. 07871.

GONSET G-76 with matching AC supply and CW monitor instruction book, clean, $225. T. J. Lally, K1UBA, 28 Amory Rd., Waltham, Mass. 617-899-2369.

RTTY: Teletype roll paper, brand new, single copy $8.00/case of 12, carbon $9.50/case of 12. Non-typing reperfs $25. Typing reperfs $45, w/synch motor Or end-of-line indicator, $50 w/ synch motor and EOL, $55. All teletype equipment complete and in working order. Frequency shift exciters, 1-6 Mc (W. E. Co. Model FSA) 5 watts RF output, 0-1000 cps shift, oven controlled oscillator, $28 each. With 3½ ft. cabinet, on casters, $39. Write for details. J. E. Cooper, 834 Palmer Ave., Maywood, N.J.

FOR Sale: New Allied Sky-Roamer, $30. Also need Twoer. John L. Sullivan, WA2HRD, 1593 Herkimer Rd., Utica, N.Y.

FOR Sale: 690V at 450 Ma. plate transformers. No C.T. 117V primary. Hermetically sealed. Wt: 19 lbs. $4.95 plus postage. A.R.C. Sales, P.O. Box 12, Worthington, Ohio

HEATH Kit HO-10 Hamscope wanted. W2KIT, Box 28, Scarsdale, N.Y.

RTTY Gear for sale. Write for list. 88 or 44 mhy. Toroids. Five for $1.75 ppd. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

NEED Cash. Selling entire Collins station, mobile, portable, fixed. KWM-2, CC-2, PM-2, MP-1, 351D-2. All equipment less than two years old and in excint shape. Highest bid takes all. All replies will be answered. J. B. Holmes, P.O. Box 36146, Houston, Texas 77036.

GLOBE LA-1 linear, $65.00. K1EWL.

FOR Sale: Back issues QST solid 1960 thru 1930. Nearly all CQs 1945 thru 1960. Radio from 1936. SAE for list. Best offer. W1AEW, 20 Lindor Heights, Mass.

MOVING To Washington? D.C. Am retiring, selling large 4 bedroom home in suburban area, ½ acre lot. Wonderful *ham location (290 countries in past 3 years).* You can save realtor fees on $30,000 home and will throw in antennas. Vacating 1 July, W4RBZ.

KWM-2, 30L1 linear, 516F AC supply. Purchased new recently. Will ship in original cartons, your expense to first $1200 offer. These units have less than 100 operating hours. WA6KBR, 3511 Altamont Dr., Carmichael, Calif. Phone 944-1340.

SELL: Eldico SSB 100F, very stable, $300; Joystick antenna and tuner, $15; 6N2 receiver converter, $30; LP filter, $5. Kreco 10M coax vertical, unpacked, $25. F.o.b. Morrisville, Penna. R. Lamp, 1219 Yardley Road.

SELL: High fidelity Webcor Viscount tape-recorder, $26, in excint condx. W2KWC, 31 Swing Lane, Levittown, N.Y. 11756. Tel: 516-796-5122.

HW-32, AC supply, xtal calibr. and mobile mike, in excint condx, $180. PFC Ed Lauster, WA2MXW/6, D-5-3, Ft. Ord, Calif. First certified check takes it. Will split shipping charges.

WANTED: Bird Thru-line wattmeter, Millen grid-dip meter with coils, Millen antenna bridge. George T. Mitchell, KG6APJ 4 Anae Lane, Apra Hts., FPO, San Francisco, Calif. 96630.

DRAKE TR-3 transceiver with AC power supply and matching spkr, Like-new with factory cartons, $475. Vincent A. Clarida, 1107 Hickory Lane, Cocoa, Fla. Tel: NE 6-9323.

75A4 serial 2773 with 3 and 6 Kc filters, Spinner knob, $400. Gonset 2M Communicator IV, $200. E. J. McElroy, W1AEO, 5 Fenton Ct., Alexandria, Va.

SBE-33, Electro-Voice 729-SR, both in like-new condx. First check for $275. W1110/4, 2500 Browning St., Sarasota, Fla.

FOR Sale: A complete radio teletype station in operating order. Any reasonable offer will be entertained in New York City area only. Henry Paskin, 275 Livonia Ave., Apt. 15D, Brooklyn, N.Y.

WANTED: "T" Connector for RG-48/U waveguide, 1¾ by 2⅛ I.D. Reasonably priced. Roy Scherman, W9FHS, 4304 N. New England Ave., Chicago, Ill. 60634.

BEST Kilowatt on market! 2-8122s! 80-2 meters! SSB-AM-CW! Write for info. $450 F.o.b. Newark, Delaware. SRS Electronics, Box 267.

SELL QST from 1936 to 1961. Make offer. Also early CQ Elmac 67, $35. W8QBR, F.o.b.

FOR Sale: HW-12, HP-13, Hustler and mount, $175. Also want Vibroplex bug. Robert Wessells, WA4RLU, P.O. Box 615, Parksley, Va.

HALLICRAFTERS S-108 Receiver. Modified to use Heath Q-mult. which is included—$85.00 F.o.b. Allentown, Penna. Ed Brooks, K3STW 2416 Trement.

FOR Sale: Collins 30K-1 and 75A-1, in mint condx. $500, for both. S. Strauss, W2RCN, 53-35 203rd St., Bayside, L.I., N.Y.

SELL: Heathkit SB-400 transmitter, $300; Drake 2-B, $200; Swan SW-175 75 M. Single band, $145.00; Jonson 6N2 transmitter, $90; Eico 730 modulator, $40. All F.o.b. Inquiries invited. Robert Pierce, K1TKZ, 57 Gifford, West Hartford, Conn. 203-233-6763.

HEATH HW-10 Shawnee, in excint condx, $175. John P. Purcell, 8632 Willow Oak Rd., Baltimore Md. 21234.

COLLINS 75S1, 32S-1, 30L-1, immaculate condx, $1300. WB6-EXN, 5524 Sundale, Bakersfield, Calif.

COLLINS 32V2, $225; 75A2, w/spkr, calibrator, $225; Tecraft (never used), 2-meter TR20/144 transmitter, $40; CC-144 converter, $30; PTR-2 power supply, $15; Robert Dollar 2-meter mobile receiver, model 226, $25; QST, and CQ 1954-1964, $3 per year. Sry, no shipping. Will deliver in NYC area. Jay Nathan, K2HVM, 5 W. 86 St., N.Y., N.Y. 10024. Tel: 212-BA7-9300, day; 212-TR7-3320 evenings.

FOR Sale: Plate transformers 3600-0-3600 VAC *@* 1000 ma., CCS with 120/240 VAC primary, one year unconditional guarantee, $35. 4-1000A filament transformers 7.5 VCT *@* 21 amps, $12. Peter W. Dahl Co., 401 4th St. S.E., Minneapolis, Minn. 55424 Tel: 338-9077.

WANTED: Commercial or military, Airborne, or Ground, equipment and test sets, Collins, Bendix, others. We pay freight. Ritco, Box 156, Annandale, Va.

COLLINS KWS-1, 75A-4 with three filters, speaker with Micro-Match, clock and beam indicator mounted in it, spare set 4CX250B tubes, Electro-Voice mike, all in excint condx with no scratches. Will ship crated for $1100. W4HAV, J. A. Fulmer, 55 Vernon Lane, Ft. Thomas, Kentucky.

FOR Sale: Challenger xmtr, T-R switch, HG-10 VFO, Signal Sentry and pwr supply, Mosley CM-1 rcvr, plus extras $240. Also "Twoer" new, four 813 tubes, Eico 720, HQ-145 in FB shape. WA9CEG, 153 E. Walnut St., Oglesby, Ill.

NATIONAL SW-3 wanted. State price, condition. Reply via air-mail. Lt. Col. John Parrott, MAAG, Japan APO, San Francisco, 96390.

FOR Cash sale: Drake 2-B receiver with Q-multiplier, spkr, $185; Gonset G.S.B. 201, 1500 W P.E.P. linear amplifier, $190. Both units are in excint condx, w/manuals. KØWSP, Tom Stephens, 4319 Burt St., Omaha, Nebraska.

JOHNSON 500, w/spare 4-250A, $425; HQ-170-C, $215. Both in like-new condx. BC-221-Q, original calibration book, AC supply, $75. Signal Sentry, $10. Bill Boring, W7YQI, 2103 N.E. 142nd St., Portland, Ore. 97230. Tel: 503-255-1179.

WANTED: An RX-1 Mohawk rcvr in excint condx. For sale: SX-110 in excint condx, $125.00 or best offer. WB2LDJ, 1117 Logan Ave., Bellmawr, N.J.

32V2 Must sell, $140. Excellent; Collins factory rebuilt PTO, cabinet TVI screened, Hokanson, K9PSX, 4353 N. Morris, Milwaukee, Wis. 53211. Tel: 964-1415.

WANTED: Hallicrafters SX-88. W8PVZ, 974 Gardner, Barberton, Ohio.

HEATHKIT Chippewa linear amplifier, 2 Kw, P.E.P. SSB, 1 Kw, AM, CW, with p/s and manuals. Roff, Jr., WA4AEB, Box 1246, Tryon, N.C. 28782.

COLLINS 32V2, 120-watt 2-meter adapter, 2-meter converter. Any reasonable offer. Robert DuBois, RD #1, West Branch, N.Y.

APACHE, in excint condx, $185.00; HQ-110, needs alignment on 6-meter band, only $120, Globe 755 VFO, $20; Lafayette HE-50 10-meter xcvr, $70. Will ship 50 miles of N.Y.C. K2ZCU, Box 192, Nesconset, L.I., N.Y. (516) 588-6255.

WANTED: Collins mechanical filters. Give condition and price in your first letter. W. H. Robertson, W4NZP, 714 McConnell, St. Memphis, Tenn. 38112.

WANTED: Back issues of IRE or IEEE professional group transactions (not Proceedings). Most groups wanted, single issues or runs. Please list what you have and price desired. Also need IRE Natl. Convention and WESCON Record. J. D. Ahlgren, W4YHD, Rte. 2, Box 35, Herndon, Va. 22070.

COMPLETE Outfit voice, cw, RTTY, 75A-4 with noise blanker and FSK KWS-1, Neither used since Collins revised and adjusted for over $600. Panadaptor, Johnson rotator, teletype, scope, frequency shift converter, connectors, cables, $1750 takes it. Peter Smith, University Lane, Manchester, Mass.

BUILD Transistorized battery power-supply 350V 100 Ma. under $10. Plans, $2.00. Herco International, Box 113, Willowdale, Ont., Canada.

HT-37, in mint condx, original carton, $250.00; SX-101A also in excint condx, $225.00. Carl Dane, W1FXK, 128 Wadhams Rd., Bloomfield, Conn. Tel: 242-5842.

WANTED: Crank-up tower. Give height, manufacturer's name. Also need TR-44 or bigger rotator. Jim, WAØITY, 5032 Clark Dr., Mission, Kansas.

"HALF-Price" Massachusetts Institute of Technology Radiation Laboratory Series. World famous radio, electronics reference books in new, attractive, inexpensive, hardbound edition. Individual books or complete set of 28 volumes available. Send 25¢ handling/postage expense for Catalog 16 (Refunded on first order). Boston Technical Publishers, Inc., Box 111, Cambridge 39, Mass.

FOR Sale: Need money for college; Eico 720 transmitter, $75; Knight V-44 VFO $25; SX-101, $200 and R-46 spkr, $7. If transmitter and VFO taken as a package deal, I will include a Vibroplex Champion bug free. Equipment used very little. All in excint condx. Bill Ray, K1PQI, 36 Cortlandt St., West Hartford, Conn.

SELL: Heath Marauder HX-10, $255. WØKLG, Box 425, Dassel, Minn. 55325.

HEATH Marauder HX-10. SSB transmitter for sale, $275; one year old, latest changes, in excellent mechanical and electrical condx. Wired by graduate electrical engineer. WA8EYR, 6460 Seneca Trail, Mentor, Ohio. Tel: (Cleveland area) WH 2-7324.

FOR Sale: KWM-2, PM-2 a.c. supply; MP-1 mobile supply with two 351D-2 mobile mounts, Shure mike and cables, $1195. L. Dolby, Sewell, N.J. Tel: 609-UL-7-0519.

DETROIT Area: Swap 'n Shop; Sunday, April 25th 10 to 4 at K of C Hall, Grand River Avenue and Lesure. No dealers! Just hams! W8MGQ.

SALE: Hy-Gain 6 months old; Doublet 5BDT ant., $20. W7-BFB, 3324 Patterson Blvd., Flagstaff, Ariz.

WANTED: Parts for KW linear and p/s. Leo Severe, RR #2, Box #5, Wilmington, Illinois 60481.

COLLINS Novice adapter (KWM-2) 399B-5 with four 40-meter crystals, mint condx, $42.00 F.P.P. Nye, 2555 Sylvan Shores, Pontiac, Mich.

COLLINS 75S3 mint condition in original containers, $475; 75A4 mechanical filters 500 cycle, $50; 2100 cycle $35; 6000 cycle, $25; Jennings vacuum variable UCS 10-400 mmf 10 Kv., $50; Heath Apache 1X-1 pertect, $150. QST library years 1949 thru 1964, $45. W9YFV, 400 Bloomingdale Rd., Itasca, Ill.

MANUALS for surplus electronics. Stamp for list. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: HT-32, HT-32A, HT-32B, HT-37 or 32S-1. Any condition. General Radio, 916-A HF bridge. Frank Stewart, 3217 Moon Drive, Mesquite, Texas.

FOR Sale: or you make offer: Viking II with VFO, $125.00; KW amplifier pair 4-250As, power supply, fully metered in 6 ft. rack, $300.00; homebrew operating console, $25. Write to R. Andrew, 3716B Union Ave., Pennsauken, N.J.

VALIANT I and SB-10, JT-30 mike, in excint condx, guaranteed to work, $250; Valiant I, $200, SB-10, $80; NC-303, matching spkr, 6 meter conv., 100 kc. calib., WWV conv.; $275. Doc, K1OZR, Tel: LO 7-5409/LY 8-4138, 150 Meridian, E. Boston, Mass.

CLEGG Zeus, $450, in mint condx. 3-element Telrex 6 meter beam, $10; 8 element Telrex, 2 meter beam, $20. Duke Flannagan, W4JEY, Box 293, Aiken, S.C. Tel: MI 9-2730.

SWAN 240, E/W 8236 tube, $245; Adcom 350 mobile p/s, $65, K6AY, 2819 Park Blvd., Oakland, Calif. 94610. Phone 415-452-3466 (will accept collect).

SBE-33 mobile rig, mobile power supply and mike; $310. 75A2 receiver, product detector, crystal calibrator, $175. W. Sather, K1OAO, 10 Gristone Road, Chelmsford, Mass.

FOR Sale: Knight R-100 receiver, realigned and calibrated, with Johnson calibrator, in excint condx, for only $69.00. Ken Larabee WØHSY, 408 Elm, Waseca, Minn.

SELL: DX-100, SB-10, SX-100 receiver, Bud low-pass filter, all excellent, $300 takes everything. W1PSY, 6 Priscilla Alden Rd., Provincetown, Mass.

RECEIVER RME 6900, superb SSB, CW, AM reception ten thru eighty. In perf. condx, $175.00. WA4SBD, 2414 Springhill Rd., Huntsville, Ala.

ELMAC AF67, PMR7, M1070 power, 5 fiberglass whips and cowl mount, mike, coils and relay, $225.00 or you make offer. K8DQC, 6815 Oakes Rd., Brecksville, Ohio 44141.

DRAKE 2B and 2BQ. In original cartons. Can deliver east of Mississippi, $220. R. Wildey, 33 Buchanan, Cherry Point, N.C.

KNIGHT R-100A, all accessories, factory calibrated, $100 or your best offer. Gary Glaze, 516 Museum Dr., Charlotte, N.C.

SX-88 receiver and Heath Twoer wanted. All replies answered. K8GNZ, Box 683, Fairmont, West Virg.nia.

SELL: Courier, $110; Morrow 5BR2 converter, $25; Q-5er receiver, $15. WA6HRS. Box 611, Sunnyvale, Calif.

SELL: Mint 28KSR, $325, best offer, or trade for mint CE-200V/100V, K8JZW.

COLLINS PTOs, new 70E-24 for 75A-4, $49; 70E-23 for KWS-1, $39; 70E-12 for 75A3, $39; 70K-1 for KWM-1, $29; 70E-8A for 32V, $19; 399B-1 DX adaptor for KWM-1, $19; 399B-3 Novice adaptor, $14; Collins 51S-1 in warranty, $ '50; Hunter 2000B, $375. RTTY converter, radio frequency lab shift 800-600-400 CPS, $150; 1601C-TR narrow shift, $150. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

73 Magazine, Oct. 1960-Dec. 1964 (complete except Jan. 1961). Best offer takes set. J. Demler, 318 Garfield, Hastings, Nebr.

WANTED: Technical manual for the TS-465 C/U Signal Generator or its civilian counterpart. State price and condx. K5EVC, Box 294, Mumford, Texas.

WANTED: BC-458 or T21/ARC-5. David Block, K4WVF, Brandeis University, Waltham, Mass.

FIRST $185 buys Viking Valiant I transmitter kit, factory sealed carton. Original cost $349.50. W8BQH.

COLLEGE Bound: Brand new Heath HX-30 6 meter SSB transmitter, assembled but never used, APX-6 Transponder converted for 1215 Mc, mint condx, ART-28 transmitter for ham TV 600W, ART-26 transmitter converted with solid state power supply for Ham TV, 420 Mc transceiver RT-7, APN1, 2000V power supply, 220 Mc filter, cab net for 6 meter linear, Feb. 1964 QST, 24" dish 1.6-5.2 Mc. VFO, new 4XC300A with socket. Stan Nazimek, WB2GKF, 506 Mt. Prospect Ave., Clifton, N.J. 07012.

75S-1, $290, with factory guarantee. Richard Petersen, 1719 A Avenue, N.E., Cedar Rapids, Iowa.

B&W 5100 and 51SB. In excint condx and operation. $225. WA5CMC, 2309 Bullington, Wichita Falls, Texas.

HEATH DX-60, new, professionally built, send $60. Will ship. C. O. Jones, WB2LQL, 48 University Court, Buffalo, N.Y. 14226.

WANTED, by ambitious young amateur: part-time job in electronics, radio, etc, New York City for summer. WB2OTT, 5001 Overbrook, Douglaston, N.Y., 11362, FA 1-4247.

NEW Hallicrafters SX-122 with matching speaker, won receiver as prize, asking $225 or your best offer. Write: Robert Stephens, King Arthur Apt. Bld. 13, Apt. 7, Northlake, Ill. Call 312-562-1074 after 6 PM.

GOING SSB. Eico 720, $65; Hallicrafters HA-5 VFO, $60; both for $100. Eico modulator with cover, $40; SX-110, $100; Nikey, $10. All perfect. Shipped collect. W3UIO, Box 277, Oxford, Penna.

SWAP: 220 Mc. Gonset Communicator IV for a 144 Mc model. W2DTE. 29-29 213th St., Bayside, N.Y.

COLLINS: KWM-1 mobile supply 516E-1 and mount 351D-1 with cable, $115. WA2MUA, 516-CA-1-7265.

SALE: Johnson Ranger II 160 thru 8 mtrs. Asking $250, excint xmttr. Elmac AF68, PMR-8, M-1070 p/s for 6-12-110 VAC. All cabls, ant. relay, mike. Ready for mobile in a mobile rack. First $275 takes it. WA2TSC, 7427 Grant Ave., Pennsauken 8, N.J.

FOR Sale: Viking 500 with TVI filter, Excint shape: $350. Richard North, 18253 Swarthmore rd., Saratoga, Calif.

SX-100, purchased in 1961, in like-new appearance and operation: $165.00. L. Rommel, K3LVK, 802 Hosfeld St., Clarks Summit, Penna. 18411.

LYSCO Model 600S xmtr xtal quality VFO, 160 thru 10 meters. Incl. modulator, $50. Will ship. H. Ogram, Jr., K3UXQ, 30 Cragmere Rd., Wilmington, Del. 19809. Tel: 302-PO2-0918.

COLLINS 62S-1, 6 and 2 meter converter, like new. Sacrifice for $500 cash. C. A. Traverse, K5UHP, 515 College, Alva, Okla. Phone Area code 405-FA7-1151.

QSTS March 1946 thru Dec. 1964. Best offer takes all. Moving. Harold E. Brown, W1ONC, 4 Ward St., Woburn, Mass. 01801.

GOING To college: Valiant II, $400: SX-111, $180; TA-33, Jr. $45. Transmitter and antenna 3 months old, receiver 1 year. All factory condx. Tel: 914-NE4-3898. WB2MVJ.

INTERESTING Offers galore in the new combined "Equipment Exchange", "Ham Trader". Next 12 issues $1.00. Sample free. Brand, Sycamore, Ill.

WANTED: Hallicrafters S-51 receiver, covering 132 Kc. to 13 Mc. State condition and price in first letter. Peter Spiliotis, 6 Brentwood Circle, Danvers, Mass.

SELL: Swan 240, Swan 117 Ac extras. WA2ZVJ, 2115 East 27th St., Brooklyn, N.Y.

SALE: Cash & carry: Valiant, $195, NC-303 $315, Gary Schmidt, WA2AVY, 238 East 58th St., New York, N.Y. 10022. Tel: PLaza 9-3591.

SELL: Eldico L-100 2 kw. P.E.P. final and power supply. 3-4CX300A, ganged vacuum variable and rotary inductors, Pi-L output, vacuum ant. relay, 2-30 Mc continuous tuning, built-in 'scope, meters, MIL parts, 52 ohm input. Each fully enclosed on 19 x 10½ panels. Built for presidential communications. $550. SR-150 with A.C. supply, mint condx, $500. K2JEF, 81-31 267 St., Floral Park, L.I., N.Y. Tel: FI 3-6663.

FOR Sale: Heath DX-100, $100: Hammarlund HQ-110-C, $110; Heath VOX-1, $10, Astatic D-104 and G-stand, $20 or all for $210. K3HLN, 1463 Skippack Pike, Center Square, Penna.

NEW, Never used: Lampkin PPM package and 205A modulation meter. All for $500.00. K6JVT, Simonson, 1165 Anza Vista, Calif.

DX-100-B, excint, spare tubes, $125.00; NC-155 with Knight crystal calibr., clean, $135.00; Dow-Key T-R relay, $7.50; AR-22 rotor, control: $12.50; Turner mike, $5.00, package deal: $250. Will deliver package within 100 miles radius or ship express collect. You pick up and get 15 meter beam free. Also Heathkit Monitor 'scope, $45.00. Hayden Anderson, RFD 1A, Gardiner, Me.

SELL: Apache, $150; NC-303, $265; Johnson low-pass, $8.00; chassis holecutter, $5.00; 40 ft. E-Z Way crank down tower, tilt-over, $180.00; QSTs 1957 through 1964, $16; 35 misc. electronics mags, $5.00. K9DFG, 330 Dolle Lane, Crystal Lake, Ill.

SB-10/Apache w/ALC, other added features, glowing quality reports, $210.00; Drake 2-A w/calibrator, spkr, extra xtals, $170; RTTY model 19 w/transistorized TU/AFSK, autostart relay, $180. Wanted: SSB xcvr. Hal Brown, K3SQY, 643 Valley Forge Rd., King of Pruss a, Penna. 19406.

CONVERTER Teletype tape to Morse tape (not homebrew) WPEOU2B #17623, in xcint optg condx (plus spares), $690.00; triple or six head multiple TD $55.00; Model 19 keyboard, $50 punch, only $40; TG-26B, $180. Set of communications pallets, $18. F. L. Holloway, Jr., 513 N. Pinehurst Ave., Salisbury, Md. 21801.

NATIONAL NCL-2000 and NCX-3, excint condx. All tubes new. W1CPI, tel: ST-3-3867, Wakefield, R.I.

SELL: 753-3, 312B-3, 32S-3, 516F-2, 30L-1. All are in mint condx: $1650.00. Will ship prepaid. WA5BAU, Arrowsmith, 7424 Edith N.E., Albuquerque, N.M.

CLEGG Zeus and interceptor, both for $595; individually, $395 and $240 respectively. Sry, no trades! Both in mint condx. Am going to 2M FM. C. E. Schroeder, W2VGI, 21 High Acres Dr., R.D. #2, Poughkeepsie, N.Y. Tel: GL-2-5136.

ELMAC AF-67 xmtr. PMR-7 rcvr, M-1070 p/s, ant. relay, mike. Gud condx: $175.00. Will ship collect. J. K. Edes, K1DLD, Guilford, Me. Tel: 207-876-2236.

HAVE new TR-3 Drake. Sell my Heath DX-60 transmitter with HG-10 VFO: $85. And Drake 2-B receiver with Q multiplier and spkr, $225. In perf. condx. Fred Borton, W4IJF, 7725 N.E. 8th Ave., Miami, Fla.

COMPLETE Station for sale: Eico VTVM, sig. gen., DB23 preselector; Heath HM-11, Apache, SB-10, HO-10 'scope; HBR rcvr, TA-33 Jr., AR-22, much more. Late models. In mint condx. All books. Best offer over $500. Will deliver NYC area. WB2EOW, 69 James Rd., Monroe, N.Y. Tel: 914-783-2363.

SELL: Invader 200, $250; GSB-100, $190; HQ-170C, $170; all excint, with original cartons and instruction books. William Culpepper, 503 Boundary, Pitman, N.J.

JOHNSON Kilowatt 4-400's without desk. Many extras. Will ship collect. $500 or your best offer. W4HUE, 4108 SW 5th St., Ft. Lauderdale, Fla. 33314.

COMPLETE Station: DX-60 transmitter; HR-10 receiver, Gotham vertical. Ideal for Novices. $125.00. WA3CBE, Ken Pugh, 2636 Longwood Dr., Wilmington, Del. 19803.

LATEST SBE-33 with switch for AM, DC-2 DC p/s and mobile mounting plate: $305. WA2FSD, Tel: 516-HU-2-7857.

SALE: 4-1000A, socket, $55; 7200-3600-0-3600-7200v 3.6 Kw. 110/220v transformer 30, WRL VFO DelUxe, 160-6 meters, $25.00. WA6VAT.

HAMMARLUND HQ-180, with clock. Best general-coverage receiver made, like-new inside and out, $273. E. P. Tilton, Box 137, Canton, Conn.

SELL: SX-110 recvr, like new condx, $90. Will ship. WAØACK, 909-17 Ave. West, Williston, N.D.

BC-610-F, like new, with manuals, spare tubes, crystals, accessories, reasonable. K5EFH, 2329 4th Ave. N., Texas City, Texas.

WANT Technical service manuals for any E.H. Scott radios, also old tube manuals. W2OYU, 277 Herrick Ave., Teaneck, N.J. Tel: 836-7632.

6 Mtr.-75 mtr. mobile xmtr, dyn. mike, cables, $35.00. F.o.b. W6RET, 8831 Sovereign Rd., San Diego, Calif.

SALE QSTs, best offer: Aug. 1947 thru July 1948; June 1951 thru Dec. 1964, except Nov. 1960. W4VTS, 315 Belvoir Ave., Chattanooga, Tenn. 37411.

UTICA "650" 6-meter transceiver, with extras, in excint condx, $120. Lee Brown, 902 Niagara St., Elmont, N.Y. 11003.

CRYSTALS Airmailed: MARS, Nets, SSB, Marine, CD, Novice etc.—Custom finished etch stabilized FT-243 .01% any kilocycle 3500 to 8600 $1.90. (Five or more $1.70.) (Nets, ten or more same frequency only $1.35.) 1700-20.000 (Overtones above 10.000) $2.50, .005% 50¢ each extra. HC-6/u miniature above 2000 add 75¢ each. 375-525 Kilocycles .01% FT-241-A $2.95, HC-6/u $4.95, .005% add $1.00 each. QST, SSB and ARRL Handbook Kits. FT-243: "DCS-500", "IMP", "Three Band Converter" $9.95/set. Many other filter and oscillator kits including G. E. Ham News. Write—be specific. Add 10¢/crystal airmail, 5¢ surface. Crystals since 1933. C-W Crystals, Box 20b5-Q, El Monte, California.

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GRICE Electronics has Collins PM-2, $125.00; 75S-1 w/Waters Q-mult., $375.00; 75A-4 w/deluxe spkr and 3 filters SN 4757, $500; A4 with spkr, 3.1 filter, SN2539, $425.00; Hammarlund HQ-100A, $125.00; Johnson Ranger, $125.00; KW deluxe Matchbox, $125.00. Write P.O. Box 1911, Grice Electronics, Pensacola, Fla.

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NEW $75.00 Transtenna 102A TR switch with sidetone for $45.00. Andrew L. Freeman, 1805 No. 3rd St., Grand Forks, N.D.

SALE: Thunderbolt Johnson 2 KW P.E.P. like-new condx: $300. K7SPH, Box 4099, Tucson, Ariz. Tel: PH-623-1278.

HEATH Twoer, $40; Knight T-60, $35; R-55 receiver, $35. All for $100. WA8GOK, 16902 LaVerne Ave., Cleveland, Ohio 44135. Tel: 216-941-8961.

COLLINS SSB station. KWS-1, 75A4-3 filters—integrated station control including speaker, antenna indicator, power meter, $1400. K5HIC, 2004 Sunnyview Lane, Mountain View, California.

ELMAC AF-68, PMR8, M1070 (perfect), package deal: $250. Gary Hultman, K8RCU/9, 5254 N. Spaulding, Chicago 25, Illinois. Tel: CO-7-3030.

HALLICRAFTERS HT-45, P-45AC, in perf, condx. $400 or your best offer. K8POU, 520 Commonwealth, Kalamazoo, Mich.

TOROIDS, uncased 88mh, 5/$2.50. ppd U.S.A. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED E-Z Way 40 or 50 ft. tower. W2FX, DiBlasi, 155 Bayview Rd., Plandome Manor, N.Y. Tel: 516-MA7-1107.

DRAKE 2B, $175; Heath HX-20 SSB transmitter, $140; Health HP-20 AC supply, $20; Morrow mobile twins, MBR-5 rcvr, $40; MB-560A 65w. transmitter and mike, $45.00. 500 watt modulator PP 100TH, $30. K1ODK, 21 Old Farm Rd., Wayland, Mass. Tel: 358-2840.

NYC Area hams! Sell Hallicrafters SX-110 receiver w/Lafayette HE-48 spkr, both are in excint condx. $85. Call WB2-GWU, 212-EV8-1893 after 5 PM. George Hawrysko, 115 South 2nd St., Brooklyn, N.Y. 11211.

SX-140 receiver for sale. Factory wired. $75.00. WØEGC, 2042 North 33rd Terr., Kansas City, Kansas.

HT-37, $265; HT-41 linear, $235.00: both mint condx, like-new, hardly used. If a package deal, both for $475.00. Al, WA2WTT, phone evenings at 212-LI4-8620, and if busy, then call 212-LI4-3367.

SELL Teletype Model TT-7/FG military version, Model 19 complete with power supply and typing reperforator, $175. You pick up. Richard Vogeley, W2IPB, 554 Seventh Ave., New Hyde Park, N.Y. 11040.

HEATH HW-32 xcvr, HP-13 mobile supply, Hy-Gain Topper antenna; brand new, factory aligned, tested, guaranteed 60 days. $190 includes shipping costs. D-104 mike, PTT stand, $250.00. K4DHP 1416 Rustic Way Lane, Falls Church, Va.

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SWAP: SW-240 and AC supply for gud rcvr. 20-A w/VFO and H.B. linear, or any like combination. Paul Wentzel, KØGBC, RFD #2, Spearfish, So. Dak.

COMPLETE 35-watt, in mint condx, Hi-Fi. Bogan DB-130 amplifier; AM-FM tuner, turntable, 15" spkr w/cabinet. Cost $400 new. Your best offer over $100 or will swap for KW. K1ZHS, Katz, 105 Pine Ridge, Waban, Mass. 02168. Tel: 969-6720.

SELL: SX-99 by Hallicrafters with matching speaker. In perfect condition and in original cartons. Asking $100 but will dicker. Raymond J. Norton, WA2CRH, 25 Sierra St., Glen Falls, N.Y. 12801.

WANTED: Plug-in coils or forms for SW-5 "Thrill Box" receiver. Write, indicating condx and price to W5MDI, 2820 McMillan Circle, Bethany, Okla.

WANTED: HQ-180A receiver. Advise lowest price in your first letter. All replies answered. K2EGI, 5 Stratford Pl, N. Babylon, L.I., N.Y.

"HOSS-TRADER Ed Moory offers demonstrator equipment: factory warranty. Cash and no-trade deals. New 2-B, $249.50; TR-3, $469.00; Swan 350, $329.00: SB-33, $249.00; Galaxy V, $369.00; New TA-33 beam and Ham-M rotor (demo) $169.00; Demo TH-6DX beam, $99.50; SB-34, $319.00; KWM-2, $849.00; 75S-3, $489.00; 2 left at old price. NCX-5, $585.00; NCL-2000, $585.00. Reconditioned gear: SB-33, $229.00; HT-37, $279.00; 200-V, $469.00; 100-V, $389.00; Factory reconditioned KWS-1 and 75A-4, $995.00; 75A-4, $425.00; GSB-100, $209.00; Johnson Ranger II, $219.00; 2-B, $195.00; SX-117, $249.00; Swan 350, $289.00; Drake R-4, $279.00. Available new Drake TR-4 transceiver, $585.00, also T4-X xmtr. Swan 240 Tri-Bander, $229.00; Swan 175, $139.00. Terms Cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone WHitney 6-2820.

ENGRAVED Name pins. 1" x 3". Pin or clip-back. Name, call, $1.00. Name, Call, Club, $1.50. Face; red, blue, green, brown, black, white letters. Specify. G. W. Chamberlain, WØSPI, Rock Port, Missouri. Special Club Prices.

DeFOREST Antiques, circa 1918-19: Marconi 4-prong VT-1 and VT-2, "unit panel" rheostat and condenser; two copies de Forest 1919 catalog; 12 assorted honeycomb coils from L35 to L1500; E. I. Co. buzzer; "Vacuum Tubes in Wireless Communication" by Elmer Bucher. 202 pp., 1918. Make offer. W. T. Bartholomew, 9407 Kingsley Ave., Bethesda, Md. 20014.

SPAULDING 56 ft. fold-over tower complete, $200. Will not ship, sry. Don Walther, 1419 Ravinia Rd., West Lafayette, Ind.

HEATH MT-1, $50; HP-20, $20; AJ-10 AM/FM tuner, $35.00; Bud deluxe 6 ft. gray cabinet, $35.00; new 5D22/4-250A's, $55/pair. Will ship anywhere. F.o.b. Oklahoma City, Okla. 73122. Roy Gillett, 4732 Eastman Dr.

FOR Sale: Immaculate HT-37, used six hours. Serial No. 337000. $375. Drake 2-B with matching spkr. $200. Need money for college. Write to H. F. Bates, San Pasqual Academy, Rte I, Box 890, Escondido, Calif.

QST, 7 Binders, June 1925 through June 1935, in gud condx. Will swap for law texts, casebooks, etc. Send list. L. Morris, 5925 W. Catalina Dr., Phoenix, Ariz.

FOR Sale: Collins receiver 74A-4, 3.1 and 1.6 filter, in perf. condx. High serial No., $425. R. C. Littler, 640 Snowhill Blde., Springfield, Ohio. Tel: 513-322-8722.

WANTED: 41000A tube, Heathkit Warrior amplifier, any condx. Hunter 2000B parts for KWP1, network amplifier. Hy-Gain, Hi-Tower antenna. K3BHB, 903 Western Ave., Jeannett, Penna.

HW-12 and HP-13, vy gud condx, $160. Burton Dennis, 1400 Cadmus Road, Adrian, Michigan.

FOR Sale: Boston Area, 75A-3, $315.00; Ranger with grid-block keying, factory wired, $140. Both in excellent condx. R. J. Becherer, W1CCM, 11 Linden Terrace, Newton, Mass. Tel: 244-8335.

FOR Sale: Hy-Gain TH-3 beam, $60.00; BC-221 frequency meter, $60.00; BC-639 rcvr, $15.00. W5MUG, 2469 Paden St., Jackson, Miss.

DX-60 excellent condition, $45.00. B&W TR switch, Model 380, $6.00. Robert Witherington, WA4KBN, Box 203, Winston-Salem, N.C.

CENTRAL Electronics 200-V for sale, in like-new condx, $449.00: new Drake 2-B with xtal calibrator, $219.00; HW-32 Heath transceiver with Collins 516B-1 12-volt supply, $194; 1000 watt linear, HT-33, $195.00. Elvin Miller, 3845 Kipling Ave., South, Minneapolis, Minn.

WILL Sacrifice Venus 6M Clegg transceiver, matching a.c. power supply, mike, and manuals for $405. In perfect condx. Dave Curtis, WA8JMP, 127 30th, Newark, Ohio 43056

SELL For college: NC-57 receiver, HT-40 xmtr, HD-11, Q-multp key, JT-30 mike. Gud condx, all for $95.00 or separate. U pay postage. Bob Holden, RD #1, Telford, Penna.

FOR Sale: Complete five-band mobile SSB transmitter-receiver and P/S. Heath HX-20 and a.c. supply: $260.00. Ed Swartz, K8UFK, Lyons, Ohio 43533.

4-400A amplifier and exciter, bandswitching 80-10 meters; needs only H.V. supply. Modernly constructed. $145.00. Technical Radio LRR-6 rcr, $40. K6OKY, Bob Potter, 860 Clark, Riverside, Calif. Tel: OV 4-2486.

TRADE Ham gear for camera and plate-making equipment for offset printing. Give full description, approximate value and what gear you want. Descriptive literature will be returned if item not purchased. Gene Hubbell, W9ERU, Box 350, RR #4, Rockford, Ill.

CLEANING HOUSE: These tubes are unused; 6 ceramic 4X250Bs, $11 each; 6—807W's, $1.50 each: 2—1813's, $5.00 each; 2—815's, $3.50 each; 3—829B's, $6.00 each; 6—838's, $4.00 each; 2—845's, $4.00 each; 6—866A's, $1.50 each; 2 matched pair 6GJ5's, $4.50 pr, 1—4E27, $4.00; 1—2C39, $5.00; many 2BP1, 3BP1, 3CP1, 3RP1 scope tubes. $3.00 each; UHF special 2—416B's, not surplus, $6.00 each. C. Huether, 31 Percy Rd., Lexington, Mass.

PRECISE 116 fast-est mutual-conductance tube-tester, new condx, $50.00; Dukane tape-recorder, $40.00; transistor tape-recorder, $10; Victor 16 m sound movie projector (trade?), $75. V. R. Hein, 418 Gregory, Rockford, Ill.

NCX-3, $260; NCX-D, $80; NCX-A, $70; Jennings UCS vac. variable 10-300 uuf. at 10,000 volts, $45; 75S1, 32S1, 516 F-2 p/s, $725.00. All are in excellent condition. Warren Groves, W8VYI, 3728 Crede Dr., Charlestown, W. Va.

WANTED: Hy-Gain 40-M beam. Ham-M. Sell: G-50, $250.00. Mint condx. Photographic radio swaps considered. W4RLS, Box 26, Russellville, Alabama 35653.

SELL: HRO Sr. 14 coils, all frequencies, speaker, power supply. Vesto 50 ft. tower, complete with hardware and including Telrex 10M310, 15M312, 20M316. 175RIS. 1000 ft. control cable, 30 ft. RG-8. Make offers. Woolfe, 65 Brower Dr., Bricktown, N.J.

HEATH Apache, $160.00.; Drake 2A, $175.00. Both in excint condx. K2KHR, 1024 Lancaster Ave., Syracuse, N.Y. 13210.

32V-2, manual, mike PTT, coax relay, spare final, $140.00; 75A-1, spkr, manual, $160.00: Thordarson 3000v. 720 ma. plate transformer, matching choke, $40; crystal lattice filter, $8.00; SSB audio phase shift networks, $3.00. HR-10 kit, $45.00. Bargain list of components. WØLWZ, 1030 So. Dudley, Denver, Colorado.

SWAN SW-240 with SW-117 ac., perfect, $295.00; Mosley A-320 beam, $40.00; Ham-M, $75.00; KW AM w/factory wired Ranger, $500.00; SX-99, $85.00; Elmac 4-400A, $25.00; Amperex 4-250A, $20; CDR TR-2A, $20; Heath QF-1, $10.00; B&K 650 tube-tester, $50; Harrinston, W1ERX, 117 Highland Ave., Rowayton, Conn.

APACHE TX-1A in excint condx. Professionally wired. Asking $200. 2 AVS vertical ant., $13.00. John Poldoian, K1UON, 205 Warren St., Waltham, Mass.

FOR Sale: BW 5100 and 51SB, in excellent working condition. Best offer. W1ERR, Leo Romaine, 134 Essex St., Saugus, Mass.

FOR Sale: Viking Challenger xmtr, 80-6 meters, 100 watts AM/CW, $75. Matching 80-6 meter VFO, $25.00. Johnson Matchbox with SWR 275-watt, $55.00. 80-10 meter Preselector-converter 35 db gain, $25.00. All are in mint condx. E. Franklin, 88-15 168th St., Jamaica, L.I., N.Y. 11432.

WANTED: Clean Gonset G-43 receiver. Write to John Gibson, 1934A Berkeley Way, Berkeley 4, Calif.

HAMMARLUND HQ-170C and matching speaker in excint condx: $195.00, and you to pay shipping. Steve Draper, WA4-SBA, 202 Bellefonte Dr., Ashland, Ky.

HT-41. Best offer over $200 before 20th of month. Bill, P.O. Box 3332, Lafayette, La.

MICHIGAN: Will sell HQ-100, speaker, DX-100 all for $225. Vy gud condx. K8IFH, 5334 S. Vassar, Grand Blanc, Mich. Tel: OW-4-6667.

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8121	Forced-air	150	1500	50 470	27 23
8122	Forced-air	400	2000	50 470	37 30
8462 (Quick-heating)	Conduction	100*	700	50 175 470	11 10 8

*May be higher, depending on heat-sink design

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