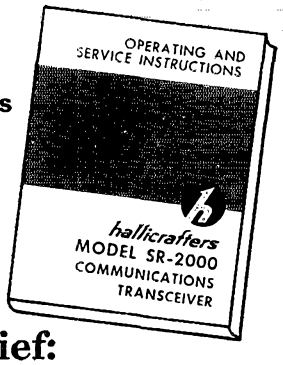
March 1967
60 Cents

OFFICIAL JOURNAL OF THE AMAL

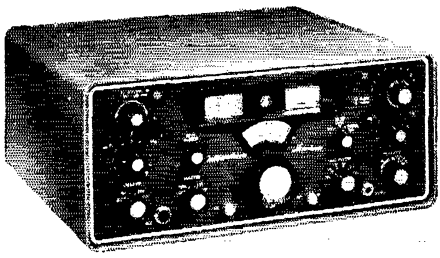
See us—and the SR-2000—at the SSB Amateur Radio Show Mar. 21, Statler-Hilton Hotel, New York!

Please do not write for this 25,000-word free book unless you are really interested. It's pretty expensive.



SR-2000 transceiver specifications in brief:

Maximum legal input in a 26-lb. box no bigger than an overnight bag! **Special features:** Receiver Offset Control (RIT) permits ±2 kc adjustment of receiver frequency, independent of transmitter, for round-table, net or CW operation. Amplified Automatic Level Control. **Frequency Coverage:** 80, 40, 20, 15 and 10 meters. Upper, lower sideband, CW. All crystals provided for 28.0 to 30.0 mcs. **General:** Dial cal., 1 kc. Linear gear drive with less than 1 kc readout. Adjustable IF noise blanker. Provision for plug-in external VFO/DX adapter. Built-in VOX, break-in CW and PTT. Built-in CW sidetone. Hi-Lo power switch for SSB.* 2.1 kc 6-pole crystal lattice filter. S-meter-RFO-AALC and final screen metering.* Two-speed blower. 100 kc crystal cal. VFO covers 500 kc. **Transmitter Section:** Two 8122 output tubes. Variable Pi network. Power input, 2000 watts P.E.P. SSB; 1000 watts CW. Carrier and unwanted SB suppression, 50 db; distortion products, 30 db. Audio: 500-2600 cps @ 6 db. **Receiver Section:** Sensitivity less than 1 μv for 20 db S/N. Audio output, 2 W.; overall gain, 1 μv for ½ W. output. **Price:** $995. amateur net. P-2000AC Power supply, $395.



*Meters for final plate current and voltage built into P-2000AC power supply. Also Hi-Lo power switch, and loud speaker.

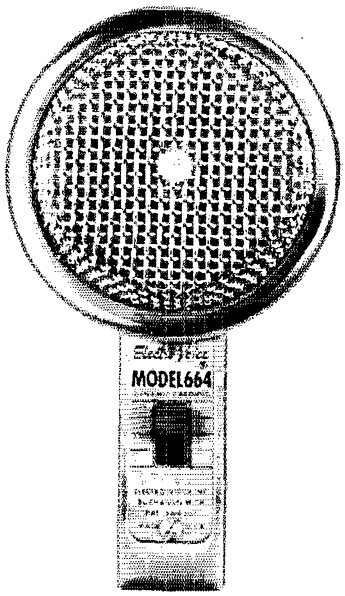
Export: International Division; Canada, Gould Sales Co.

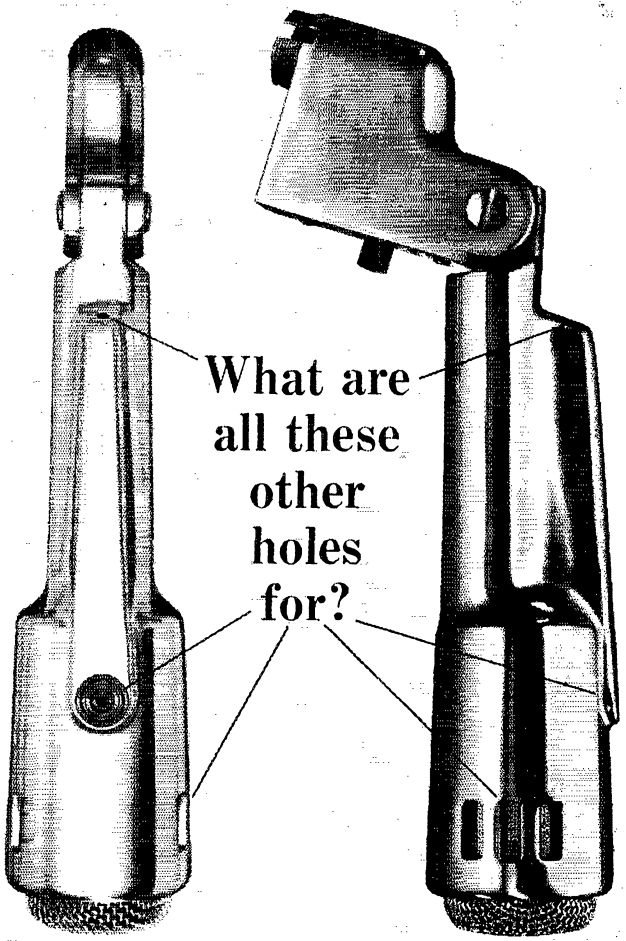
hallicrafters

A Subsidiary of Northrop Corporation

5th & Kostner Aves., Chicago, Illinois 60624

If the Electro-Voice Model 664 picks up sound here...





The holes in the top, sides and rear of the Electro-Voice Model 664 make it one of the finest dynamic cardioid microphones you can buy. These holes reduce sound pickup at the sides, and practically cancel sound arriving from the rear. Only an Electro-Voice Variable-D® microphone has them.

Behind the slots on each side is a tiny acoustic "window" that leads directly to the back of the 664 Acoustalloy® diaphragm. The route is short, small, and designed to let only highs get through. The path is so arranged that when highs from the back of the 664 arrive, they are cut in loudness by almost 20 db. Highs arriving from the front aren't affected. Why two "windows"? So that sound rejection is uniform and symmetrical regardless of microphone placement.

The hole on top is for the mid-range. It works the same, but with a longer path and added filters to affect only the mid-frequencies. And near the rear is another hole for the lows, with an even longer path and more filtering that delays only the bass sounds, again providing almost 20 db of cancellation of sounds arriving from the rear. This "three-way" system of ports insures that the cancellation of sound from the back is just as uniform as the pickup of sound from the front—without any loss of sensitivity. The result is uniform cardioid effectiveness at every frequency for outstanding noise and feedback control.

Most other cardioid-type microphones have a single cancellation port for all frequencies. At best, this is a compromise, and indeed, many of these "single-hole" cardioids are actually omnidirectional at one frequency or another!

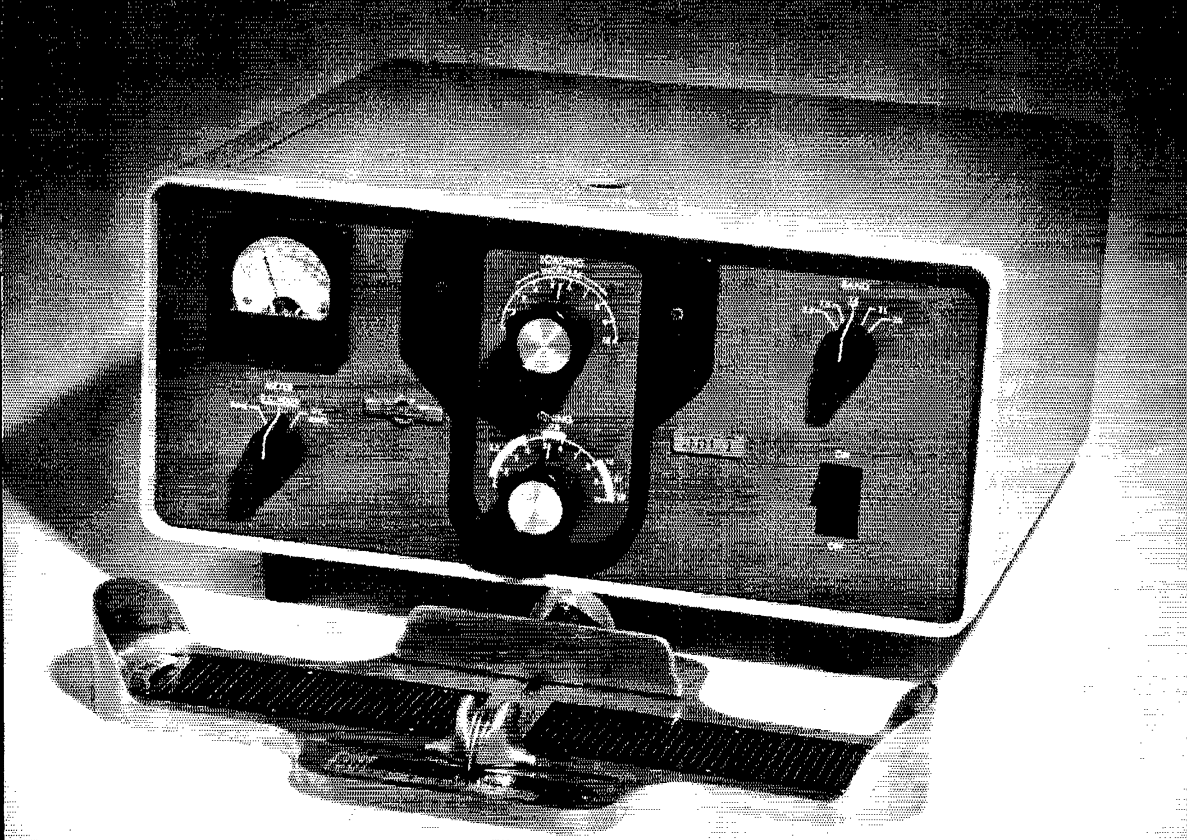
In addition to high sensitivity to shock and wind noises, single-port cardioid microphones also suffer from proximity effect. As you get ultra-close, bass response rises. There's nothing you can do about this varying bass response—except use a Variable-D microphone with multi-port design* that eliminates this problem completely.

Because it works better, the E-V 664 Dynamic Cardioid is one of the most popular directional microphones for demanding communications applications. To learn more about Variable-D microphones, write for our free booklet, "The Directional Microphone Story." Then see and try the E-V 664 at your nearby Electro-Voice microphone headquarters. Just $85.00 in satin chrome or non-reflecting gray.

*Pat. No. 3,115,207

ELECTRO-VOICE, INC., Dept. 372Q
631 Cecil St., Buchanan, Mich. 49107

Electro-Voice®
SETTING NEW STANDARDS IN SOUND



The Right Shoe

Feel like you're running barefoot? If so, it's time to try on Collins' 30L-1 Linear Amplifier. Conservatively rated, the 30L-1 provides 1,000 watts PEP on SSB and 1,000 watts average on CW. It gives your KWM-2 more talk power. Does wonders for other 70-100 watt SSB/CW exciters, too. You also get RF inverse feedback, automatic load control, instant warm-up and automatic antenna transfer. See the 30L-1 Linear Amplifier at your Collins distributor.

COLLINS

QST

MARCH 1967

VOLUME LI NUMBER 3

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

OFFICES

225 Main Street
Newington, Connecticut 06111
Tel.: 203-666-1541

Subscription rate $6.00 per year postpaid: $6.50 in Canada; $7.00 elsewhere. ARRL Membership, including *QST*, available only to individuals with a bona fide interest in amateur radio: $5.00 per year; $5.25 in Canada; $6.00 elsewhere. Single copies, 60 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

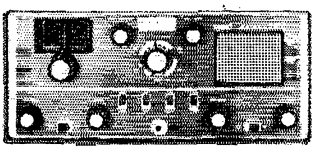
Second-class postage paid at Hartford, Conn. and at additional mailing offices.

INDEXED BY
Applied Science and Technology Index
Library of Congress Catalog Card No.: 21-9421

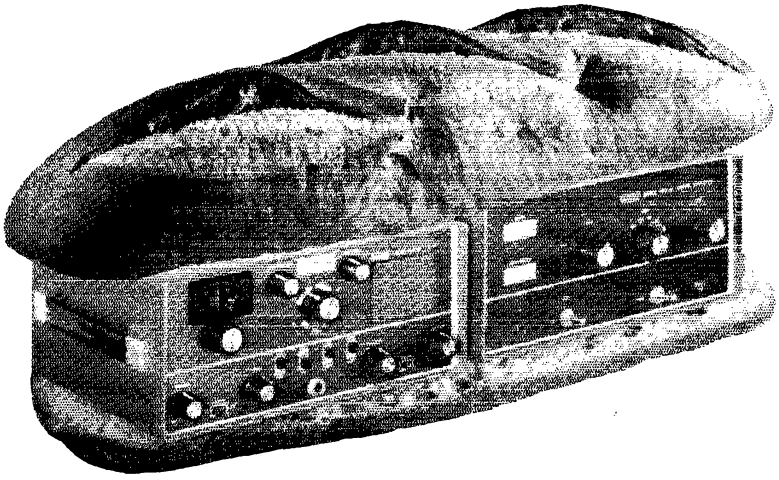
What band is this fine kilowatt amplifier on? 15? 10? Would you believe 6? That's it — elimination of the "breadslicer" is the reason there's so much coil. See more by K2AYM, on Page 11.

—CONTENTS—

SBE



torpedo! hero! submarine!



The words may be different depending upon where you live but the meaning is identical—a delightful sandwich—lots of goodies tucked into a small space–and always, most for your money.

Add the words, "SBE COMBO" to the best-buy section of the menu whenever you want to sandwich a plump, four-band kilowatt into that small car and still have room for the family. (it's right at home also).

First combo layer—SB-34, 80-40-20-15 meter transceiver with built-in 12V DC and 117V AC supply and replete with such condiments as solid-state switching (no relays), USB or LSB (by panel switch), steep slope mechanical filter (Collins), delta receiver tuning (± transmit frequency). Varactor control dial set, 500 ma receiver-only standby drain (12V DC), 20 diodes, 23 transistors (only 3 tubes),one-knob dual speed tuning.

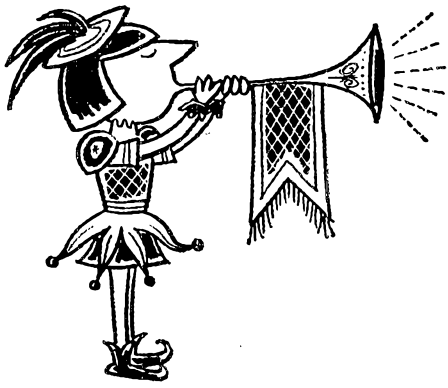
Second combo layer—SB2-LA, 1000 resounding watts p.e.p. input on 80-40-20, 750 watts on 15. And smallllll . . . only 5¼"H, 11¾"W, 11⅝"D, 43#. Built-in 117V AC supply uses silicon rectifiers and voltage multiplying to reduce transformer size/weight. Low voltage (800V) high current operation — easier on capacitors, diode rectifiers, components. Built-in antenna and control relays (2)—internal blocking bias—meters for plate current and output — uses 6 inexpensive 6JE6 parallel connected tubes.

Write for a menu—errr catalog.

SIDEBAND ENGINEERS—213 East Grand Avenue, South San Francisco, California 94080.

RAYTHEON

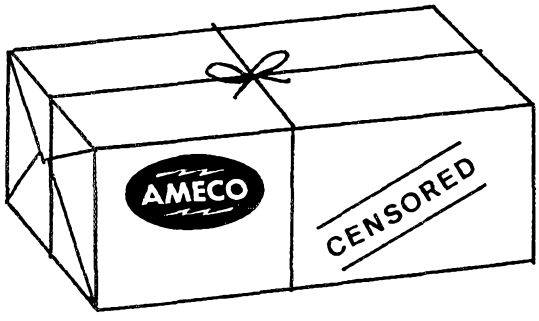
Export sales: Raytheon Company, International Sales & Services, Lexington 73, Mass. U.S.A.



SEE...the first unveiling of the all new AMECO "PT".

A continuous tuning 6-160 meter pre-amp specifically designed for use with a transceiver.

Proven in use by thousands of DX and local contacts by such stations as G3AWZ, OY7ML, W2GHK, AND MANY, MANY OTHERS



THE AMECO PT WILL:

1. Improve sensitivity and signal to noise ratio while receiving.
2. Bypass itself while the transceiver is transmitting.
3. Feed a 2nd receiver (ham band or general coverage).
4. Automatically mute the 2nd receiver while transmitting.
5. Improve immunity to transceiver front-end overload by use of the PT's built-in attenuator.

All of the above without modification to the transceiver.

☐ FIRST PUBLIC SHOWING AT THE SINGLE SIDEBAND SHOW, MARCH 21, 1967 (IEEE WEEK), STATLER-HILTON HOTEL, NEW YORK.

☐ NEXT PUBLIC SHOWING AT THE NEW ENGLAND DIVISION ARRL CONVENTION, SWAMPSCOTT, MASS. APRIL 22 & 23.

SEE US AT THESE SHOWS OR WRITE FOR FURTHER DETAILS AND FULL LINE CATALOG.

MANUFACTURERS OF FM AND AM TWO-WAY RADIO, SSB AND ISB COMMUNICATIONS, CONTROLATOR FUEL CONTROL AND DATA EQUIPMENT, AMECO* HAM, CB AND SHORT WAVE LISTENING EQUIPMENT.

AMECO EQUIPMENT CORP.

AMECO

A SUBSIDIARY OF AEROTRON, INC.

WRITE FOR FREE LITERATURE.

U.S. HIGHWAY 1, NORTH
RALEIGH, NORTH CAROLINA 27608

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, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS or V.H.F. PAM. Novices may be appointed OVS. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

ATLANTIC DIVISION				
Delaware	W3HC	John Thompson	1016 Parkside Drive	Wilmington 19803
Eastern Pennsylvania	W3ZRQ	Allen R. Breiner	212 Race St.	Tamaqua 18252
Maryland D. C.	K3JYZ	Carl E. Andersen	14601 Claude Lane	Silver Spring, Md. 20904
Southern New Jersey	W2ZI	Edward G. Raser	19 Blackwood Drive	Wilburta Gardens, Trenton 08628
Western New York	K2HUK	Charles T. Hansen	Warner Gulf Rd.	Holland 14080
Western Pennsylvania	W3NEM	Robert E. Gawryla	1463 N. Allen St.	State College 16801
CENTRAL DIVISION				
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	K9IVG	Mrs. M. Roberta Kroulik	401 El Portal Drive	Michigan City 46361
Wisconsin	K9GSC	Kenneth A. Ebneter	822 Wauona Trail	Portage 53901
DAKOTA DIVISION				
Minnesota	WØTCK	Herman R. Kopischke, Jr.	RFD 2	Janesville 56048
North Dakota	WØDM	Harold L. Sheets	21 Euclid Ave.	Grand Forks 58201
South Dakota	KØFXW	Seward P. Holt	Box 58	Clear Lake 57226
DELTA DIVISION				
Arkansas	K5GKN	Don W. Whitney	1117 North Drive	(P.O. Box 311), Osceola 72370
Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 354-E	Covington 70433
Mississippi	W5EMM	S. H. Hairston	2321-27th Ave.	Meridian 39303
Tennessee	W4UVP	William A. Scott	115 East Holston Ave.	Johnson City 37601
GREAT LAKES DIVISION				
Kentucky	WA4KFO	Lawrence F. Jeffrey	1605 Antler Ave.	Owensboro 42301
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 12309
N. Y. C. & Long Island	K2IDB	Blaine S. Johnson	266 Cypress St.	Massapequa Park, L. I. 11762
Northern New Jersey	W2LQP	Louis J. Amoroso	180 Pleasant Ave.,	Bergenfield 07621
MIDWEST DIVISION				
Iowa	WØBDZ	Owen G. Hill	RFD	Gilman 50106
Kansas	KØBXF	Robert M. Summers	3045 North 72nd,	Bethel 66009
Missouri	WØTPK	Alfred E. Schwaneke	Edgar Star Rte.	Rolla 65401
Nebraska	WØGGP	Frank Allen	Box 272	Gering 69341
NEW ENGLAND DIVISION				
Connecticut	W1GVT	John J. McNassor	218 Berlin Ave.	Southington 06489
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.	Braintree 02185
Maine	K1DYG	Herbert A. Davis	RFD 1	Franklin 04634
New Hampshire	W1SWX/K1DSA	Robert Mitchell	Box 137-A, RFD	Chester 03036
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				
Alaska	KL7DG	John P. Trent	1700 Tudor Rd.	Anchorage 99502
Idaho	W7ZNN	Donald A. Crisp	3727-14th St.	Lewiston 83501
Montana	W7TYN	Joseph A. D'Arcy	1916 Haggin Ave.	Anaconda 59711
Oregon	W7AJN	Everett H. France	3335 S.E. 116th Ave.	Portland 97266
Washington	W7HMQ	Everett E. Young	2217 Fifth St., S.E.	Puyallup 98371
PACIFIC DIVISION				
East Bay	K6LRN	Richard Wilson	107 Cordova Way	Concord 94521
Hawaii	KH6BZF	Lee R. Wical	45-601 Luluku Rd.	Kaneohe 96744
Nevada	W7PBV	Leonard M. Norman	652 Utah St.	Boulder City 89005
Sacramento Valley	WA6JDT	John F. Minke, III	6230 Rio Bonito Drive	Carmichael 95608
San Francisco	WA6AUD	Hugh Cassidy	77 Coleman Drive	San Rafael 94901
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno 93702
Santa Clara Valley	W6ZRJ	Jean A. Gmelin	10835 Willowbrook Way	Cupertino 95014
ROANOKE DIVISION				
North Carolina	W4BNU	Barnett S. Dodd	420 West Franklin St.	Salisbury 28144
South Carolina	K4LNJ	Clark M. Hubbard	124 Fant Lane	Union 29379
Virginia	W4SHJ	H. J. Hopkins	8600 Hammett Ave.	Norfolk 23503
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554
ROCKY MOUNTAIN DIVISION				
Colorado	KØFDH	Richard Hoppe		Lawson 80460
New Mexico	WA5FLG	Bill Farley	1306 Spruce	Alamogordo 88310
Utah	W7VSS	Gerald F. Warner	4765 South 275 West	Ogden, 84401
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601
SOUTHEASTERN DIVISION				
Alabama	K4WHW	Edward L. Stone	1806 Spring Ave., S.W.	Decatur 35601
Canal Zone	KZ5TT	Mrs. Lillian C. Smith	P.O. Box 191	Balboa
Eastern Florida	W4MVB	Jesse H. Morris	P.O. Box 1241	Jacksonville Beach 32050
Georgia	W4RZL	Howard L. Schonher	P.O. Box 1902	Columbus 31902
West Indies (P.R.-V.I.)	KP4DV	Albert R. Crumley, Jr.	P.O. Box 10073	Caparra Heights San Juan, P.R. 00922
Western Florida	W4RKH	Frank M. Butler, Jr.	494 Elliott Rd.	Fort Walton Beach 32548
SOUTHWESTERN DIVISION				
Arizona	W7FKK	Floyd C. Colyar	3411 West Pierson St.	Phoenix 85017
Los Angeles	W6BIIG	H. G. Garman	3732 Chatwin Ave.	Long Beach 90808
Orange	W6DEY	Roy R. Maxson	1434 South Olive St.	Santa Ana 92707
San Diego	W6LRU	Don Stansifer	4427 Pescadero	San Diego 92107
Santa Barbara	WA6OKN	Cecil D. Hinson	1933 Coventry Court	Thousand Oaks 91360
WEST GULF DIVISION				
Northern Texas	W5BNG	L. L. Harbin	4515 Calmount	Fort Worth 76107
Oklahoma	K5CAY	Daniel B. Prater	1401 E. Oklahoma Ave.	Enid 73701
Southern Texas	W5AIR	G. D. Jerry Sears	5634 Eskridge St.	Houston 77023
CANADIAN DIVISION				
Alberta	VE6TG	Harry Harrold	1834-5th Ave. N.	Lethbridge, Alta.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4JT	John Thomas Stacey	19 Cottonwood Cres.	Brandon
Maritime	VE1MX	J. Harley Grimmer	40½ Rosedale Ave.	Fairview, Halifax Co., N. S.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.	Willowdale, Toronto, Ont.
Quebec	VE2OJ	Jim Ibey	209 Brookdale Ave.	Dorval, P. Q.
Saskatchewan	VE5QC	Mel Mills	P.O. Box 801	Saskatoon

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

NEW from International

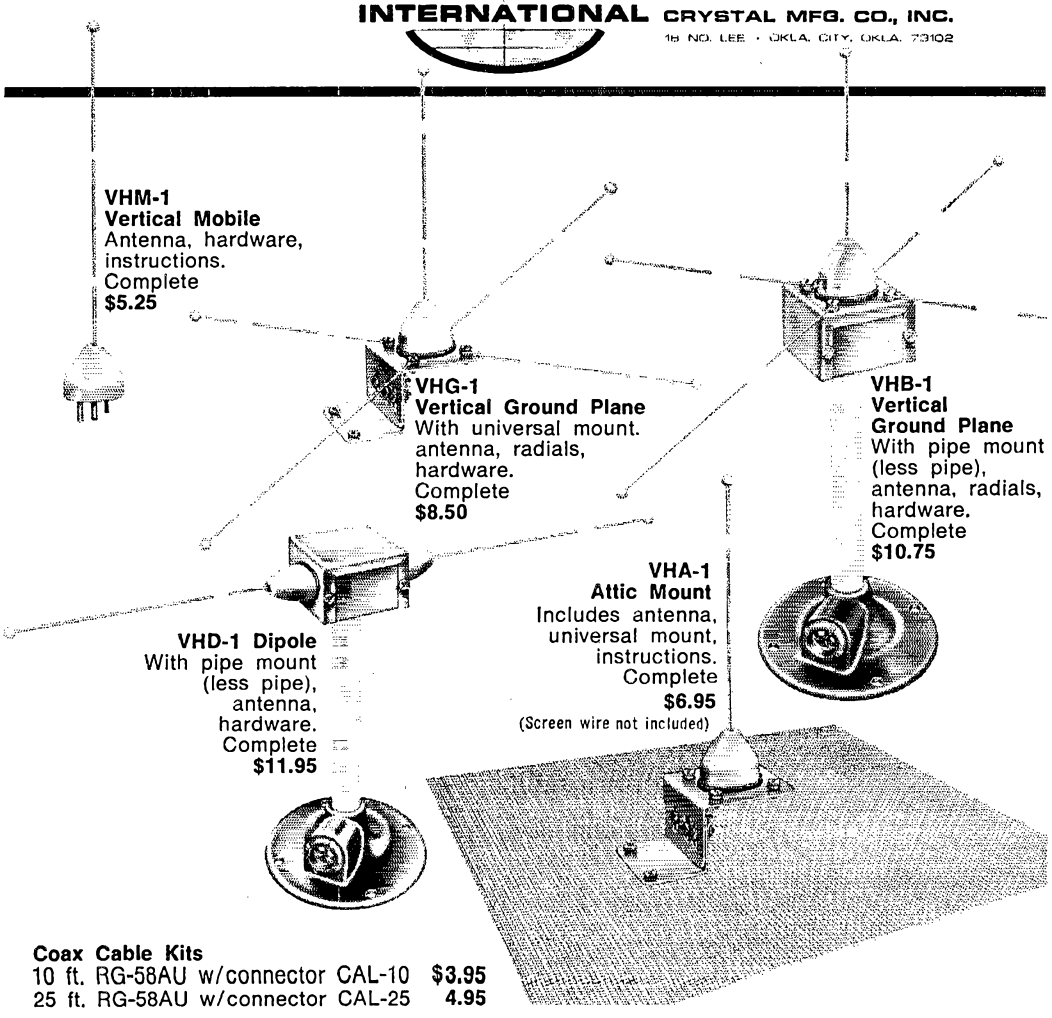
low cost VHF space-saver antennas

144-430 mc **120-480 mc**

- *Designed for full performance*
- *Solid molded bases*
- *Easy mounting*
- *Low cost*
- *Mobile Fixed Base*

If antenna space is a problem, you will find International Space-Saver antennas the answer. The new line of Space-Savers keep antenna display and space requirements to a minimum with full operating performance. Manufactured from the finest material, yet low in cost.

INTERNATIONAL CRYSTAL MFG. CO., INC.
18 NO. LEE • OKLA. CITY, OKLA. 73102



VHM-1
Vertical Mobile
Antenna, hardware, instructions.
Complete
$5.25

VHG-1
Vertical Ground Plane
With universal mount. antenna, radials, hardware.
Complete
$8.50

VHB-1
Vertical Ground Plane
With pipe mount (less pipe), antenna, radials, hardware.
Complete
$10.75

VHA-1
Attic Mount
Includes antenna, universal mount, instructions.
Complete
$6.95
(Screen wire not included)

VHD-1 Dipole
With pipe mount (less pipe), antenna, hardware.
Complete
$11.95

Coax Cable Kits

10 ft. RG-58AU w/connector CAL-10	**$3.95**
25 ft. RG-58AU w/connector CAL-25	**4.95**

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.

Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914–1936
EUGENE C. WOODRUFF, W8CMP, 1936–1940
GEORGE W. BAILEY, W2KH, 1940–1952
GOODWIN L. DOSLAND, WØTSN, 1952–1962
HERBERT HOOVER, JR. W6ZH, 1962–1966

Officers

President . . . . . ROBERT W. DENNISTON, WØNWX
Box 73, Newton, Iowa 50208

First Vice-President . . . . WAYLAND M. GROVES, W5NW
1406 West 12th Street, Odessa, Texas 79760

Vice-Presidents . . . . . CHARLES G. COMPTON, WØBUO
GILBERT L. CROSSLEY, W3YA

Secretary . . . . . JOHN HUNTOON, W1LVQ

Treasurer . . . . . DAVID H. HOUGHTON
225 Main St., Newington, Connecticut 06111

• • • • •

Honorary Vice-President . . . . . FRANCIS E. HANDY, W1BDI

• • • • •

General Manager . . . . . JOHN HUNTOON, W1LVQ
Communications Manager . . . . . GEORGE HART, W1NJM
Technical Director . . . . . GEORGE GRAMMER, W1DF
Assistant General Manager . RICHARD L. BALDWIN, W1IKE
Assistant Secretaries . . . . . PERRY F. WILLIAMS, W1UED
WILLIAM SMITH, W1DVE WILLIAM I. DUNKERLEY, JR, WA2INB
225 Main St., Newington, Connecticut 06111

• • • • •

General Counsel . . . . . ROBERT M. BOOTH, JR., W3PS
1100 Vermont Avenue, N. W., Washington, D. C. 20005

Associate Counsel . . . . . ARTHUR K. MEEN, Q.C., VE3RY
Suite 2212, 44 King St. West, Toronto 1, Ont.

DIRECTORS

Canada

NOEL B. EATON VE3CJ
R.R. 3 Burlington, Ontario

Vice-Director: Colin C. Dumbrille VE2BK
116 Oak Ridge Drive, Baie d'Urfe, Quebec

Atlantic Division

GILBERT L. CROSSLEY W3YA
734 West Foster Avenue, State College, Pa. 16801

Vice-Director: Jesse Bieberman W3KT
RD 1 Valley Hill Road, Malvern, Pa. 19355

Central Division

PHILLIP E. HALLER W9HPG
6000 S. Tripp Ave., Chicago, Ill. 60629

Vice-Director: Edmond A. Metzger W9PRN
1520 South Fourth St., Springfield, Illinois 62703

Dakota Division

CHARLES G. COMPTON . . . . . WØBUO
1011 Fairmount Ave., St. Paul, Minn. 55105

Vice-Director:

Delta Division

PHILIP P. SPENCER W5LDH/W5LXX
29 Snipe St., Lake Vista, New Orleans, La. 70124

Vice-Director: Max Arnold W4WHN
612 Hogan Road, Nashville, Tenn. 37220

Great Lakes Division

DANA E. CARTWRIGHT W8UPB
2979 Observatory Ave., Cincinnati, Ohio 45208

Vice-Director: Charles C. Miller W8JSU
4872 Calvin Drive, Columbus, Ohio 43227

Hudson Division

HARRY J. DANNALS W2TUK
RFD 1, Arbor Lane, Dix Hills, Huntington, N.Y. 11743

Vice-Director: Stan Zak K2SJO
13 Jennifer Lane, Port Chester, New York 10573

Midwest Division

SUMNER H. FOSTER . . . . . WØGQ
2110 Goblin's Gully Dr., S.E., Cedar Rapids, Iowa 52403

Vice-Director:

New England Division

ROBERT YORK CHAPMAN W1QV
28 South Road, Groton, Conn. 06340

Vice-Director: Bigelow Green W1EAE
11 Laws Brook Rd., South Acton, Mass. 01771

Northwestern Division

ROBERT B. THURSTON W7PGY
7700 31st Ave., N.E., Seattle, Wash. 98115

Vice-Director: R. Rex Roberts W7CPY
837 Park Hill Drive, Billings, Mont. 59102

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose, Calif. 95126

Vice-Director: Ronald G. Martin W6ZF
1573 Baywood Lane, Napa, Calif. 94558

Roanoke Division

VICTOR C. CLARK W4KFC
12927 Popes Head Road, Clifton, Va. 22024

Vice-Director: L. PHIL WICKER W4ACY
4821 Hill Top Road, Greensboro, N.C. 27407

Rocky Mountain Division

CARL L. SMITH . . . . . WØBWJ
1070 Locust St., Denver, Colo. 80220

Vice-Director: John H. Sampson, Jr. W7OCX
3618 Mount Ogden Drive, Ogden, Utah 84403

Southeastern Division

CHARLES J. BOLVIN W4LVV
2210 S.W 27th Lane, Miami, Fla. 33133

Vice-Director: Albert L. Hamel K4SJH
220 N.E. 25th Street, Pompano Beach, Fla. 33064

Southwestern Division

JOHN R. GRIGGS W6KW
11422 Zelzah Ave., Granada Hills, Calif. 91344

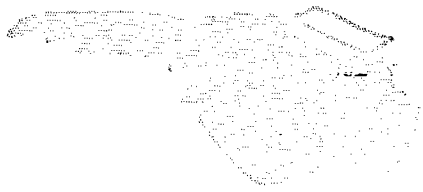
Vice Director: Thomas J. Cunningham W6PIF
1105 East Acadia St., El Segundo, Calif. 90245

West Gulf Division

ROEMER O. BEST W5QKF
P.O. Box 1656, Corpus Christi, Texas 78401

Vice-Director: Ray K. Bryan W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla. 73159

"It Seems to Us..."



"GEAR OVERSEAS"

In any program aimed at the preservation of amateur radio frequency allocations, it is essential to seek a favorable attitude on the part of governments participating in international allocations conferences. In most of the older, more stable countries, there is an established amateur organization, usually a member-society of the International Amateur Radio Union, which can accomplish a great deal toward the desired end. Through IARU channels, particularly the regional organizations, such programs have been under way for several years.

In many of the "new and developing" countries, however, particularly in Africa and Asia, there are few amateurs if any, and a weak organization — or none at all. A first step, therefore, is to develop amateur radio in countries where it does not now flourish. Although the objective is far more than mere shipping of equipment, the various programs in which League Hq. has been involved the past six or eight years have come to be tagged with the label "gear overseas."

Until recently, most of the efforts, unfortunately, proved to be false starts. One major problem inherent in the program is ensuring international liaison so that any equipment will reach the intended parties rather than end up in a government or commercial installation. We thought potential solutions would be available through such agencies as CARE, the Peace Corps, Rotary International, etc. Staff conferences were held with a number of such groups. But in every case discussions showed a roadblock of one sort or another. As one example, CARE felt obliged to limit itself to providing fundamental necessities (e.g., farm tools) and could not promote the comparative "luxury" of ham radio.

Another approach was tried by various groups of amateurs organizing on their own. Many of them are in industry, and enthusiastic about providing gear overseas. Programs were initiated but — perhaps for the same reasons as above — soon bogged down and eventually disintegrated.

Two years ago it was decided to tackle the objective head-on, and initiate some pilot projects directly from Hq. The first was in Liberia. Code-practice equipment (courtesy of a U. S. manufacturer) and supplies of League publications were provided in quantity; the Liberian Radio Amateur Association sponsored training classes, which so far have produced a dozen new Liberian amateurs and 20 more are predicted for the next year. Thus the EL amateur population will soon have been doubled!

A second project involves Nigeria where, with the help also of the Radio Society of Great Britain, training classes are now in process. In two additional African countries, individual U. S. hams have taken first steps toward similar activities with League support.

The program is now being expanded. Progress, we know, will be slow — not spectacular. The average African is handicapped through a lack of opportunity for technical education, and as a result sometimes possesses little desire for self-improvement on his own time. Working through local organized groups, however, appropriate people can be made interested in radio communications and both training literature and gear can be supplied to assist their progress.

The industry, we know, will be solidly behind any such effort. W6UF of Eimac, and the E. F. Johnson Co., without even waiting to be asked, have already supplied substantial funds and equipment to speed the effort to assist amateur radio overseas.

What can *you* do? Right now, your biggest support for this project comes from the fact that you are a member of the League. Later on, as we get to the point where we can shift over from supplying basic training materials to furnishing items of equipment for club stations, we may ask you for some material assistance. But there are some of you who could provide us some specialized help right now, and we would be anxious to hear from you. If you are one of those who travel extensively in Asia or Africa, or if you live in the vicinity of some of our larger universities, where there are numbers of foreign students, let us know. We'd like to have you work with us in spreading the word about the value of amateur radio and the ARRL program. QST

League Lines . . .

The year-end count of League membership shows a net loss of 345 Full Members out of the 81,000 in Canada and the U. S. As in 1965, the change was fractional -- 0.4%. Amateur license figures did ten times worse -- FCC totals show 10,000 fewer hams on their roster at the end of 1966. The number of newcomers is not keeping up with the dropouts, perhaps accentuated by those long-inactive who no longer wish to pay $4 for renewal of an unused ticket.

At mid-year the membership trend was down more than the half-percent final result. Thus "Hamquest", while not an overwhelming success, did help turn the trend. Our sincere thanks to all participants who worked so hard to bring hundreds of amateurs into both the League and local club folds.

Like expectant fathers we beam when a new Handbook makes its appearance -- the 1967 edition with its "shocking-red" cover is no exception. The Handbook should be in every ham shack, as the standard reference manual of theory and practice -- not the merely new and novel, which we reserve for QST, but the tried and true practical approaches to current amateur practice.

Out of curiosity, members of our Communications Department staff totaled up their logged QSOs during 1966. It came to 26,550 -- not bad for a group that is sometimes labeled inactive and out of touch.

Chases "Calendar of Annual Events" for 1967 lists Amateur Radio Week for June 18-24. It's the week culminating in ARRL Field Day, and another chance to promote amateur radio among the public. Is your club getting its share of local exposure? If not, ask Hq. for the manual "Getting Newspaper Publicity for Your Club and Amateur Radio." Yes, it covers radio/TV as well.

The annual ARRL Board of Directors meeting is scheduled for early May. It's not too soon to initiate club discussions of current amateur affairs and report them -- or individual views -- to your director. See page 8.

Some pretty strong language on abuse of the power limit appears in "Happenings," page 84 of this issue, over the signature of FCC's W4GF. It's a must reading for QRPers and high-power men alike.

Who gets the 1967 ARRL Technical Merit Award? Your nomination to your director or to Vice President Groves by April 15 may be the decisive one. Other info on page 86.

We haven't run any radio-control articles in QST recently because we sense a minimum of interest, a feeling strengthened by an almost complete lack of comment on earlier such items. Are we wrong? Drop Hq. a postcard if you'd like to see an occasional article treating this field.

Six-Meter Kilowatt with 4-400As or 4-125As

"Breadslicerless" Shorted-Turn Tuning

BY GERALD D. JONES,* K2AYM

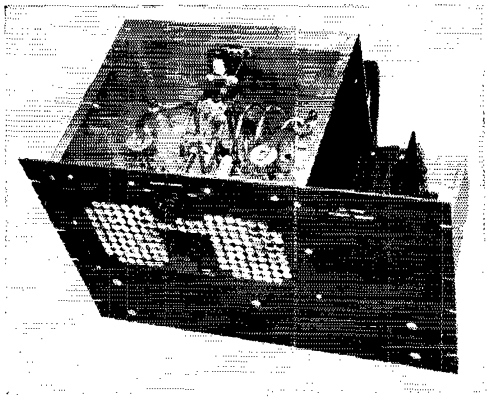


Fig. 1—The 50-Mc. "Breadslicerless Kilowatt" by K2AYM, with top cover removed. Air blown into the back of the chassis comes up around the tubes and out through front-panel holes.

If you're set on having the big voice on 6 from your area during the upcoming sunspot cycle, or if you just want the thrill of seeing your fellow ham-clubbers "lose their cool" when you casually mention your double-hop sporadic-*E* contacts across the continent, read on. A pair of 4-400As in this amplifier will put you in business for serious ground-wave or scatter-propagation work. A pair of 4-125As or 4-250As, while not as comfortable in their margin of reserve, still work well at one kilowatt input.[1] Designed for c.w. and high-level plate-modulated a.m. service, the amplifier features a few departures from commonly-used techniques, in the interest of efficiency, simplicity and low cost.

The grid and plate circuits are resonated with the input and output capacitances of the tubes, only. No variable or fixed capacitors are used. This eliminates the large, expensive and frequently troublesome plate-type tuning capacitor (breadslicer). There are several reasons for wanting to get rid of this item. Conventional variables have some questionable characteristics in v.h.f. transmitters. The ground paths from the rotor plates through the rotor shaft, the capacitor frame and the mounting legs, to the chassis, can be an unsuspected source of trouble. Multiple ground paths may accentuate harmonics, or form parasitic resonant circuits at higher frequencies, resulting in an unstable amplifier.

One way to eliminate these problems is to make a capacitor using two metal disks as plates. One is fixed and the other is mounted on a lead screw which passes through a grounded nut. Turning the lead screw changes the spacing between the plates. This type of capacitor has troubles of its own. Heavy r.f. current flowing through the lead screw and nut tends to burn and oxidize the threads, causing erratic tuning, and heating losses.

This design solves these problems by eliminating the variable capacitor entirely and substituting inductive tuning. A loop of brass or copper strip is mounted in the center of the plate tank coil so that it can be rotated from the front panel.[2] This rotating loop is magnetically coupled to the inductor and need be turned only 90 degrees. The loaded tuning range is just over 1 megacycle. By pruning the plate tank coil, any one-megacycle segment of the six-meter band can be chosen when the amplifier is put into operation. Inasmuch as most six-meter activity occurs between 50 and 51 Mc., the plate coil dimensions given are for tuning this range.

One point of great concern was whether the shorted turn would overheat when immersed in an r.f. field of such intensity. Somewhat to the author's surprise, it barely gets warm! After a half hour with the amplifier operating into a dummy load at one kilowatt input, the shorted turn and other components in the plate-circuit enclosure seem to be heated only to the environmental temperature contributed by the tubes. No hot spots have been found. Using 4-400As, an overload test running two kilowatts input (2000 volts at one ampere) showed everything in the amplifier to be running comfortably. The wattmeter in the dummy was off scale, beyond one kw. during this test, incidentally.

Because the output capacitance of a pair of 4-400As is somewhat more than that of a pair of 4-125As or 4-250As, the same plate tank coil cannot be used with all tube types. Specifications for 4-125As and 4-400As are given in the parts

* Linda Lane, Averill Park, New York.

[1] Maximum rating for a pair of 4-125As on a.m. phone is 760 watts input. They will stand up fairly well in amateur service at the full legal power limit. Since amateur users may get such tubes second-hand, at little or no cost, the risk of damage is usually taken in stride. This is a calculated risk, however, and the manufacturer should not be expected to make good on tubes that fail when operated in excess of the published ratings — *Editor*

[2] Shorted-turn tuning, though little used by amateurs, has been around a long time. An example for use on lower frequencies is shown in *The Radio Handbook*, 16th edition, p. 609. Publisher: Editors and Engineers, Ltd., Summerland, California.

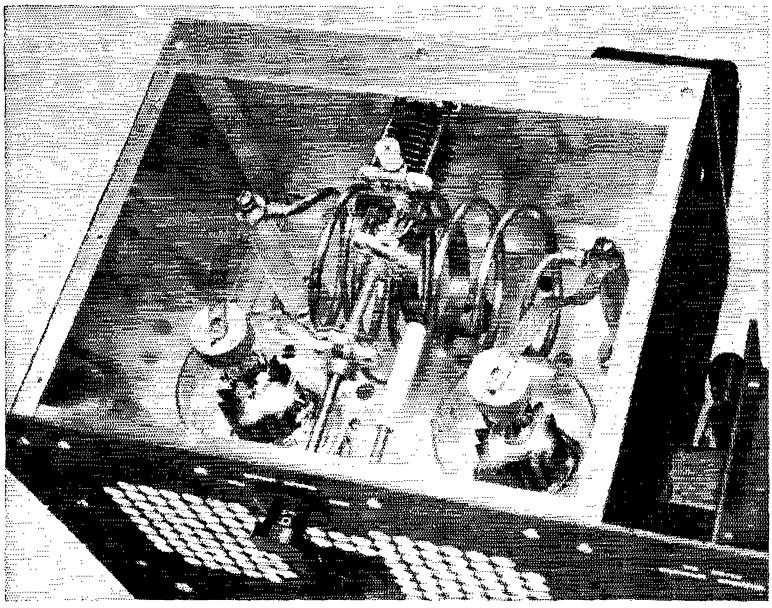


Fig. 2—That big coil for a 50-Mc. rig is made possible by the elimination of the variable capacitor normally used for tuning the plate circuit. Inductive tuning is done with the "shorted turn" visible at the midpoint of the tank coil. The variable capacitor at the top is for series-tuning the output link.

list. 4-250As have not been tried, but they are more like 4-400As than 125s.

The broadband grid circuit is adjusted when the amplifier is built and need not be tuned again unless the tuning range of the amplifier is changed or a different tube type is used. The same grid coil can be used with 4-125As as with 4-400As but it must be adjusted by changing the turn spacing a little.

The rest of the amplifier is more or less conventional. No bias supply is used, as operating bias of minus 220 volts is developed by drive. No screen supply is needed, as the screens are supplied through a dropping resistor. A 6BF5 tube clamps the screen voltage when drive is removed. In c.w. operation, the driver is keyed and the amplifier idles "on the clamp." With 4-400As, it idles between 225 and 300 m.a. plate current at 2000 volts on the plates. This idle current depends on the vigor of the particular 6BF5 and is below the allowable plate dissipation rating of the amplifier tubes. Running this fairly high idle current also improves effective power supply regulation. With 4-125As, the amplifier idles at a somewhat lower current.

Construction

The amplifier is built on a 4 by 10 by 17-inch steel chassis. Mount the 4-400A socket 6 inches apart center to center, and 3¼ inches from center to panel, with the grid pins facing each other. This spacing allows the grid coil to be mounted directly on the grid terminals. About 15 to 20 holes ⅜ inch in diameter must be drilled in the chassis to ease the back pressure on the blower. Without these holes, it was found that an adequate amount of air could not be moved through the tube sockets to cool the 4-400A envelopes and the plate circuit enclosure. Their location is not critical; anywhere that they don't interfere with the underchassis wiring is satisfactory. See Fig. 3.

A standard aluminum rack panel 12¼ inches high is used. Ventilation holes to let the air out of the plate circuit enclosure are ⅜ inch in diameter drilled on ½-inch centers and then countersunk slightly to deburr them. After the panel is mounted to the chassis, the plate-circuit enclosure is built. A commercial box this size, 12 by 10 by 7½ inches, could not be found, so it was built from aluminum sheet and angle. The ceramic standoff insulators which support the tank coil, L_3 are 4 inches high, made by National Co. They were from a piece of surplus equipment and exact duplicates might be difficult to find. Millen 31004 ceramic standoffs are similar but ½ inch shorter. Mount the standoffs 8½ inches apart and 2¾ inches from the rear of the enclosure. Teflon rod could possibly be used for the tank standoffs instead of ceramic, but do not use low-melting-point plastics anywhere inside the plate-circuit enclosure. Nylon fails in a spectacular way when subjected to the high r.f. field near the tank coil. Nylon screws were tried in a few places but they resembled lightning bugs when power was applied. They sort of glow and then just melt!

The shorted turn is made from a strip of copper bent in a circle, with the ends overlapped and soft soldered, making a ring 2½ inches in diameter. A 6-32 screw through the overlapped section mounts the turn on the ceramic standoff (Millen 31002). The ¼-inch brass tuning shaft is drilled and tapped for a 6-32 screw. The head of the latter cut off to mount the other end of the shorted turn and its insulator are supported by the shaft where it passes through the panel in a panel bushing ¾ inches long. If you can't find a suitable commercially-made bushing, try making one from an old potentiometer. Adjust the length of the tuning shaft to center the shorted turn in the tank coil. Don't worry too much about the

spacing between the coil and the tuning loop as there is very little tendency to arcing between them. (The shorted turn is not grounded and is located at the relatively cold center of L_3.)

The plate r.f. choke is a rather critical component and should be wound of Teflon-insulated No. 18 wire on a Teflon or porcelain rod. Possibly a bakelite or dry wooden dowel would do. The secret is to use an approximate quarter wavelength of wire, about 55 inches. The Teflon insulation on the wire serves to space the turns. If you can't find Teflon wire, use Formvar or enamel insulated wire, but wind two lengths simultaneously in bifilar fashion.[3] Then, after anchoring the ends of one of the wires in holes drilled through the form, carefully unwind the other wire. This leaves a neatly wound choke with turns spaced one wire diameter. Apply a liberal coat of coil cement.

The r.f. choke is mounted inside a piece of 1½-inch copper pipe under the chassis, below L_3, to get it out of the r.f. field. The pipe acts as a shield and adequately prevents unwanted coupling. Punch a 1⅛-inch hole or larger directly under the center of L_3. The lead from the r.f. choke to L_3 passes through this hole after the choke is mounted. Solder the 1½-inch pipe to the chassis, centered under this hole. Mount the choke inside the pipe by passing long screws through the pipe and the ends of the Teflon rod. Locate these screws well clear of the winding, and keep plenty of clearance around the choke itself and the lead to L_3. The combination of high voltage and high power r.f. is capable of jumping ¼ inch or more on modulation peaks! If your choke is of good electrical quality, you can leave out C_{12}. It is shown in the amplifier because it is good engineering practice to bypass that point, but was not used in the author's amplifier. One tried "talked" with modulation. No r.f. has been found on the B+ lead using a tuned "sniffer."

The output coupling link, L_4, should be No. 8 Teflon-insulated wire, but again, if you can't find No. 8 Teflon wire use another insulation, with care. One side of the link is grounded to the enclosure, so a fuse will blow or a circuit breaker will trip, in the event of an arc between the link and the tank coil. Connecting C_{11} in the hot lead requires the use of short ceramic standoff insulators to mount it, as both sides of the capacitor are hot to ground. The shaft to the panel must also be insulated with a good ceramic coupling. This is a little less convenient to build than if the capacitor were in the ground side of the link, but it eliminates the possibility of two thousand volts unexpectedly appearing on your transmission line and antenna or antenna tuner. A thing like that could ruin your whole day. *Or life!*

The grid coil, L_2, was wound using an Alka-Seltzer bottle as the form. Rough tuning to resonance is done with a grip-dip meter calibrated with a receiver, with the tubes in place.

The filament and screen bypass capacitors, C_2 through C_7, used in the amplifier shown in the photographs, are 1200-pf. 1-kv. ceramics by Herlec (Sprague). They originally had mounting studs, but these were hacksawed off in order to solder the body of the capacitor to the chassis in the interest of a nice low-inductance path to ground. As they were surplus, it may be impossible to find duplicates. Centralab type 858S-500 (500 pf.) or 858S-1000 (1000 pf.) would be good substitutes. A compromise would be to use the Centralab types on the four screen leads and use less expensive mica or button bypasses on the filaments and for C_1. The principle of series-resonating the screen bypasses may be in order.[4]

[3] For more on making r.f. chokes, see "R.F. Chokes for the V.H.F. Bands," *QST*, November 1963, p. 41, or *The Radio Amateur's V.H.F. Manual*, p. 311.

[4] Summer, "Series-Resonant Bypassing for V.H.F. Applications," *QST*, May 1963, p. 65, or *The Radio Amateur's V.H.F. Manual*, p. 309.

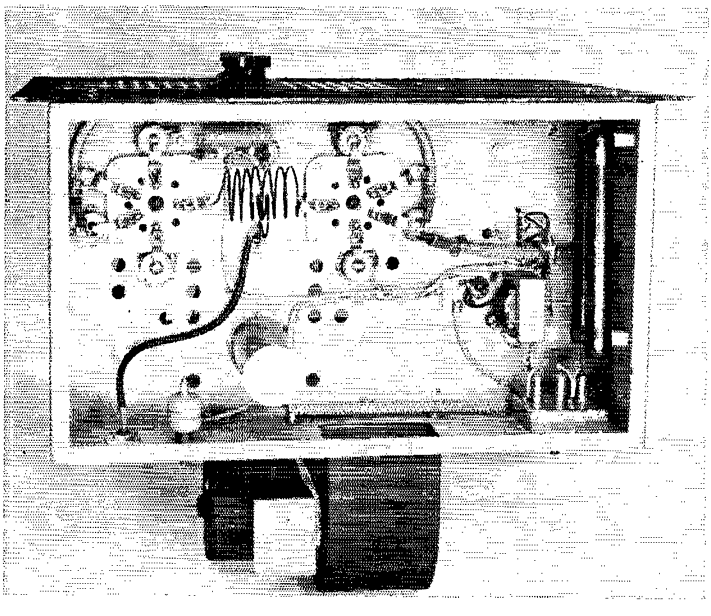


Fig. 3—Bottom view of the K2AYM amplifier. The grid coil, L_2, supported directly on the tube sockets, is resonated by the tube input capacitances only. Cylindrical object is the shielded r.f. choke in the final plate circuit.

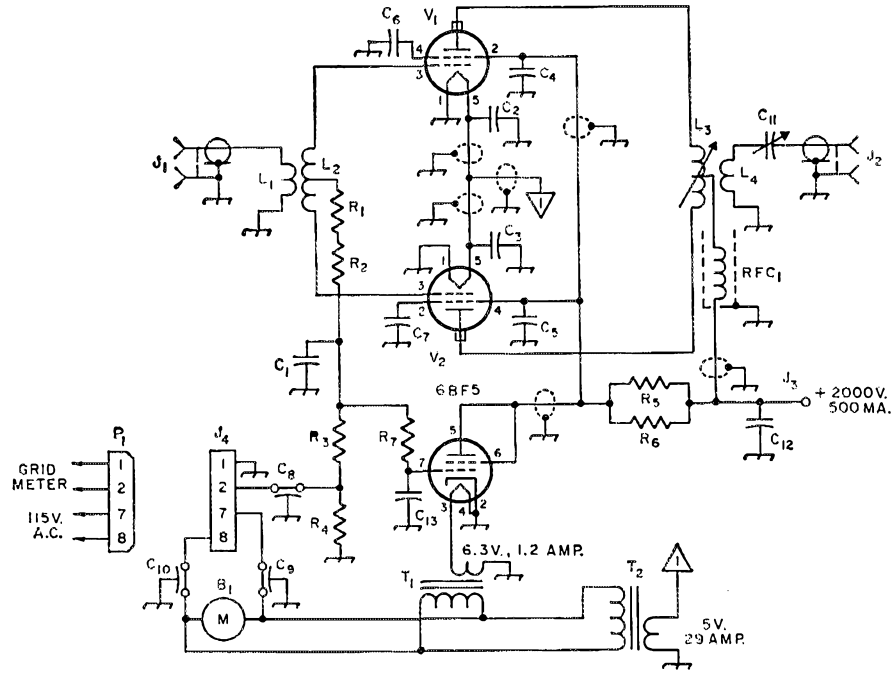


Fig. 4—Schematic diagram and parts information for the 50-Mc. kilowatt amplifier. Because most parts require some description, no attempt was made to put values on the diagram.

B_1—150-c.f.m. blower (Dayton 4C005).

C_1–C_7, incl.—4200-pf. 1000-volt cup ceramic (Sprague-Herlec; see text for mounting method and suggested substitutes).

C_8—0.047-μf. 100-volt feedthrough (Sprague 102P16).

C_9, C_{10}—0.01-μf. 400-volt feedthrough (Sprague 102P14).

C_{11}—50-pf., or larger variable, 0.062-inch spacing.

C_{12}—500-pf. 20-kv. TV "doorknob" capacitor.

C_{13}—0.001-μf. disk ceramic.

J_1, J_2—Coaxial chassis fitting.

J_3—High-voltage safety terminal (Millen 37001).

J_4—8-pin power fitting, male.

L_1—2 turns No. 14 enamel, 1½-inch diam., inserted between turns of L_2 at midpoint.

L_2—7 turns No. 14 enamel, 1½-inch diam., 2½-inches long, c.t.

L_3—4-400As: 6 turns ¼-inch copper tubing, 3⅛-inch i.d., 6 inches long. Make from 68-inch piece.
4-125As: Same, but 7 turns made from 78-inch piece.

L_4—1 turn No. 8, heavy Teflon or other heat-proof insulation. Make from 14½-inch piece.

P_1—8-pin cable plug, female.

R_1, R_2—470-ohm 2-watt carbon.

R_3—9000-ohm 25-watt.

R_4—220-ohm or 100-ohm 1-watt carbon.

R_5, R_6—75,000-ohm 100-watt.

R_7—100,000 ohms, ½ watt.

RFC_1—55 inches No. 18, 3000-volt Teflon insulation, close-wound on ¾-inch Teflon rod 3½ inches long. Shield is 1½-inch copper or brass pipe. 3¾ inches long.

T_1—6.3-volt 1.2-amp. transformer.

T_2—5-volt transformer, 29 amp or more.

V_1, V_2—4-125A, 4-250A or 4-400A. See text.

C_1, C_2, and C_3 can be any value from 500 to 5000 pf., with a voltage rating of 400 or more. The screen bypasses should be rated for at least 1000 volts. Another approach is possible using television high-voltage "doorknobs" liberated from junk TV chassis. This type (typical value 500 pf. at 20 kv.) could be mounted on its side, with a right-angle bracket to the chassis on one end and a ¼-inch wide strip of copper or brass from the other end to the tube pin connection. Try to mount the capacitors as close as possible to the point they are to bypass. Regardless of what type of capacitor you choose, use ¼-inch copper or brass strip for its leads.

The grid resistors, R_1 and R_2, must be of the noninductive type. Wire-wound resistors or an r.f. choke used here could turn this amplifier into a giant tuned-plate tuned-grid oscillator! R_3 may be of the wire-wound variety.

Filament wiring is done with RG8-U coax, with the vinyl jacket removed. All wiring under the chassis is done with shielded wire. The shields are tack-soldered to the chassis at intervals.

It is recommended that a shorted quarter-wave stub be put in parallel with the amplifier output. This is quite easy to make, and it offers good attenuation to even-order harmonics. It is cheap insurance against second-harmonic radiation in the f.m. broadcast band. Cut a 39-inch piece of RG-8/U (not poly-foam). Short the inner conductor to the shield at one end and solder. Mount the other end in a male coax fitting. Put a coax tee fitting on the output connector, screw the stub into the tee, and coil up the coax.

A bottom plate must be used on the chassis, not only to complete the r.f. shielding but to contain the air pressure from the blower. The air flows into the chassis, picking up the heat dissipated by the screen-dropping resistors, then up through the tube sockets and the holes in the chassis. Now in the plate-circuit enclosure, the air circulates around the tubes and plate circuit

components, and finally leaves through the holes in the panel.

Tuning and Operating

Final grid-circuit tuning is done with drive applied and filaments lighted. Do not apply plate voltage. Squeeze or stretch the turns of the grid coil, while watching for maximum grid current. Then adjust the coupling of the link, L_1, for minimum s.w.r. between the driver and the amplifier. Correct grid current is 22 milliamperes. When the grid circuit is properly adjusted, no more than about 20 watts is required to drive the amplifier properly.[5]

Since the law says that you must use the minimum power necessary to maintain satisfactory communications, it is assumed that some method of reducing plate voltage will be available in your high-voltage power supply. About 1000 volts is best for initial tune-up, and routine operation. Connect an antenna or dummy load to the output connector and set the link tuning capacitor, C_{11} to minimum capacitance. Apply drive and plate voltage. Rotate the shorted turn to find the dip in plate current. This control should "feel" very much the same as the plate tuning capacitor in a conventional amplifier. With the amplifier lightly loaded, the dip is sharp and deep, the plate current falling well below 100 ma. Increase C_{11} to increase the plate current, then re-dip the shorted turn. As the loading is increased, the tuning range of the shorted turn goes down. With the loading set at minimum, it is a little more than 2½ megacycles. With the loading set to the legal maximum of 500 ma. at 2 kv., the shorted turn will tune just a little more than one megacycle. It is possible to find the desired amount of loaded plate current on the *wrong* side of resonance of L_4 and C_{11}. When the amplifier is loaded incorrectly in this manner, you won't be able to find a dip with the shorted turn, so, always start loading from the minimum-capacitance end of C_{11}, When the amplifier is loaded correctly, increasing the capacity of C_{11} will increase the plate current at resonance. If you use an antenna tuner following the amplifier, adjust C_{11} to resonance as indicated by maximum plate current. Keeping the shorted turn dipped, adjust the loading in the antenna tuner to trim the amplifier plate current to the desired value.

You may find that your plate circuit does not tune exactly the frequency range that you want. Or worse, you may find that it doesn't dip at all. If this is the case, don't panic. Different enclosure dimensions or very slight differences in parts layout will require a little experimenting with the plate inductor, L_3. To make sure your coil is in the "ball park," calibrate your grid-dipper with your six-meter receiver and dip L_3. With the shorted turn positioned vertically, the coil is tuned to the high-frequency end of its range. With its horizontal or at right angles to the turns of L_3, it is at the low-frequency end of its range.

To move the tuning range higher in frequency, spread the outer turn at each end of L_3. To move lower, move the outer turns inward. Try to keep the middle turns relatively closer together and bunched around the shorted turn. If the entire coil is spaced uniformly, the tuning range of the shorted turn is reduced and the result can be confusing. If your check with the grid dipper shows the resonant frequency to be several megacycles away, and stretching or squeezing the turns is insufficient, then the coil will have to be pruned to bring it within range. Hopefully, your frequency will be low, in which case you can take a little at a time off each end of L_3 and recheck for the resonant frequency. If it is high, then either add some to each end or wind a new coil from a longer piece of tubing.

Check for any signs of instability with plate voltage applied and drive removed. The clamp tube will not throttle back an unstable amplifier. It "senses" the presence of r.f. voltage in the amplifier grid circuit and cannot tell the difference between desired six-meter drive and undesired r.f. on some parasitic frequency that the amplifier might tend to oscillate on. One similar amplifier built using different dimensions in its plate-circuit enclosure would occasionally break into parasitic oscillation when drive was removed, and plate current would soar to 900 ma. This tendency was suppressed by putting a choke in each plate lead. This consisted of a 3000-ohm 2-watt carbon resistor with 2½ turns of No. 18 wire ½-inch diameter wound around it and soldered at each end. The amplifier shown in the pictures is perfectly stable with and without drive, and no suppression is needed.

With the grid current set to 22 ma., and the amplifier loaded to 500 ma. at 2000 volts, check the screen circuit. Proper screen current is approximately 50 ma., at 400 volts.

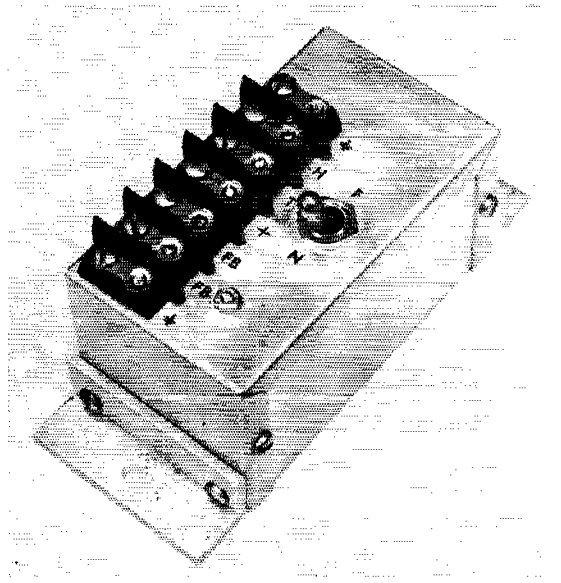
Neutralization is not needed, because this family of tubes is self-neutralized roughly in the 50-megacycle region. Neutralization was tried, with the undesirable effect that the broadband characteristics of the grid circuit were destroyed. Different layout, or changes in screen bypassing, could bring on a need for neutralization.

Linear operation is contemplated for sometime in the future, with s.s.b. It should be just a matter of changing to some form of regulated screen supply and adding an adjustable grid-bias supply. No changes should be necessary in the plate or grid circuits. After some experimentation, any additional information will be made available.

Two other amplifiers of similar design have been built, one of them with 4-125A's. Both are doing very well for their owners. Many thanks are due to W2JKI and K2CBA for their help with the "Breadslicerless Kilowatt." QST

[5] The driving power level is really important only in amplitude-modulated service. The amplifier can be run at any level of drive on c.w. or f.m., and fairly high efficiency is possible with 10 watts or less from the driver stage. If maximum efficiency in transferring drive from exciter to amplifier is important, it may help to insert a variable capacitor between L_1 and ground. Adjust it, and the position of L_1 with respect to L_2, and the turn spacing L_3, for zero reflected power on a bridge connected in the line to J_1. Once the optimum value is found, a fixed capacitor may be substituted, and no further adjustment will be required.

A Mobile Equipment Protective Alarm



BY HERMAN LUKOFF,* W3HTF

SEVERAL years ago when my good friend W3IHRW insisted that I borrow his KWM-2 for my vacation trip to W4-land, I was greatly tempted, especially with four junior op's back at the home QTH to worry about. The responsibilities associated with borrowing this expensive piece of gear at first deterred me from doing so. I distinctly remembered seeing an ever-increasing list of serial numbers of pilfered KWM-2s in issues of *QST*. Still, the thoughts of keeping in touch with home started to get stronger as departure time drew near. A check with the insurance company disclosed that my insurance covered only permanently mounted accessories to the auto. I could foresee a losing battle in trying to prove that the ten-second wing nut demountable transceiver was a permanent part of the car. The agent did inform me that $20 would buy the extra protection I needed for the two-week period. $20 sounded a little steep for the occasion, especially when it was equivalent to the cost of another day's vacation. Why not try a burglar alarm? This would provide all of the protection that I needed. Within two hours I had a unit designed, built, and operating. My trip to W4-land was a success with complete peace of mind relative to the borrowed KWM-2, and with regard to skeds back home.

Since then I have acquired my own transceiver and gone through several different designs for the burglar alarm system. They have all had the same objectives in mind.

1. The alarm shall work by creating enough of a rumpus by blowing the auto horn and creating enough public attention to scare the burglar off before he has succeeded in disconnecting the transceiver.
2. There shall be no modifications to the radio gear.
3. Standby battery drain shall be minimal.
4. It must be foolproof.

One of the simplest circuits used was a microswitch with an arm that detected the presence of the transceiver. If the transceiver was removed,

* 506 Dreshertown Road Fort Washington, Penna. 19034

Worried about the safety of that new mobile rig which hangs so majestically under your car's dashboard? Well, you have good reason to be concerned because thousands of dollars worth of mobile equipment is stolen from parked vehicles each year.

This article describes an easily-built alarm device that actuates the automobile's horn the moment your mobile rig is separated from the alarm system's sensing lead. This gadget should be a worthwhile addition to any mobile installation, especially if the equipment is to remain in the car on a permanent or semi-permanent basis.

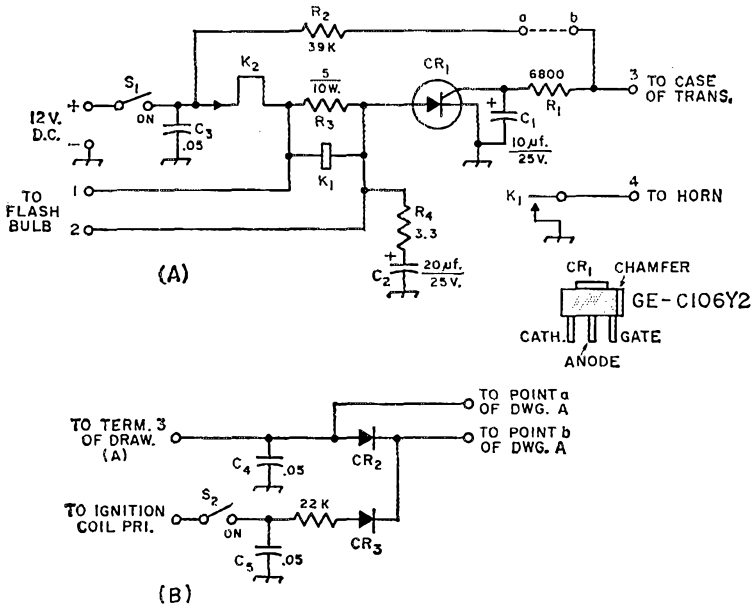


Fig. 1—Schematic of the alarm unit. Resistance is in ohms, K = 1000. Resistors are ½ watt composition unless otherwise noted. Decimal-value capacitors are in uf. and are paper. Capacitors with polarity marks are electrolytic. Resistors and capacitors are numbered for text reference. At A, the basic alarm unit. At B, an optional circuit addition (see text).

CR_1—Silicon controlled rectifier (GE-C106Y2).
CR_2, CR_3—1N34 diode.
K_1—12-volt horn relay, modified (see text).
K_2—12-volt turn-signal flasher (Tung Sol 536).
S_1, S_2—S.p.s.t. toggle.

the microswitch closed and operated a latching relay that energized the horn circuit. This simple version proved too unreliable because of vibration sensitivity and changes in switch operating point with each insertion and removal of the transceiver.

The circuit finally selected has no adjustments and is positive in action. The heart of the device is a silicon-controlled rectifier (SCR). The SCR is analogous to a thyratron gas tube. It remains cut off until a low-energy signal triggers it into the conduction mode. Then it latches into a very low impedance condition and remains there until the anode voltage is removed. The new low cost GE-C106Y2 plastic encased unit is used in this circuit. It is a gem of a device that can control up to two amperes of anode current with less than 200 microamperes gate-triggering current.

Circuit Description

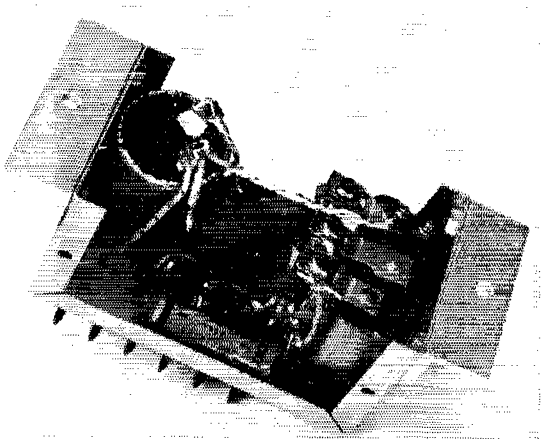
A sense lead from the gate of CR_1 (terminal 3) is connected to the frame of the grounded transceiver, Fig. 1 at A. With zero potential applied CR_1 is kept in the non-conductive state. If the sense lead is disconnected from the transceiver, a current determined by R_1 and R_2 is diverted into the SCR gate. A current of 200 μa. is adequate to guarantee firing of the SCR. Anode current flows through K_1, a replacement type horn relay, causing it to operate and provide a closed path from terminal 4 to ground. Terminal 4 is connected to operate the auto horn. Most auto horns operate by placing a ground on the horn or horn relay line. I spent fifteen minutes looking for the horn relay in my car before I finally realized that there wasn't one.

To provide a more startling effect, the horn is pulsed on and off by means of K_2 which is an auto turn-indicator flasher adopted for the purpose. K_2's contacts supply current to K_1 when its bimetallic element becomes sufficiently hot. Since it also interrupts current to its own heating element, K_1 will cool and re-establish the cycle again.

Another reason for having the horn pulse is that it is distinctive. If someone else's horn gets stuck in the middle of the night, you can readily tell that it is not your burglar alarm that has sounded. K_2 should be the type cited in the parts list. There are apparently two types of flashers used in the automotive industry: one having a built-in resistance, typically 18 ohms, that operates at low current levels; the other uses the thermostatic element itself as the resistance, typically less than 1 ohm. The latter type is less expensive, but operates at higher current levels, more than the circuit can safely tolerate.

The current when interrupted is not actually zero, but is a lower-than-zero value determined by:

$$I_L = \frac{12\ V.\ (Supply\ voltage) - V_{FM}\ (SCR\ anode\ Drop)}{18\left(\begin{matrix}flasher\ res.\\ ohms.\end{matrix}\right) + \left(\frac{5 \times K_1\ Resistance}{5 + K_1\ Resistance}\right)}$$



An inside view of the alarm unit. The headlight flasher, K_2 is at the upper left. The horn relay is at the right. The edge of the barrier-strip connector is visible at the lower edge of the picture.

with a V_{FM} of 1.5 volts and a K_1 resistance of 20 ohms $I_L = 0.48$ amperes which is greater than the 5 ma. needed to keep the SCR in the conductive state, but low enough for K_1 to drop out.

The shunt resistor R_3 performs the dual function of adding sufficient load so that the flasher will operate properly, and diverting current from K_1 to permit it to drop out when K_2 is in its high resistance state of 18 ohms.

R_1 and C_1 act as an r.f. filter on the gate lead to keep r.f. or ignition voltage pickup from firing the SCR. It is also effective in filtering the large transient that occurs when transceiver power is first applied. If the alarm still sounds every time transceiver power is turned on, this is a clear indication that a voltage is being developed between the transceiver frame and ground. A better ground on the transceiver frame is in order. C_2, C_3 and R_4 provide additional filtering, preventing noise pulses on the +12-volt line from triggering the SCR.

The SCR has a built-in memory, that is, once it is fired into conduction it stays in that state until the anode current is reduced to zero by removing the supply voltage.

The point of keeping the SCR fired is that in the event the burglar changes his mind about removing the transceiver, restitution of the sense lead to the transceiver will have no effect in turning off the alarm. The alarm can only be shut off, once it is triggered, by flicking the concealed on/off switch.

From the previous it is apparent that considerable thought should be given to the placement of the alarm. Conspicuous placement is not recommended; a location under the dash panel or in some inconspicuous spot under the hood (near the horn, voltage regulator or other object) is suggested.

The SCR is rated to perform up to a junction temperature of 110 degrees C (230 degrees F) so that placement under the hood should present no problem as long as the alarm is not mounted on the engine block. Placement of the sensing lead on the transceiver is important. It should be placed so that it would be one of the first wires disconnected. The probability of having the transceiver stolen is considerably higher if the sense lead is the last wire disconnected. The sense lead can be any size insulated wire and must independently connect to the cabinet frame. Several ways of connecting the sense lead are: under the head of a screw on the front or side panel, by means of an alligator clip to a protruding member, wing nut, or plugged into the ground terminal of the key jack. Any of these methods will provide a quick disconnect.

Construction

The horn relay, K_1, requires a modification before it can be used. As purchased, only three terminals of the four are brought out. One side of the relay coil is internally connected to a contact. The modification consists of isolating the coil lead and bringing it out of the case separately. A conventional 12-volt relay can be used if you wish to avoid the modification, but at three times the price. It is a good idea to select the Minibox size after the relay is purchased since it is the largest component and probably varies in size from one auto supply house to the next. As it is, the relay terminals have to be bent from a 90-degree angle to 180 degrees to prevent touching the top of the $4 \times 2\frac{1}{4} \times 2\frac{1}{4}$-inch Minibox which I used.

All components are mounted in the Minibox. The small components are mounted on a tie strip, including the SCR. Terminal connections for the SCR are shown at the inset in Fig. 1. The flasher, in its round can, presents a mounting problem. The method selected is not elegant, but suffices. As is evident in the photograph, the can was pried open and a small hole drilled in the top of the can. A 6-32 nut and bolt holds the can to the Minibox. After the nut is tightened, the thermostatic element can be put in place and the lip pressed back into shape. The seal is not hermetic so there is no need to worry about opening the flasher. The reader may think of a better way to mount the flasher.

Other details of construction are shown in the photographs. The designations for the switch and terminal strip are coded, for example, N for on and F for off to confuse the enemy should he discover the alarm — a minor point, to be sure, but provided at negligible effort. Aluminum angle stock is fastened to the ends of the minibox and is used to mount the unit to the car body.

Testing

To test the alarm, connect it to a 12-volt power source with terminal 3 grounded, S_1 OFF, and an ohmmeter connected between terminal 4 and ground. When S_1 is turned on, no indications should appear. Remove the ground from terminal 3. The ohmmeter should now indicate continuity at approximately a 1 sec. on — 1 sec. off rate in synchronism with audible clicks from the

horn relay. The alarm can now be connected to the horn circuit and transceiver for final checkout.

An Option

With the addition of a few more components as shown in Fig. 1B, another level of protection can be added — the whole automobile can be protected against theft. In the event there is unauthorized use of the automobile, another concealed switch S_2 (under the dash or in the glove compartment) will impress the voltage at the battery terminal of the ignition coil on the SCR and trigger the alarm. Diodes CR_2 and CR_3 permit a buffering of signals to take place such that the alarm will simultaneously monitor the transceiver and the automobile for theft. Bypass capacitors C_4 and C_5 are necessary to filter transient noises that can be detected and stretched by diodes CR_2 and CR_3 and cause false firing of the SCR.

S_2 must be placed in the on position when you leave your automobile and in the off position when you return. If you forget to turn S_2 off, you will soon be reminded of it when you start the car. It is interesting to note that the alarm will operate even if someone not having an ignition key attempts to bypass the ignition switch with a jumper wire.

Summary

This transceiver burglar alarm can be built very economically. The total cost of all components is under $7.00 and is a good buy for the protection it provides.

Earlier it was mentioned that the low standby current was a design goal. The total current drain in the alert condition is only 250 microamperes — an inconsequential load for an automotive storage battery. A 2.5-ampere battery charger can in one hour replace the charge consumed by the alarm in more than one year's use. For all practical purposes, you can forget about any drain on the battery.

Some of you may feel that publication of this article may invalidate the effectiveness of the burglar alarm system. Let me assure you that this is not the case. In a recent survey made among a group of transceiver thieves, it was disclosed that 99 per cent did *not* read *QST*, and therefore, would be caught completely by surprise by this alarm.

For those who prefer a flash of brilliance, provisions are made for flashbulb attachment. Terminals 1 and 2 supply power to the flashbulb. You can imagine the startling effect of a flashbulb going off, as well as a 120-db. horn blaring away. I doubt whether anyone would want to continue with unauthorized transceiver removal under these conditions, especially if he thinks his picture has been taken. The car owner does stand the slight risk of having his car torn apart by the thief while looking for the camera that isn't there.

I strongly recommend that the alarm be tested once every three months just to provide assurance that it is operational. Under the normal alert condition, the unit is silent and the SCR draws negligible current; therefore, there is no way of determining that the alarm is operational other than by testing it through removal of the sense lead.

One possible weak link in the system is the ease with which the horn may be disconnected because of the use of quick disconnect cable plugs on most modern automobiles. I suggest that these be securely taped together to thwart any quick disconnect action.

The alarm has now been in service for nearly a year and has provided reliable operation despite many miles of travel and demonstrations to friends. The chances are that the alarm will never be called upon to operate but the peace of mind I have achieved with leaving my car at the airport, train station or parking lot greatly exceeds the cost of my effort in developing the alarm. QST

Strays

Stolen Equipment

On December 18, the following equipment was stolen from my car: Clegg 66'er, Serial No. 2100-239, a mobile microphone with my call engraved on it, and 40 feet of RG58/U coaxial cable with connectors. A $50 reward is offered for the return of the equipment and information leading to the arrest of the thief. Andrew J. Feldman, WB2FXN, 1055 Ocean Parkway, Brooklyn, N. Y. 11230, Tel: 212 377 5895.

—•••—

The Long Beach (Calif.) Civil Defense reports the theft of the following equipment: Gonset Communicator IV, Model 3351CD, 1¼-meter band with Civil Defense kit and microphone, serial No. A-1437, Long Beach City Property No. 76-290. Gonsett Communicator IV, Model 3351CD, 1¼-meter band with Civil Defense kit and microphone, serial No. 905057, Long Beach City Property No. 76-292. Gonsett Communicator IV, Model 3342CD, 6-meter band with Civil, Defense kit and microphone, serial No. 400631, Long Beach City Property No. 76-289. Please refer any information to the Theft Detail, Department of Police, Long Beach, California 90801.

—•••—

The following equipment was stolen from the home of Edwin H. Buck, W4TXE, P.O. Box 4081, Sarasota, Florida 33578: Collins KWM-2, serial No. 11184, Collins 30L-1, serial No. 11191, and a Collins PM-2, serial No. 10452.

50-Mc. Transistor Transceiver, Mark II

Part II – Receiver Details and Packaging

BY EDWARD P. TILTON, WIHDQ*

In the previous issue our transceiver was described in a general way, and constructional and operating details of the transmitter portion were given. Now we follow with a similar treatment of the receiver, and information on controls, packaging and power sources.

There are several ways to handle reception in a v.h.f. portable rig. The simplest is a superregenerative detector operating at the signal frequency. This is capable of picking up any station that you're likely to work with a transmitter power under one watt, but it lacks selectivity and its audio quality is generally poor. Its characteristic high hiss level is annoying to many operators. The superheterodyne receiver has been costly and complex by comparison, but use of a pocket-size imported broadcast receiver for the i.f. system offers a practical low-cost way to better v.h.f. reception. We used this approach in our earlier portable,[1] still an attractive little box.

The very simple two-transistor converter in the 50-milliwatt transceiver was not as stable as we would have liked, and its multipurpose mixer-oscillator left it wide open to interference from signals on many other frequencies, so we looked for ways to improve performance without increasing cost or complexity too greatly. We built and tested four different receivers, finally using the simplest of them as a good compromise for the job at hand. This converter-receiver combination will not give the ultimate in weak-signal sensitivity. It still has some weaknesses as to response to unwanted signals. But it is stable, easy to build and adjust, and more than good enough for our needs. It uses only three transistors, though two working models preceding it had four, and the first attempt had five.

* V.H.F. Editor, *QST*.

[1] "Featherweight Portable Station for 50 Mc." Tilton, November, 1964, *QST*, p. 24. *The Radio Amateur's V.H.F Manual*, First Edition, p. 149.

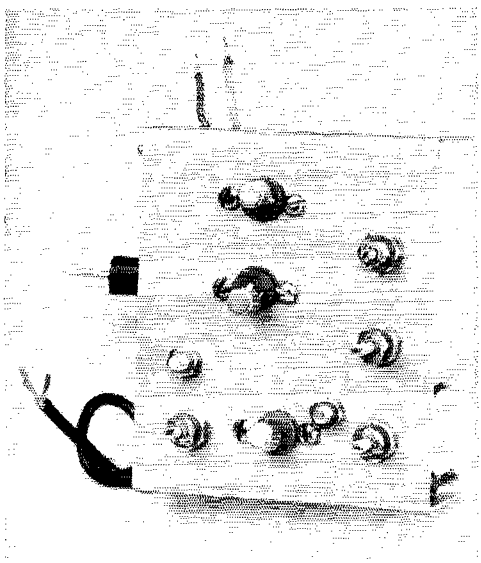


Fig. 6—Front view of the converter portion of the 50-Mc. transceiver. Core studs at the right side are for adjusting the r.f. amplifier collector circuit, the mixer base circuit, and the oscillator collector circuit. The r.f. stage input circuit is at the lower left.

Converter Circuit Features

The schematic diagram, Fig. 7, makes most circuit details self-evident. Most silicon v.h.f. transistors work well in these stages. The r.f. amplifier, Q_5 is a common-base stage. Its collector circuit is band-pass coupled to the mixer, Q_6. The mixer collector circuit is a few turns of wire wound over the built-in antenna (loopstick) of the broadcast receiver. The oscillator, Q_7, has one crystal (Y_2) wired to a selector switch, S_{2A}. The other side of the switch, S_{2B}, is connected to a crystal socket on the front panel, so that crystals may be plugged in for Y_3, to do any of several jobs. The crystal socket is omitted from Fig. 7 for simplification.

When crystal Y_2 is selected by S_2 the injection frequency is 49.5 Mc. Beating with incoming signals, this produces intermediate frequencies between 500 and 1500 kc. for a signal range of 50 to 51 Mc. The broadcast receiver may not go down to 500 kc. unless its oscillator padder is fudged a bit, but the lowest frequency usable for voice in this country, 50.1 Mc., comes in at 600 kc. If you don't care about tuning as high as 51.1 Mc. the crystal frequency for Y_2 can be modified to suit your desires.

Use of a crystal on 51.5 Mc. for Y_3 permits tuning of the first megacycle of the band in the reverse direction on the broadcast dial. The low end appears at 1500 kc. and 51 Mc. is at the 500-kc. end. This provides a quick solution to image problems that may crop up locally, since image rejection is much better at the 1500-kc. end of the receiver's tuning range. Mobile services around 48 Mc. ride through strongly as images when Y_2 is used, but disappear when Y_3 is switched in. A local MARS net just below the band edge takes over the receiver at W1HDQ

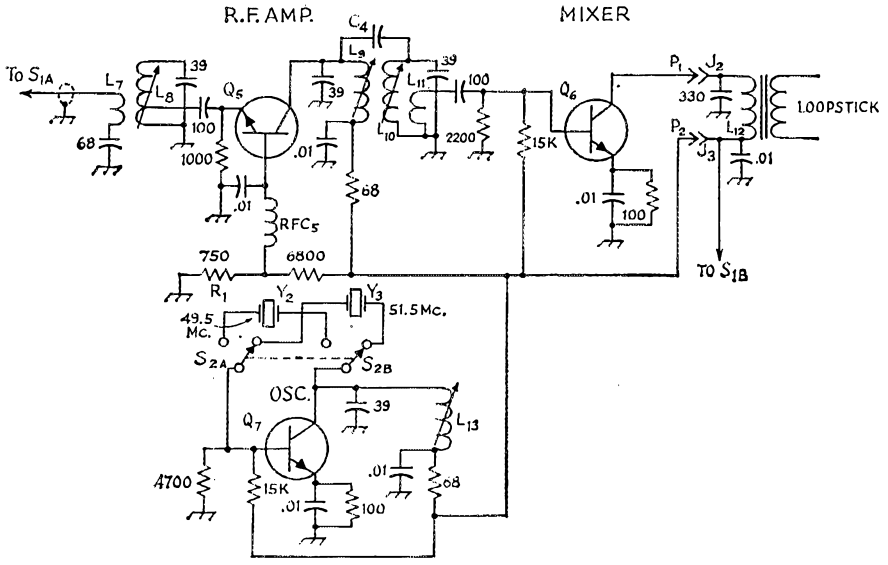


Fig. 7—Schematic diagram and parts information for the transistor converter. Decimal values of capacitors are in μf.; others in pf. All are mylar or dipped mica, 50-volt rating or more. Resistors are ¼-watt composition. Parts are numbered numerically following those of Part I.

C_4—Leads of insulated hookup wire twisted together 4 turns. See text.

J_2, J_3—Insulated tip jack (Johnson 105–800).

L_7—2 turns of the inner conductor of the lead to S_1, wound over bottom turns of L_8. See text and Fig. 8.

L_8, L_9, L_{10}, L_{13}—6 turns No. 24 enamel, on ¼-inch iron-slug ceramic form (Miller 4500, or 4501 coil with 3 turns removed.) L_8 is tapped at 2 turns from ground end. If made from prepared coil, unwind, clean insulation at tap point, solder on tap, and rewind. Space out turns on any coils if needed to obtain resonance within core range.

L_{11}—2 turns No. 24 enamel, wound over bottom turns of L_{10}.

L_{12}—About 8 turns No. 24 enamel, wound over turns of built-in loopstick of broadcast receiver. Position and number of turns not critical. 330-pf. capacitor also uncritical.

P_1, P_2—Insulated solderless tip plug (Johnson 105–300).

Q_5, Q_6, Q_7—Silicon v.h.f. transistor (RCA 40235 used; 40236 through 40240 also tried).

R_1—680 and 68-ohm ¼-watt in series. Check different values for optimum amplifier performance.

RFC_5—8.2-μh r.f. choke (Millen J300-8.2).

S_2—Two-pole two-position slide switch.

Y_2—Third-overtone crystal, 49.5 Mc. International Crystal Mfg. Co. Type FA-5 or FA-9.

Y_3—Same as Y_2, but 51.5 Mc., or as desired; see text.

when Y_2 is used, but gives no trouble with Y_3. On the other hand, Y_3 puts most of the band occupancy in the part of the dial where tuning rate is least favorable. Signals in the upper half of the band (if there are any) appear as images in the tuning range when Y_3 is used. So it boils down to using whichever crystal does the best job under conditions of the moment.

Plugging other crystals in for Y_3 provides coverage of any one-megacycle segment in or near the 50-Mc. band. For ranges other than 50 to 51 Mc. the r.f. circuits must be repeaked for optimum reception, but this is done readily enough by moving the core studs in L_8, L_9 and L_{10}. Repeaking these lower in frequency gives 48 to 49 Mc. with Y_2. Running them out and switching in Y_3 gives 52 to 53 Mc.

Receiver Construction

From Figs. 1 and 2 (Part I) it will be seen that the broadcast receiver is mounted on the front panel of the transceiver, with the back of its case removed and the speaker facing forward. No specific dimensions can be given as there is an almost unlimited variety of small receivers available. We recommend that one of the better types be used; a.v.c. action and audio quality are considerably better in most 8-transistor models than in the very cheap 6-transistor ones. The one used here is Radio Shack's 8-transistor job, priced around eight dollars.

All pocket sets we've seen use p.n.p. transistors, and so have opposite battery polarity to that required for the n.p.n. transistors in our transmitter and converter. This poses no real problem, as the receiver cases are plastic and there is no "ground" as such. We drilled holes near the four corners of the case for mounting. With some sets it may be necessary to install wire screening inside the speaker hole to prevent pickup of broadcast stations, but this was not needed with the receiver used here.

Making a vernier drive for the broadcast receiver dial turned out simpler than we had anticipated. A ¼-inch panel bearing (E. F. Johnson 115–255) is used with a drive shaft of ¼-inch tubing or rod. A small rubber grommet is slipped over the shaft in a position to bear against the edge of the small circular dial of the receiver. The mounting hole for the bearing can be filed

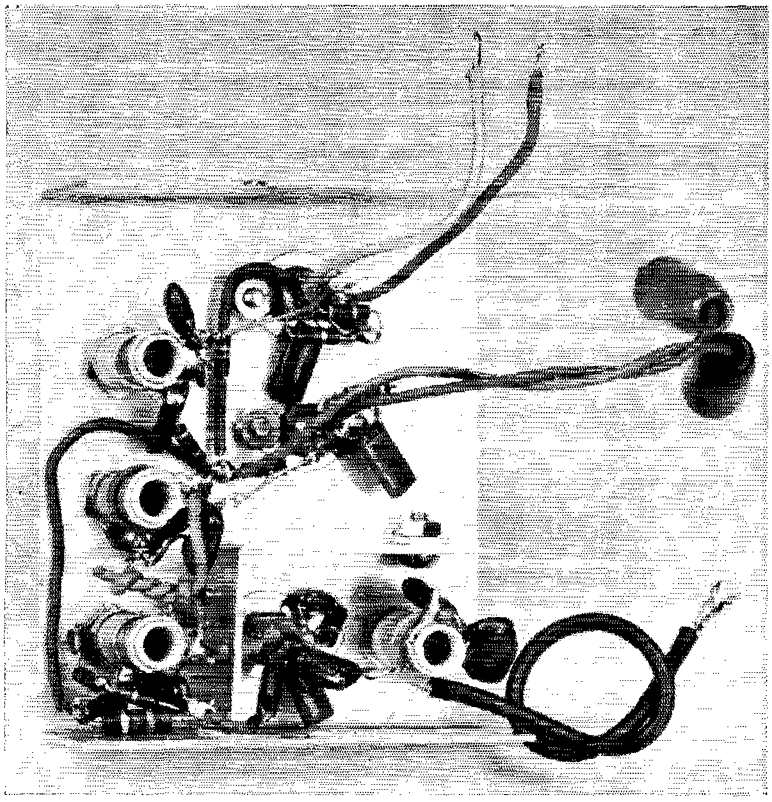


Fig. 8—Rear View of the 50-Mc. converter. The r.f. amplifier transistor socket and the input coil are isolated from the rest of the converter by an L-shaped shield, lower right. Leads at the top run to the crystal switch. Those with tips attached plug into jacks connected to the mixer collector winding on the loopstick. Coax at the lower right goes to S_{1A}.

slightly oval in shape, to permit adjusting the pressure of the grommet on the dial. You can select your own tuning rate by trying different sizes of grommets. We liked the smallest: one with a ⅛-inch center hole and intended for mounting in a ¼-inch hole. This has to be stretched some to get it on the ¼-inch shaft, but it holds firm and works fine. For a time we were worried that this two-bit vernier drive might not stand up very long, but the first grommet is still working, after literally hundreds of hours of band searching and experimental receiver work. And replacements are very inexpensive, in any case!

The converter chassis is a C-shaped piece of aluminum, cut to 2½ by 5 inches and then bent over one inch top and bottom. The physical layout is not particularly critical, except that the holes for the three coils (left side of Fig. 8) should be ¾ inch center to center. They are on a vertical line ⅜ inch in from the side of the plate, with L_9 ½ inch up from the bottom. Next above it is L_{10}, with the oscillator coil, L_{13}, at the top. The r.f. input coil, L_8, is ½ inch in from the other side, and the socket for Q_5 is centered approximately between L_8 and L_9. The sockets for Q_6 and Q_7 are along a vertical line 1⅛ inches over from that of the three coils. Q_6 is midway between the center lines of L_{10} and L_{13} (⅜ inch up from L_{10}), and Q_7 is the same distance above the level of L_{13}. The r.f. amplifier is isolated from the rest of the converter by means of an L-shaped shield mounted on spade lugs. The amplifier collector lead runs through this shield to L_9. The converter assembly is held on the bottom plate by two self-tapping screws.

The antenna coupling winding, L_7, is made from the inner conductor of the RG-174/U coax used for the lead to S_{1A}. Strip the braid back about two inches and leave the polyethylene intact except for about ⅛ inch at the end, for soldering to the series capacitor. Wrap the insulated conductor around the winding in the same direction as the bottom turns of L_8, and solder the braid and one side of the series capacitor to a ground lug under the coil mounting. Leave some surplus length in the coax, so that the converter can be removed with the connection to S_{1A} left intact for minor adjustments.

The common positive supply lead and the mixer collector lead are fitted with solderless tip plugs (E. F. Johnson 105-300) which fit into matching jacks (105-800), to permit easy disconnecting for converter removal. The jacks are soldered to a tie-point strip visible in Fig. 2, just adjacent to the top of the broadcast receiver. The oscillator base and collector leads running to S_{2A} and S_{2B} are made just long enough to reach the terminals of the switch, and must be unsoldered to remove the converter.

Packaging and Power

Presumably the components of the transceiver could be fitted into some standard-size case, but the metal work involved in making your own is not extensive. The front and back panels are 4¾ by 6 inches, with ⅜ inch folded over on all sides. Metal size before bending: 5½ by 6¾ inches. Sheets for the sides are cut 5½ by 9¾ inches, and bent up to 4¾ by 9. Top and bottom plates are 6 by 9 inches. Self-tapping screws hold the case together. Access holes for the transmitter and receiver adjustments, and holes for the microphone jack, transmitter crystal, and receiver audio gain control should be located according to the parts used. Jacks for metering in the negative lead, and for internal-external power selection (see Fig. 9) can be mounted wherever convenient on the rear wall.

The send-receive switch is a wafer type with horizontal lever action, though any small 3-position 2-pole r.f. switch will do. The crystal switch is an ordinary slide type. Antenna leads are small-size coax (RG-174/U) throughout.

The seven "D" cells are wired in series with strips of metal or stiff wire. They should be piled in 4-3 layers, wrapped with electrical tape to hold them in place, and then clamped in a wrap-around metal strip that is screwed to the bottom plate.

A variety of power sources may be used. The cells shown are inexpensive by the set, and stand up very well. Transistors have a very great advantage over tubes in overall efficiency, and even smaller batteries can be used if light weight is the primary consideration. Usually it isn't, and we may be more interested in uniform performance or economy. Mercury cells are more uniform and longer-lived than ordinary "D" cells, but because of the intermittent nature of the load and their recuperative powers the cheaper cells make a logical choice for most users. Another transistor "plus" is that, with no critical filament temperature to be maintained, the efficiency of the transceiver remains constant over a wide range of battery voltage. Output drops off with fading voltage, of course, but the quality of the signal holds up until the batteries are almost dead.

The transceiver may be run from a car battery by removing the jumper (P_3 and P_4, Fig. 9) and plugging P_7 into J_5. A cigarette lighter plug and cable to P_7 is handy for operation from a car battery. The car's electrical system must be negative-ground, which is the U. S. standard. Rechargable batteries intended for use with portable TV sets and other medium-drain devices are very nice for the transceiver power, where weight is not a major factor. The Centralab CRL-1200 Power Pack[2] will run the transceiver for days without recharging. In case you're worried about running 12 volts on a 9-volt transistor radio, it can be said that this has been tried with several different types with no apparent damage resulting. If you still want protection, it's a simple matter to install a 9-volt zener regulator on the receiver line. One more possibility for a power source is a simple 115-volt supply that delivers 9 or 10 volts d.c., at a maximum of 300 ma.

Adjustment and Use

Adjustment of the transmitter was described in Part I. Monitoring of the total drain can be done with a milliammeter plugged into J_6, Fig. 9. If the meter is removed a phono plug with its contacts shorted (P_6) is plugged into J_6. A pilot light connected to a phono plug offers a current check of sorts also. A 150-ma. lamp will light at normal brilliance, or slightly more. A 250-ma. lamp will be bright only on audio peaks. The lamp is only a rough check and should not be left connected in normal operating, as it wastes considerable power. It is handy to have one along with the rig, however, as it does tell you quickly whether or not the current drain is normal. A 150-ma. lamp is a must for a dummy load, used as described in Part I.

[2] A review of the various types of batteries suitable for use with transistor gear is in preparation for an early issue of *QST*.

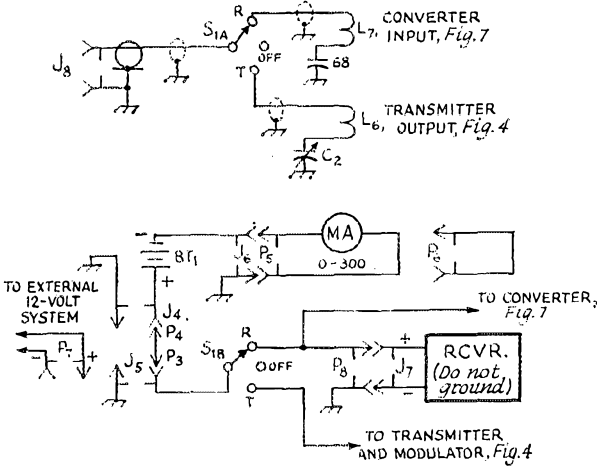


Fig. 9—Switching and power circuits for the transceiver.

BT_1—7 "D" cells in series.
J_4, J_5 J_6—Phono jack.
J_7—Polarized power plug on receiver battery lead (part of broadcast receiver.)
J_8—Coaxial socket, BNC type.
P_3, P_4, P_5, P_6, P_7—Phono plug.
P_8—Similar to J_7, but polarity reversed. Can be removed from top of 9-volt transistor radio battery.
S_1—2-pole 3-position wafer switch, miniature type.

The tuned circuits of the transmitter and converter are broad enough so that repeaking is not necessary in the course of normal use between 50 and 51 Mc., except for the retouching of C_1 in the transmitter. With the twisted-wire coupling capacitor, C_4, made as described, receiver response is nearly flat from 50 to 51 Mc. If there is a severe image problem the front-end selectivity can be improved at any one portion of the band about 300 to 500 kc. wide by omitting this capacitive coupling, and using only the inductive coupling arising from the ¾-inch spacing between L_9 and L_{10}. In some areas activity is concentrated below 50.4 Mc. or so, and the sharper response is no problem. It will improve the image rejection at the 500-kc. end of the broadcast set markedly, without an appreciable reduction in receiver gain or sensitivity, except in the upper part of the tuning range.

As with most transistor receiving devices, it is important to use a properly tuned and matched antenna system, if one is to avoid overloading problems from out-of-band signals. A well-matched 50-Mc. beam accomplishes this ordinarily, and something like our 50-Mc. portable job [3] is highly recommended. When a beam cannot be used, various "long wires" are effective, if properly tuned and matched to the transceiver input. Wire antennas and the little plastic-case antenna coupler visible in Fig. 1 were described in detail in November, 1964, *QST*, and in *The Radio Amateur's V.H.F. Manual*, so are not dealt with here. The transmitter and receiver inputs are set up for 50 ohms, so the coupler can be peaked for maximum received signal strength and it will be approximately tuned for transmitting.

Some sort of field-strength indicator is very helpful, and we carry the one described in the *V.H.F. Manual* [4] with the transceiver at all times. We swing the tuning capacitor in the coupler for maximum field-strength indication, and we're set up for best transmitting efficiency. Receiving will take care of itself, as it is always much better than needed. There is more than enough room in the upper right portion of the transceiver case for one of W1CER's Varimatchers,[5] which would eliminate all doubt as to proper tuning and matching. We will probably get to installing one eventually, for maximum antenna performance is a must with such low power.

Let no reader write the transceiver off as a toy. Its half a watt is only a few decibels down from the power levels of many stations that work out regularly and well on 6, and its receiver is considerably better than those in many inexpensive tube transceivers. Just be sure that you have a good antenna; don't expect to work the world with a random wire close to the ground in an average residential location. This may do for a mountaintop fire tower site, but even there a rotatable antenna with more gain is a big help.

The first transmission ever made with this rig was on the home beam at W1HDQ aimed southwest. It brought a reply from W8ZRY/2, Huntington, L. I., some 75 miles. He heard the signal first with his beam turned away from us, so we had some margin of readability left at this distance. In the September V.H.F. Party we toted the transceiver and 3-element portable beam up three miles of Vermont's Long Trail to the top of remote Stratton Mountain. Here we quickly worked stations up to 100 miles in all directions, from Mount Washington, N.H., to southern Connecticut, and as far west as Utica, N.Y.

Like its 50-milliwatt predecessor, the Mark II is giving the writer many hours of real operating pleasure. Almost without fail, people at the other end marvel at the readability and talk-power of the signal. We hear lots of stations we can't work and we probably always will, so long as we operate on power that can be back-packed up mountain trails, but the thrill of making solid contacts out to 100 miles or more with a little package like this never palls. We close with a plea to owners of kilowatts: Please — investigate some of those signals that are close to the noise, now and then. One of them might be W1HDQ/1, or some of the numerous clear-air enthusiasts who have bought my sales pitch. Remember, we're working under a 30-db. handicap — but you can hear us if you *try!* QST

[3] "Featherweight Portable Array for 50 Mc." Tilton, August, 1960, *QST*, p. 38. Improved version, January, 1966, p. 32, and *The Radio Amateur's V.H.F. Manual*, First Edition, p. 231.

The little box really works, as Bill Smith, KØCER-W1DVE, found out in using it in this mountain location. The site is Mt. Everett, in the Berkshires of Western Massachusetts. The antenna, not visible in the picture, was a 35-foot wire tied part way up on the fire tower.

[4] "Simple Field-Strength Indicator and Wavemeter," *The Radio Amateur's V.H.F. Manual*, First Edition, p. 281.

[5] "The Varimatcher," DeMaw, May, 1966, *QST*, p. 11.

• *Beginner and Novice*

A Wide-Range Absorption Wavemeter

Are You Putting Out On The Correct Band?

BY LEWIS G. McCOY,* W1ICP

THE home constructor, interested in building his own gear, finds that certain instruments make his job easier. One of these is the absorption-type wavemeter, particularly one with an indicator. With this instrument it is possible to make many useful checks on a piece of equipment. For example, the wavemeter will show whether an oscillator is oscillating, or if a doubler or tripler is performing correctly. It will indicate when a transmitter is tuned to the correct band, and it will show if a v.h.f. parasitic is present. Additionally, a wavemeter can be used as a field-strength meter to show when r.f. is being radiated from an antenna, and it can be used to make antenna adjustments.

When building a transmitter, or adjusting one, the wavemeter can be coupled to each stage and the effect of any adjustments can be observed on the indicator. The instrument can be used to check oscillators in a receiver to make sure they are functioning. The list could go on and on, but the reader can see that such an instrument is a very valuable tool. Just as important, an indicating wavemeter is simple to build.

* Beginner and Novice Editor.

Ever wonder how to find out when all the stages in a rig are working and multiplying correctly? Ever wonder how to make sure an antenna is radiating? When you don't make contacts, ever wonder why? Here is an extremely simple test instrument that is worth its weight in gold to any *ham.*

What It Is

Fig. 1 shows the circuit diagram of the wavemeter described in this article. The unit consists basically of a calibrated tunable circuit. When the combination of L_1 and C_1 is brought into a field of r.f. energy, a small amount of energy is absorbed by the wavemeter circuit, if the circuit is tuned to the frequency of the r.f. (if it isn't, very little energy is absorbed). This r.f. current is then rectified by CR_1 and the resulting d.c. is fed to M_1 to cause a visual indication.

Don't misunderstand: an absorption wavemeter is *not* a precision frequency meter, since it will not show the *exact* frequency of the r.f. energy. However, it is accurate enough to show the amateur band or general spectrum region of the r.f.

In our unit, plug-in coils are used for L_1. Six coils in all are required for a frequency range of 1.6 Mc. to 300 Mc. This takes in all of the amateur bands through 220 Mc., plus all frequencies in between. The Novice may not be aware of the fact that in many instances it is desirable to be able to check frequencies outside the amateur bands. Many Novices mistune transmitters to a frequency they think is in the 80-meter band

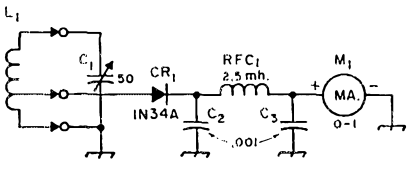


Fig. 1—Circuit diagram of the wavemeter.
C_1—50-pf. variable (Millen 20050).
C_2, C_3—0.001-μf. disk ceramic.
CR_1—1N34A germanium diode.
M_1—0-1 milliammeter.
L_1—See coil table.
RFC_1—2.5-mh. r.f. choke. (Millen 34000-2500)

but actually is twice the frequency, or slightly above the high end of 40 meters. And of course such radiation gets them into trouble with the FCC.

Also, v.h.f. men or Technicians use frequencies outside ham bands in multiplying a crystal frequency to the ultimate signal frequency. Oscillator or multiplier frequencies of 6, 8, 24, or 48 Mc. are commonly used, and the wavemeter covers these areas as well as the ham bands.

Construction Details

The wavemeter is built in a 2⅛ × 3 × 5¼-inch Minibox. Any enclosure of about the same size can be used. However, the area under the tuning knob for C_1 should be at least as large as the calibration chart shown in Fig. 2. C_1 should be mounted so that the rotor tab and stator support bar can be soldered directly to the coil socket terminals, using as short connections as possible. This is necessary in order to make the chart apply to your unit. The chart can be cut out and mounted under the shaft nut of C_1 Transparent plastic or celluloid can be used to protect the face of the chart.

The meter, M_1, is mounted at the other end of the box. In the unit shown a 0-1 milliameter is used. You can use a more sensitive meter if you happen to have one, but we found that the sensitivity of the one used was enough to give full-scale deflection when coupled to a transistor oscillator running very low power.

The Coils

Millen type 45004 four-prong coil forms are used for L_1. C_1 is a Millen type 20050.[1] If you want the calibrated chart to agree with your unit you will have to use the capacitor specified. Other types having the same capacitance can be used, but you will have to make your own calibration chart in that case. More about that in a moment.

The most difficult part of the construction is making the coil which covers 1.6 to 4 Mc. This coil requires 125 turns of No. 30 enamel or Nylclad wire, close spaced. As No. 30 is easy to break, care should be taken when winding the coil. We unwound about 25 feet from the roll of wire, clamped the roll in a small vise and, starting at the far end, slowly wound on the turns, keeping the wire taut enough for a smooth winding but not taut enough to cause stretching.

Dimensions are given in Fig. 1 and the coil table for the hole spacing in the coil-form side. The hole between *A* and *B*, or the center one, is for the coil tap. In winding the coils we started at the end closest to the coil-form pins, and when the tap point was reached, doubled the wire to a length of about four inches, fed it through the tap hole, and then continued the winding until completed. The finished coils can be given several coats of clear Acrylic spray to protect the windings.

The highest-frequency coil is merely a hairpin of wire, a total length of 2 inches formed so that the wires are ½ inch apart. The tap is 1½ inches from the ground end. Cut off ¾ inch of the form, measuring from the open end. This will permit you to get tighter coupling to an external circuit with this coil, and will make insertion of the hairpin into the coil form that much easier. After you've cut away the form, insert the hairpin and tap into their respective coil pins so that the ends of the hairpin protrude from the pin ends just enough for soldering.

[1] Millen components may be purchased directly from the James Millen Mfg. Co., Inc. (Attn: Wade Caywood), Malden, Mass.

Coil Table

Range	*A (inches)*	*B (inches)*	*Wire Size*[2]	*Turns*	*Tap*[3]
1.6–4 Mc.	⅜	⅞	No. 30	125	32 turns
3.2–7.4 Mc.	⅛	¼	No. 30	35	11
6–14 Mc.	⅜	¾	No. 20	27	8
12–29 Mc.	⅛	¼	No. 20	10	3
30–90 Mc.	4 turns of No. 20, turns spaced to cover 1 inch; tap is 1½ turns from ground end.				
95–300 Mc.	Hairpin of No. 14 tinned wire, ½ inch spacing, 2 inches long including coil pins, tapped 1½ inch from ground end.				

[2] All wire is enameled or Nyclad, close-wound.
[3] All taps counted from ground end.

Doing Your Own Calibrating

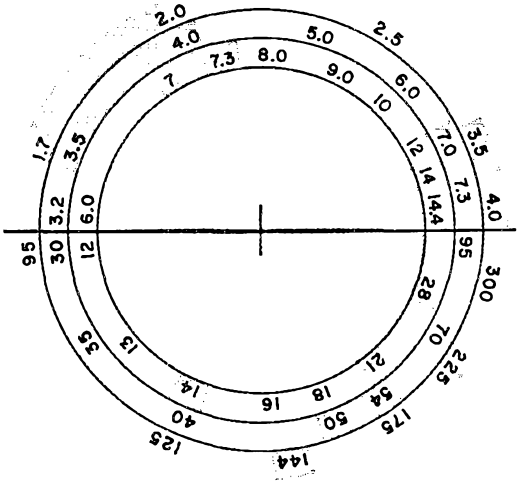
In the event you use a different coil or capacitor you will need to make your own scale calibration. The easiest way to do this is to use a grid-dip meter, if you have one or can borrow one. To calibrate, plug the lowest-frequency coil into the wavemeter and one of similar range into the grid-dip meter, and then couple the two together by putting the coils of the two units close to each other. When you swing either the wavemeter capacitor or the grid-dip meter tuning through its range, at one point you will get a reading on the wavemeter. Move the two instruments far enough apart to get the sharpest tuning with C_1, note the grid-dip frequency reading, and mark that frequency on the wavemeter scale. Do this through the various frequency ranges and you'll have your wavemeter calibrated.

You can also use your transmitter frequency if you know that it is accurate. However, this method gives you only a few check points, while the grid-dip meter method will provide all the points you need.

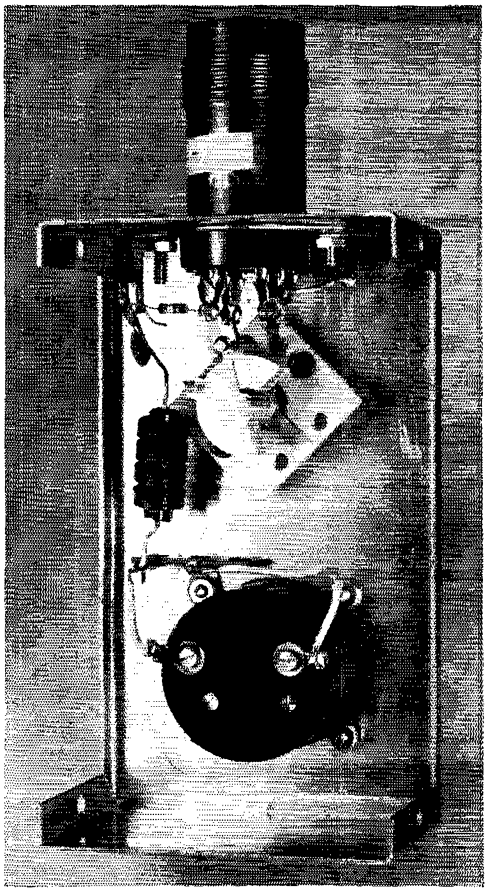
Using the Wavemeter

Bear in mind that the wavemeter can only be used for checking circuits in which r.f. energy is present, such as an oscillator, frequency multiplier or power amplifier actually in operation. The wavemeter will not give any indication around a circuit with the power off. In using it with a transmitter, always be careful to keep both the meter and your hands away from any wiring that could give you an electrical shock.

To check a circuit, plug in the wavemeter coil that covers the expected frequency, bring the coil near — within an inch or so — the circuit, and tune the capacitor for maximum meter reading.



Here is the calibrated chart that can be cut out and used for your wavemeter. However, because some amateurs don't like to mar their QSTs, we will provide a copy of the chart free. Address your request to ARRL Headquarters, 225 Main St., Newington, Conn. 06111. Be sure to include a stamped, self-addressed envelope.



This view shows the "innards" of the wavemeter. In order for the printed frequency chart to agree with your unit, C_1 must be mounted exactly as shown. Also, the coils must have the same number of turns specified in the coil table.

If necessary, change coils until you find one that *does* give a reading. Once you get a reading, back off as much as possible for the most accurate check. If you couple the wavemeter too tightly to a strong r.f. field the meter may read over a wide range of frequencies. You'll learn from experience how tightly to couple. In checking an antenna, you may have to use a pick-up antenna on the wavemeter to get a good reading. The pick-up antenna can be a short length of wire with a few turns wrapped around the wavemeter coil.

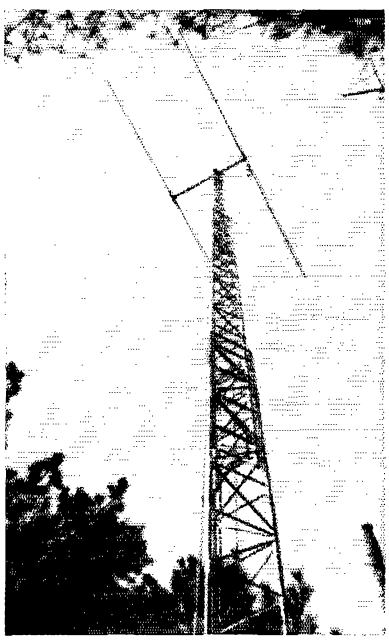
You can learn a good deal about your transmitter by plugging different coils in the wavemeter and checking circuits on frequencies where they aren't *supposed* to be operating, such as at harmonics or parasitic frequencies. It pays to check every circuit for v.h.f. parasitics, for example.

Once you've used a wavemeter around your station you'll wonder how you've ever got along without one. QST

It isn't the purpose of this article to give complete blueprints for a tower design. Rather, its objective is to spotlight some of the possible pitfalls at the same time that it offers encouragement for building your own, to your own requirements.

Ninety Feet for One Hundred Dollars

BY THOMAS J. BROOKS, JR.*, W5OSL



Looking up at the beam on top, with the tower fully extended. The lowest section is secured to the house, while the middle section is guyed at the top. The upper section is used without guys so the quad beam can be rotated without interference.

Pointers on Welded-Steel Telescoping Tower Construction

THROUGHOUT most of the twenty years I have been a licensed radio amateur, one of the things I have wanted has been a high tower that would support almost any type of rotary beam.

Most good towers are expensive. As a matter of fact, if one considers a unit having a height in excess of forty or fifty feet he is usually thinking in terms of hundreds or even thousands of dollars. I have never been able to convince the XYL (or myself either, for that matter) that this was a justifiable item to be included in the family budget. So, for many years I have been doing the best I could with trees, cypress poles, the sides of buildings, and anything else that would hold a wire or a beam off the ground.

Finally, a decision was made to construct a steel tower, and after a good many months of planning and working, the project was completed and is now in use. The following description is offered in the hope that it may be of interest to others with the same problem, who have access to welding equipment and are willing to spend some time using it.

Materials and Methods

The design finally selected consisted of three 30-foot triangular sections. The largest measures 20 inches on a side (Fig. 1). The middle or intermediate section is just small enough to telescope easily into the larger one, and measures 15¼ inches on each side. Finally, the top, or inside, section is 12 inches on a side and is just small enough to telescope inside the middle section. These tolerances could have been made a little closer with some increase in rigidity when fully extended, but only if all sections were *absolutely* straight.

In actual practice the size of the tower should be governed by the type and size of rotator to be employed, since the rotator usually will be mounted in the *smallest* section. The one used at this installation is a C-D Model AR-22, which is not large enough for heavy beams. I do not know the dimensions of the Ham-M rotator or other units in its category, but if it is larger than the AR-22 it would not go in this type of triangular tower measuring one foot on a side. It is therefore important to choose a rotator before any construction is begun, and to be certain that the smallest section of the tower will be big enough to accommodate it.

The tower described here was constructed of EMT steel tubing of three different sizes. This

* 750 Lenox Drive, Jackson, Mississippi 39211.

tubing is obtainable from any wholesale electrical supply house. The amount required will depend upon the height of the tower. I used 1-inch i.d. tubing for the corners of the top section and 1¼-inch i.d. tubing for the corners of the two lower sections. All cross braces and angle braces are made of ½-inch i.d. tubing. One-inch tubing was chosen for the top section in order to conserve on weight, but if a very heavy beam is to be mounted on it it would probably be advisable to use 1¼-inch tubing for all three sections.

The tower is cross-braced at two-foot intervals throughout the length of each section, commencing one foot from the end. Between each cross-brace there is an angular brace. These angles and cross braces combined provide an amazing amount of rigidity and stability, and under no circumstances should any of them be omitted. The rotator is mounted approximately five feet from the top of the inner section, and a ⅛-inch steel plate is welded over the top. This plate must have a hole in its center just large enough to allow the passage of whatever type of pole is to be used to support the boom of the antenna. I used a 2½ inch diameter length of aluminum tubing which happened to be available.

The tower is mounted on a specially-constructed base consisting of a solid block of concrete 3 feet deep and 3½ feet on each side. Into this block there are fixed three 2-foot lengths of 1½-inch steel angle, two of which serve as hinges for two of the legs of the tower. Each leg of the tower also has a length of steel angle welded to it to serve as the other half of the hinge. This allows the entire structure to be laid down on the ground, and makes it much easier to erect. When it is in the upright position a bolt is slipped through the third leg and its support, making the tower rigid. One of my engineering friends has examined this base and has told me that it is not nearly big enough or heavy enough to support the tower if it were standing free without guys. The moments of stress at the base are terrific in even a light breeze on a structure this tall, and he insists that to be safe the concrete base should be at least 6 to 8 feet deep and 6 to 8 feet on each side. I pass this information on for whatever it may be worth, but in this particular installation the tower was mounted so that it bears against the roof of the radio shack at a height approximately eight feet from the ground. Brackets were welded on the lower section at this height and six-inch lag bolts were screwed into the rafters. I am convinced that this provides adequate support, but only because of the added rigidity afforded by the roof fastenings.

Two winches make it possible to raise or lower either section independently of the other. The winches are welded to ⅜-inch steel plates which in turn are welded to the lower section about five feet above ground, one on each of two flat sides of the triangle. One pulley is mounted at the top of the lower section and another at the top of the middle section, for raising and lowering the middle and top sections, respectively. The pulleys should be selected and mounted with the greatest of care. Remember, they must support the combined weight of the beam, rotator, cables, feed lines and the tower itself, except for the lower section. If a pulley breaks or a cable snaps, everything comes down, *fast!*

The winches were purchased from a local sporting-goods store and are of the inexpensive type used on boat trailers. The ¼-inch steel aircraft cable used for raising and lowering the two sections was purchased from an army surplus store in one roll measuring 180 feet. This is more than enough for both winches. According to my calculations, the cable should be strong enough to support safely the weight it carries.

It would be easy to fashion a system of pulleys so that only one winch would be necessary, but this would leave the center section "floating"; conceivably, one might crank the top section entirely out without raising the center section, unless a system of stops was provided. Having used it for several months in its present design I can say that I am very glad to have the two winches because of the precise control they afford.

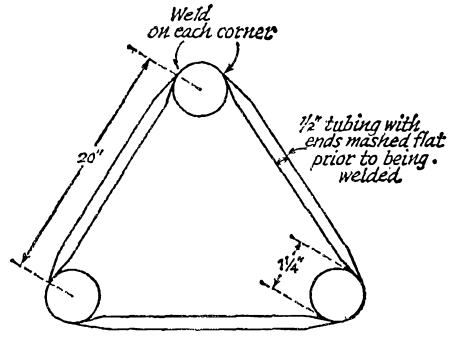
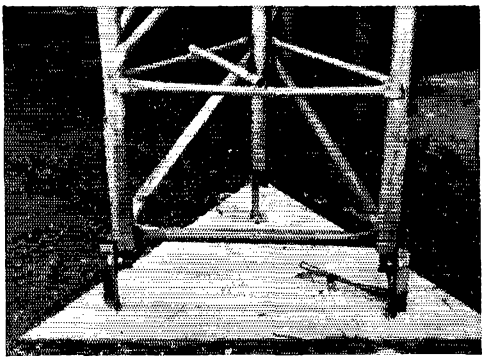


Fig. 1—Cross-sectional dimensions of the bottom section. The two upper sections are similar in cross section, but successively smaller so the three will telescope easily but not loosely.

Assembly

Construction of the tower should begin by straightening the steel tubing. It comes in 10-foot lengths, and if these are examined carefully upon delivery it will be seen that almost all of them are slightly curved. They can be straightened by any convenient means that will enable the builder to apply a controlled amount of force at the appropriate point.

I found it convenient to build one 10-foot section at a time and then to weld these end to end to complete a 30-foot length. All cross braces and angle braces were sawed to the proper length and their ends were mashed in a bench vise so that both surfaces could be welded simultaneously to the corner posts. For greatest strength, it is best not to mash the ends completely flat, but to stop just short of this point and then bring the edges together by pounding with a hammer on an anvil or other heavy



The triangular concrete base has L-section steel pieces set in for bolting to the bottom of the tower. Two of the bolts can be used as hinges for raising or lowering the tower when the three sections are telescoped together.

piece of steel. The cross braces are first welded to the corner tubes, one set at either end of the ten foot length, and then the whole thing should be carefully examined and trued up. Once this is done the remaining cross braces should be added. The 10-foot section should then be reexamined for any warping or twisting that might have developed as a result of the welding process, and if any is present this should again be corrected. Then the angle braces should be welded in place, care being taken to alternate the angles properly.

To weld a straight section it is imperative that some sort of jig be employed. This will require an absolutely flat table surface made of steel or something else that will not burn if a torch is accidentally aimed at it. The jig I used consisted of several blocks of wood cut to such a length as to provide proper spacing between the corner posts, and clamped in place with long screw clamps. The tubing being worked on was then clamped to the steel table so it could not warp when heat was applied during the welding process. The angle braces should be welded on in pairs on two sides of a section at a time. That is to say, it is *not* a good idea to put all the braces on one side, then all on a second side followed by all on the remaining side. In my experience this is sure to result in a warped structure.

Perhaps it should be pointed out again that the inside, or smallest section, of the tower should be made first. After this a single 10-foot section of the next larger size should be temporarily welded up using a minimum number of cross braces to hold it together, and this should be carefully slid over the inner section *to make sure that it is large enough, but not too large.* It would be a real tragedy to complete construction on an entire 30-foot section and discover that it was too small or too large!

Welding Tips

Perhaps a word should be said about the technique of welding to be employed. Oxyacetylene welding is, in my experience, easier to handle than electric welding. If a mistake is made it can be corrected by reheating and rewelding the joint. On the other hand, it is much slower than electric welding and will take a correspondingly greater amount of time. The real disadvantage of oxyacetylene welding, however, is that one must heat a fairly large area in order to make a good weld. This almost guarantees that the sections being worked on will be out of shape when completed, and *after the angle braces have been applied there is no way to straighten the tower.*

Electric welding is faster and does not require that a large area be heated. It is therefore much easier to keep the work in line, but electric welding requires a considerably greater amount of experience on the part of the operator. Only a person highly skilled in its use can keep from blowing holes in the tubing. It is a very distressing thing to make what looks like a beautiful weld and and then just before the arc is broken to see a gaping hole suddenly appear. I have never developed sufficient skill to be able to patch holes with the electric torch itself. In the long run, you may spend more time patching these holes with an oxyacetylene torch than you save

TABLE I

Materials Required for Construction of Tower

All tubing is galvanized EMT (Electric Metallic Tubing) obtainable from any electrical supply house.

Nominal Tubing Size (Inches)	*Actual Inside Diameter (Inches)*	*Weight in Lb. Per 100 Feet*	*Approx. Cost Per 100 Linear Feet*	*Amount Required (Linear Feet)*	*Total Weight In Lb.*	*Cost*
½	.622	30	$5.50	540	162	$29.70
1	1.049	68	12.00	90	61	10.80
1¼	1.380	94	17.00	180	169	30.60
					392*	$71.10**

* Does not include weight of beam and rotator, mast, cables, pulleys, winches, coax, guys, paint, etc.

** Cost of steel tubing only. Winches, pulleys, cables, guys, paint, welding supplies, etc., will add an additional $20.00 to $30.00, depending upon the types used.

by using the electric welder. Both welds are quite strong if correctly made.

Upon the completion of each of the 30-foot sections it is imperative that all the scale and rust that may have accumulated be removed and the tower painted. It is a laborious chore to rub off all the burned metal on each of the welded joints, and especially to remove the splatter produced by an electric weld, but if this is not done the tower will begin to rust in a very short time. A welder's wire brush is the best tool for this. After the tower has been thoroughly cleaned, one or two coats of exterior-type oil paint should be applied. I put on a heavy coat of exterior enamel over which I sprayed two coats of aluminum paint, being careful to try to get in all the cracks and crevices.

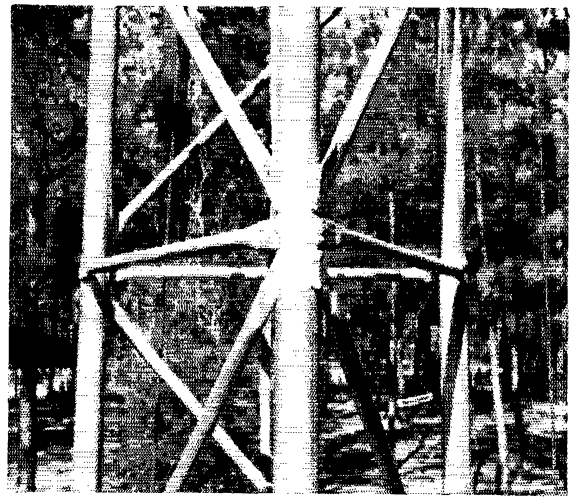
The tower supports a heavy tri-band diamond quad. On one occasion, before it was guyed, it was left at the 60-foot level and an unexpected storm with winds up to 40-plus miles per hour buffeted it without damage. More recently, the middle section has been raised to a height of approximately 55 feet and permanently guyed in this position. A cross brace was inserted under the base of this section to provide a solid support and permit relaxing the tension on the cable and winch. The top section can be raised and lowered at will and, so far, it has functioned quite well without additional guy wires. As a matter of fact, it is difficult to install guys on the top section if a quad antenna is used. Such an antenna extends for 8 to 10 feet below the top of the tower and as it is rotated it would be fouled by the guys. If a Yagi beam were employed this would not be a problem.

Caution: It is not recommended that this tower be climbed higher than the 30-foot level. When adjustments need to be made on the antenna, *lower the two top sections into the bottom one!*

Don'ts

This tower has been cranked up to a height of 76 feet, leaving an overlap of 6 or 7 feet between the ends of each of the sections. By using a 10-foot mast atop the rotator it is possible to mount an antenna so the boom is almost 90 feet above ground. This is a tall structure, and has to be regarded as a dangerous one. It weighs between 400 and 500 pounds, and towers of this magnitude can cause personal injury or death and extensive property damage if they should fall. Even the best of them can be brought down by a tornado, hurricane, or earthquake. The tornado that went through my home town not long ago completely wrecked the 1,600-foot tower of one of the local television stations. Keeping this in mind, several things should be avoided at all costs. The ones which seem to me to be the most important are the following:

1. Unless you are an experienced welder *don't* make this your first project. You may not know how to recognize a "cold" joint, and a few bad welds might be disastrous. I obtained a fair amount of experience by making a complete set of lawn furniture and various other household items. Repair work was also done on a trailer, a swing set, and numerous other things before beginning the tower. Even so, when it was finally finished and I examined some of the first joints I had made I was moved to redo them to provide increased strength.



Close-up of one corner post with cross braces and angle braces welded in place.

2. *Don't* construct this tower and attempt to climb it (even to the top of the lower section) without testing it in some way. When you have finished a 30-foot section you should be able to support it horizontally at the ends and jump on the middle portion without bending it noticeably. If you can twist it or damage it by your own weight or any leverage you can personally apply to it, there is almost surely something wrong. If there is any doubt as to its strength or rigidity ask a professional welder to pass on the job you have done.

3. *Don't* put this tower, or any tower, where it will be likely to kill someone or damage someone else's property if it should collapse, and be SURE you have adequate insurance coverage.

4. *Don't* undertake the construction of a project as ambitious as this without first checking the regulations governing the height of structures permitted in your area, and any other restrictions that might apply.

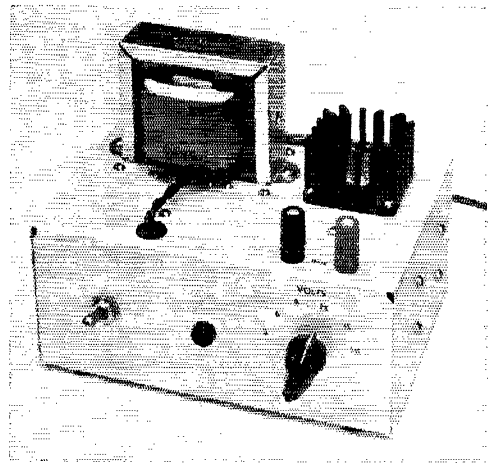
5. In the construction of the tower *don't* under any circumstances attempt to do your welding indoors, even in a "well-ventilated" room. This applies both to oxyacetylene welding and to electric welding. The tubing you will be using will be galvanized, and the material applied in the galvanizing process has a very high zinc content which is highly toxic when inhaled. *The welding should be done out-of-doors, or under a wide-open shed with no walls.* Even then, it is a good idea to have a fan blowing the fumes away from the work so they will not be inhaled. The galvanizing compound burns with a greyish-white color and a very pungent odor. Aside from the inhalation of zinc fumes, there

(Continued on page 154)

A Transistor-Battery Substitute

For those who do much experimenting with transistors, a regulated and well-filtered d.c. supply is a necessity, unless an inexpensive source of fresh batteries is available. Batteries are fine for portable work, but they aren't suitable for experiments where a constant voltage source is required for extended periods. The supply to be described here is a low-voltage dry-battery substitute; a switch is used to select one of six common battery voltages in the 3- to 18-volt range. Up to 1 ampere of d.c. is available at the output.

As shown in Fig. 1, the circuit of the battery substitute consists of a filament transformer and a full-wave bridge, followed by a capacitor-input filter and a transistorized series regulator. Zener diode CR_5 provides a more-or-less constant voltage reference for the regulator transistor, Q_1. C_2 filters out any ripple that might appear across CR_5. S_2 selects the appropriate Zener. Current through CR_5 is limited to a safe value by R_1. Originally R_2 was not in the circuit; however, Q_1 ran hot during periods of heavy current drain at low output voltages. R_3 provides a small bleeder load for the supply, and C_3 is an r.f. bypass.

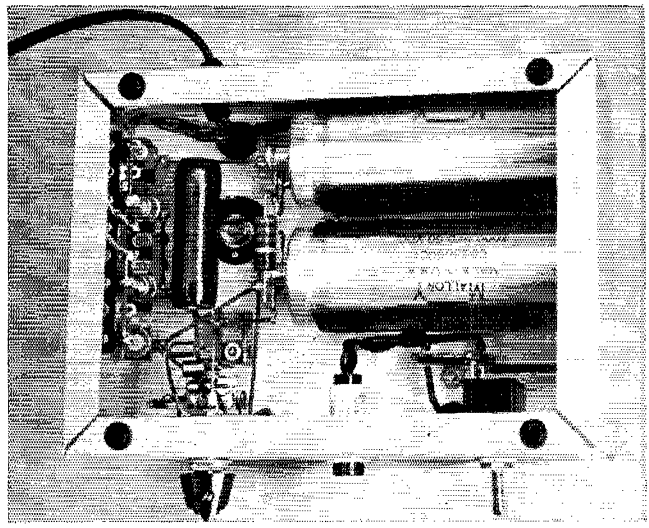


Top view of the transistor-battery substitute. Up to 1000 ma. of d.c. is available at 3, 6, 9, 12, 15 or 18 volts; the rotary switch, located just below the output binding posts, selects the desired potential. A heat sink for the regulator transistor is provided by a Wakefield type NC680-1.25B circuit board cooler. The transistor is insulated from the heat sink with a mica spacer furnished with the transistor.

Circuit Thoughts

The circuit described above was chosen over the continuously-adjustable type of supply because most transistor equipment operates at standard battery voltages; there is little call or need for other potentials. Although the supply was designed to provide outputs of 3, 6, 9, 12, 15 and 18 volts, Fig. 2 shows that these aren't precisely the values obtained. Fortunately, few battery-operated items are exacting in their voltage requirements.

The output of the supply is equal to the Zener voltage minus the emitter-to-base voltage drop in Q_1. Both the Zener voltage and the emitter-to-base voltage change with the load variations. The emitter-to-base voltage measures close to zero



Interior view of the transistor power supply. Three Richco type V-1011 plastic component clips are used to insulate each of the two electrolytic capacitors from the chassis. The four rectifier diodes are mounted between two 8-terminal tie points at the left side of the box. Since one pole of the rotary switch and the contacts associated with this pole aren't needed for switching, they are wired together and used as a common tie point for the Zener diodes. The lamp assembly at the bottom of the photograph is a push-in type requiring no mounting hardware.

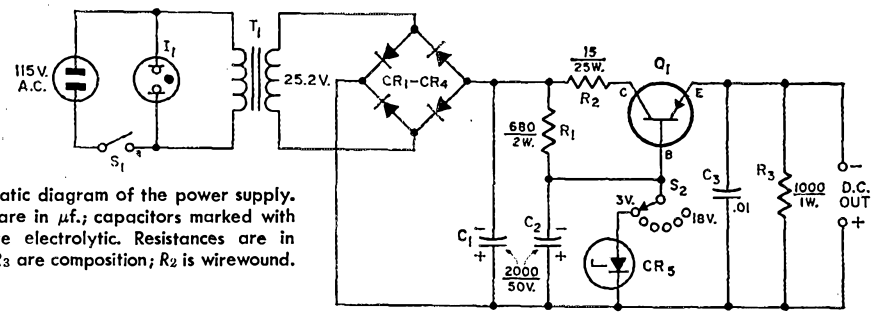


Fig. 1—Schematic diagram of the power supply. Capacitances are in μf.; capacitors marked with a polarity are electrolytic. Resistances are in ohms; R_1 and R_3 are composition; R_2 is wirewound.

C_1, C_2—2000-μf. 50 volts d.c. (Mallory CG23U5OC1).
C_3—0.01-μf. disk ceramic.
CR_1–CR_4, inc.—50 p.i.v. 3-amp silicon diode (Motorola 1N4719).
CR_5—Voltage regulator diodes; see text and Zener diode table.
I_1—Neon lamp assembly with built-in resistor (Leecraft 32-2111).
Q_1—2N1970.
S_1—S.p.s.t. toggle switch.
S_2—Phenolic rotary, 1 section, 2-pole (1 used), 6-position, shorting (Mallory 3126J).
T_1—Filament transformer, 25.2 volts, 2 amp. (Knight 54 A 4140).

with only a breeder load and rises to approximately 0.3 volt with a 1000-ma. load. An increase in load current lowers the unregulated d.c. input voltage which appears across CR_5 and R_1. Zener current is reduced, decreasing the voltage at which the diode regulates. How much the voltage drops depends upon the characteristics of the particular Zener employed.

A variation in characteristics was found to exist between different brands of diodes as well as between diodes with different voltage ratings, even though the diodes were manufactured by the same company. For example, the Zener voltage of a General Electric Z4XL9.1B dropped only 0.02 volt for a Zener current variation of 23 ma. whereas a Z4XL12B dropped 0.3 volt for approximately the same change in current. Although this might not be a fair comparison since the 12-volt Zener is working closer to its maximum ratings than the 9-volt Zener, nevertheless, under the operating conditions of the power supply, the 9-volt diode regulates better than its 12-volt brother.

If the supply is turned on and allowed to remain running for some time with no external load, the Zener voltage will rise, slightly increasing the output voltage. This increase will be greater for the 18-volt Zener than for the other diodes because the 18-volt Zener operates closer to its maximum ratings. From the power formula it can be seen that the 18-volt diode is able to handle only 1/6 as much current as the 3-volt diode, both Zeners having the same wattage rating. Since, in this supply, the Zener current for any output voltage drops by about 25 ma. when the load is increased from 0 to 1000 ma.,

Zener Diode Table

All units are 1 watt.

Approximate D.C. Output Voltage	*CR_5*
3	1N4729A (Motorola)
6	Z4XL6.2B (General Electric)
9	Z4XL9.1B (General Electric)
12	Z4XL12B (General Electric)
15	1ZF15T10 (International Rectifier)
18	Z4XL18B (General Electric)

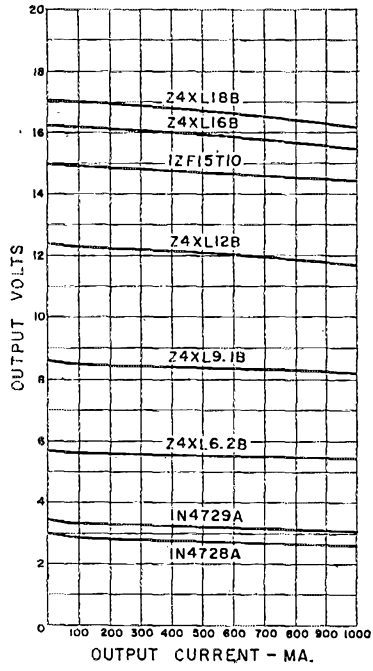


Fig. 2—Regulation of the supply for various Zener diodes. Although six Zeners were used in the supply, eight diode curves are shown as a matter of information. Note that, especially at the lower voltages, better regulation can be achieved by increasing the bleeder load.

the no-load Zener current of the 18-volt Zener must be at least 30 ma., to insure that the diode will always draw enough current to regulate the voltage. It's unwise to go much above 30 ma. for this particular Zener, as its maximum current rating is 43 ma. At this point, we must either accept a small change in output voltage due to diode heating or use 10-watt Zeners which are relatively expensive.

Many Zeners were tried in the battery substitute; Fig. 2 illustrates the regulation of the supply for eight of these diodes. The six Zeners used in the final circuit are listed in the Zener table. Regulation for a change in load current of 1 ampere is about 5 per cent in the 6- through 18-volt positions and 15 percent in the 3-volt position. The regulation is proportionally better for smaller current excursions. A change in line voltage of 20 volts caused the output to change about 3 percent at 3 volts and approximately 1 percent at the other output voltages.

Power-supply ripple at full load is insignificant, being only about 3 millivolts r.m.s. as measured with an oscilloscope. Negligible ripple is the result of the electronic filtering action of Q_1. The effective capacitance across the load is equal to the current gain of Q_1 multiplied by the capacitance of C_2. This amounts to an output capacitance somewhere in the vicinity of 40,000 μf. for the battery substitute.

As mentioned earlier, transistor heating is a problem at low output voltages. Although Q_1 has a maximum collector-dissipation rating of 150 watts, it's not possible to take advantage of this rating unless a very large heat sink is used. A small heat sink can be employed, provided other means are taken to limit collector dissipation to a safe value. For output potentials of 3 through 18 volts, two schemes are possible. Either an 18-volt filament transformer or a series resistor can be used. Since an 18-volt transformer isn't commonly available, we chose the resistor. With R_2 out of the circuit, and S_2 in the 3-volt position, Q_1 dissipates about 30 watts for a 1000-ma. load. By installing R_2 in the supply, the transistor dissipation is decreased to less than 15 watts. The heat sink used appears to be entirely adequate at this level.

Construction

The power supply was constructed on a 5 × 7 × 3-inch aluminum chassis as shown in the photographs. Originally the transistor was bolted directly to the heat sink, and the heat sink was insulated from the chassis with fiber washers. However, the transistor became overheated when supplying heavy loads at low output voltages. The problem was solved by mounting the heat sink directly to the chassis and insulating the transistor from the heat sink with the mica washer supplied with the transistor. Plastic component clips were employed to insulate the two large electrolytic capacitors from the chassis. Although the negative side of the circuit can be grounded to the chassis, it is advisable to isolate the circuit from the case so that the power supply may be used safely with equipment that requires a positive ground.

Modifications

Other output voltages in the 3- to 18-volt range can be obtained by substituting appropriate 1-watt Zeners for those listed in the Zener table or by using a switch with enough positions to accommodate the additional diodes. The chief stumbling block in the way of obtaining a precise output voltage at any desired current level is the high minimum-voltage tolerance of Zener diodes. At present, the tightest tolerance commonly available is ±5 percent. This means that a 10-volt Zener may be off by as much as ½ volt in either direction.

One-watt Zeners in the 18- to 24-volt range may be used if R_2 is reduced in value or removed from the circuit; however, a swing in load current from 0 to 1000 ma. will be impossible without either losing regulation or exceeding the ratings of the diodes. If only a small range of currents need be handled, the problem can be solved by increasing the value of R_1 and changing R_2 as mentioned above. Of course, if 10-watt Zeners are used, there won't be any difficulties.

— *W1YDS*

Hamfest Calendar

Delaware — The Kent County Amateur Radio Club will hold its Annual Auction on March 14, 1967 in the basement of the Kent County Court House, Dover, Delaware. For further information contact K3OCE.

Georgia — The Columbus Amateur Radio club will hold their annual Hamfest on April 1 and 2 at the Fine Arts Building located at the Fair grounds in Columbus, Ga. Free Bingo for the XYLs and harmonics, plenty of parking space. For information or reservations contact Hal DeVaughn, W4FIZ, 3804 Conrad Dr., Columbus, Ga. 31904.

Illinois — The annual auction of the Chicago Suburban Radio Association will be held on Wednesday, April 5 at National Hall, 3907 Prairie Ave., Brookfield, Ill. No admission, all interested in amateur radio are invited. For more information contact Bob Vik, K9PEN 3040 Forest Ave., Brookfield, Ill.

Wisconsin — The Ozaukee Radio Club, Inc., will hold its Hamfest in Belgium, Wisc., on April 1. More information from WA9DOT.

COMING A.R.R.L. CONVENTIONS

April 22-23, 1967 —New England Division, Swampscott, Massachusetts
May 27-28, 1967 — Dakota Division, Minneapolis, Minnesota
June 2-4, 1967 — Oregon State, Portland
June 30, July 1-2, 1967 — ARRL National, Montreal, Quebec
July 1-2, 1967 — West Virginia State, Jackson's Mill
July 7-8, 1967 — Central Division, Milwaukee, Wisconsin

A FOUR-BAND ROTATABLE DIPOLE

End Loading for Practicable Length on 7 Mc.

BY HAROLD A. ROGERS,* WA6QPD

With end loading, the rotatable dipole is a practical antenna, both as to size and feed impedance, on frequencies as low as 7 Mc. A further advantage is that it can be operated harmonically to cover four bands.

To most amateurs, the thought of building and erecting a rotatable dipole for 40 meters is frightening. A half-wave dipole for 40 meters is about 65 feet long, and finding the right aluminum tubing, designing the support, and hauling the whole thing to the top of a tower or mast would be a major undertaking. In most situations, the antenna would overhang a small city lot, and the average neighbor may take a dim view of the monster overshadowing his home. However, the advantages of a rotatable dipole make the effort worthwhile if the antenna could be of reasonable size, and even more attractive if the antenna would work on more than one band.

The antenna shown in the accompanying photographs and drawings is the result of about a year of experimenting, including the use of the same antenna as a vertical dipole. The antenna is end loaded by loading coils and capacitive hats,[1] and has an overall length of 34 feet. It is usable on 40 through 10 meters when fed with an open-wire resonant line. If fed with 72-ohm coax, the antenna can be used on 40 and 20 meters, with a low v.s.w.r. on both bands. It seems to be as efficient as a full-sized dipole, as far as signal reports and received signal strengths are concerned, although theoretically a shortened antenna cannot be as efficient as a full-sized dipole operated under the same conditions.

A point to consider in using an end-loaded antenna is that the capacitance displayed by the hats can be affected by surrounding objects. An end-loaded antenna should be tuned after it is installed in its operating position, or at least in a position that *simulates* the final operating position as far as the proximity and type of surrounding objects are concerned. If the location of your rotary dipole will cause one end of the dipole, as it is rotated, to move close to a large metallic object, such as a tower, you can expect a change in the resonant frequency when the antenna is in that position. However, the change should not be too severe unless the spacing is very close between the hat and a near object.

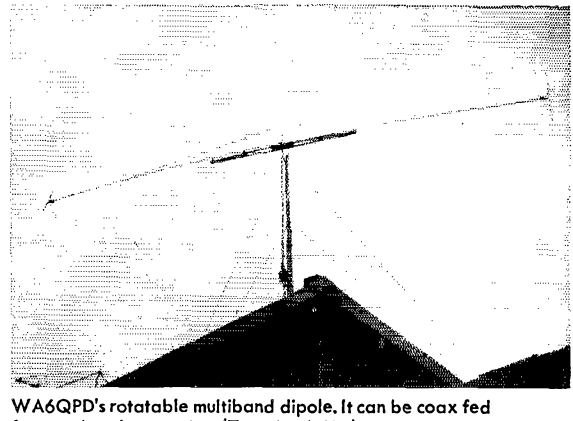
* 2606 Hill Park Drive, San Jose, Calif.

[1] See *The ARRL Antenna Book*, Chapter 2, for a description of this method of loading a shortened antenna.

Antenna Construction

The antenna consists of two lengths of aluminum tubing (the two halves of the dipole), two end sections that include the loading coils and capacitive hats, and a wooden mounting frame. Each piece of tubing is 16½ feet long, providing a radiator that is about a quarter wave on 40 meters, a half wave on 20 meters, three-quarters of a wave on 15 meters, and two half waves on 10 meters. When a resonant transmission line is used, the exact length of the elements is not critical. If a "flat" coax line is to be used on 40 and 20 meters, the elements must be adjusted to be resonant at the selected frequency in the 20-meter band.

The antenna shown in the photograph has elements made of ⅞-inch aluminum tubing, with ⅛-inch walls. The weight of these elements required a top, or umbrella-type, guy, but if the elements are made of telescoped sections of thin-wall tubing top guys should not be necessary. Almost any design would be suitable, but the tubing selected for the outermost parts of the elements should be at least ½ inch to ¾ inch in diameter, to simplify attaching the end sections.



WA6QPD's rotatable multiband dipole. It can be coax fed for two-band operation (7 and 14 Mc.) without special matching. With tuned feeders it will operate from 40 to 10 meters.

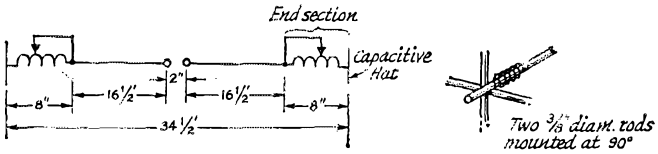


Fig. 1—Basic arrangement of the end-loaded four-band dipole.

The end sections require two four-inch lengths of the same size aluminum tubing used in the outermost parts of the antenna elements, and two eight-inch lengths of wood dowel or plastic rod of a diameter to fit snugly into the tubing. It may be necessary to sandpaper the dowel to size for a snug fit.

The locations of holes to be drilled in the tubing sections and the dowel are shown in Fig. 2. The only critical work involved is to be sure that the holes for the 10-32 bolts in the end sections of tubing, the dowels, and in the ends of the elements will be aligned when these parts are assembled. It may be desirable to assemble the parts temporarily, and drill mating holes through all parts in one operation.

After the holes are drilled, but before final assembly, the wood dowels should be boiled in paraffin or oil to reduce moisture absorption. Be careful during this operation, since it could be a fire hazard.

The wire clamps shown in Fig. 2 are used to obtain low-resistance connections to the elements, and to mount the loading coils without copper-to-aluminum junctions. The material may be pipe tape, used by plumbers and sold at most hardware stores, but any galvanized strap material would be suitable. The length of the wire clamps is not specified since this dimension will depend on the diameter of the element and the diameter of the coil stock.

The coils have an inductance of about 22 microhenrys each. Either 2- or 3-inch diameter coil stock may be used; both sizes have been used on experimental models. The coils now in use were cut from Air Dux No. 2406 stock material. The inductance value is not critical, but if a lower value is used, the capacitive-hat dimensions would have to be increased accordingly. An end-loaded antenna is more effective with large capacitive hats rather than large inductances. As presently in use, the loading coils are not protected from the weather, and there seems to be relatively little effect on v.s.w.r. when the coils are wet. However, ice may be another matter, and it would be desirable to enclose the coils in a plastic container if icing conditions are anticipated.

Assembly and Tune-up

The assembly of the antenna is shown in the drawings and the photograph of the cut-away

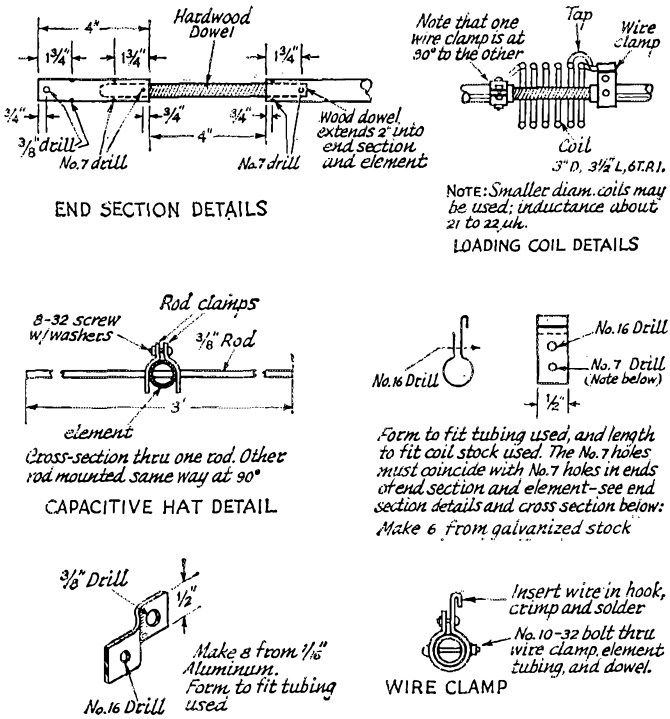


Fig. 2—Details of the end sections, loading-coil mountings, and capacitive hats. Tubing may be substituted for the solid rods in the capacitive hats, with some saving in weight. The wire clamps are used for mounting the loading coils and for connecting the feed line to the antenna.

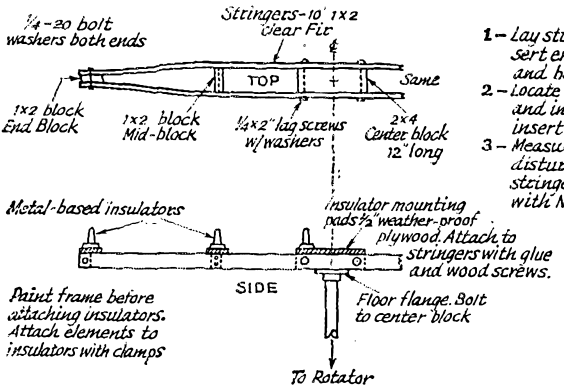


Fig. 3—Construction of the mounting frame. One side only is shown; the other side is similar. Wood should be straight grained and free from knots. All joints should be fastened with waterproof glue and wood screws.

model. There are no particular precautions, except to be sure that everything is properly secured. The wood selected for the frame should be straight grained and free from knots. The best grade of Douglas fir was used for the antenna shown in the photographs. When assembling the wood frame, use a good *waterproof* glue at all joints, and a good grade of outside house paint.

The antenna is attached to the drive shaft by a floor flange bolted to the center block of the frame. Use a large-diameter flange, with a reducer to fit the drive shaft (if water pipe is used), if necessary. The junctions of the flange, reducer, and drive shaft should be welded, or at least drilled and secured with a large cotter pin. Welding is the best method. If a top guy is necessary to reduce element droop, attach a flange to the top of the center block with lag screws, and use a 1½ or 2-foot length of pipe as a gin pole for the guys.

Ideally, the antenna should be tuned after it is in place on the tower or mast, but this is impossible in most cases. A practical method is to secure a step ladder to the peak of the roof, attach the antenna frame to the top of the ladder with lashings of rope or heavy cord, and tune the antenna in this position.

Tune-up requires a grid-dip oscillator and a one-turn link with a diameter to fit the g.d.o. coil. With the transmission line disconnected, connect the link across the center of the antenna and couple the oscillator to the link. Adjust the tap on each coil by the same amount, until the antenna is resonant at the desired frequency (a tune-up frequency of 7.15 Mc. is suggested for general coverage of the 40-meter band). When the right tap position is found, *solder* the tap to the coil. Clamp-type connections have a tendency to loosen because of antenna vibration. Tune-up may also be accomplished by using minimum transmitter power, and a v.s.w.r. bridge at the antenna. Adjust the antenna for minimum v.s.w.r.

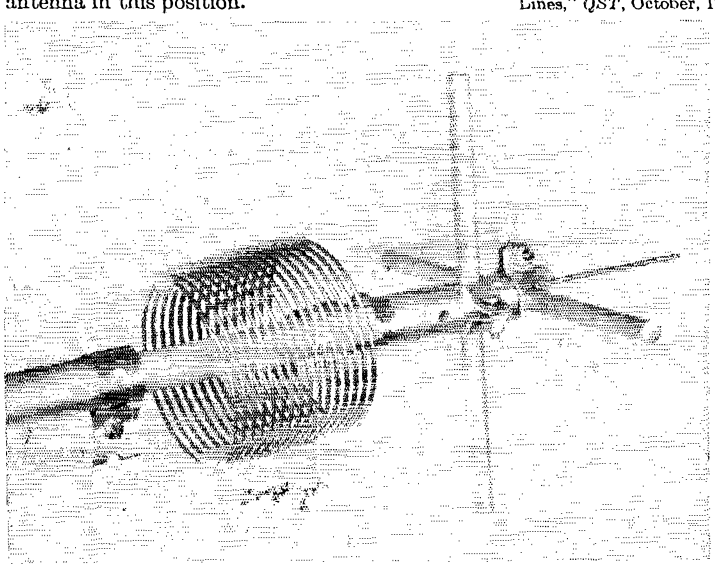
The photograph of the end section shows a sliding stub that can be added to facilitate tune-up. When approximate resonance has been obtained by adjusting the coil taps, exact resonance may be obtained by sliding the stubs out to lower the frequency, or by clipping some material from the stubs to raise the frequency. Each stub should be adjusted by the same amount, and a *small* adjustment has a considerable effect on the resonant frequency.

Feeding the Antenna

If the antenna is to be used on 40 through 10 meters, it should be fed with open-wire line. An impedance-matching network such as the transmatch shown in the October, 1966 *QST*[2], or one

(*Continued on page 152*)

[2] McCoy, "A Transmatch for Balanced and Unbalanced Lines," *QST*, October, 1966.



Construction of the end section, capacitive hat, and loading-coil mounting. (The loading coil and rods used in the hat are not full length in this mock-up.) The short length of aluminum wire extending from the end is an addition that can be used for final tuning of the dipole as described in the text.

With a little effort and a small outlay of cash the author has provided greater operating convenience when using his KWM-2 transceiver. The circuit changes enable him to tune a few kilocycles above and below the normal receiving frequency without disturbing the transmitting frequency. By using this technique as a guide line it should be possible to alter other transceivers in a similar manner.

Receiver Offset Tuning for the KWM-2

BY C. B. PHILLIPS,* WB6MGF

MANY transceivers lack the provision for receiver tuning without changing the transmitting frequency. This deficiency becomes particularly evident during group or net operations and is especially noticeable when operating c.w. The answer to the problem is to provide a means by which to deviate the received frequency from two to five kilocycles without changing the transmitter frequency. This article describes a simple and inexpensive way of doing it. The cabinet for the external controls also houses the VOX controls, putting them in a more convenient location than when they were on the rear of the KWM-2 chassis.

Circuit Changes

The revised frequency-determining circuit is shown in Fig. 1. The transmitting frequency is governed by C_3, L_{301}, L_{302}, and L_{303}. When relay K_1 switches C_3 out of the circuit during receive, C_1 and C_2 are connected to L_{301}, L_{302}, and L_{303}. This enables the operator to tune above and below the transmitter frequency by adjusting C_1 which is mounted in the accessory cabinet. When S_1 is set in the CAL position, K_1 is activated, placing C_3 in the circuit. By setting C_1 at midrange, and switching S_1 back and forth from CAL TO RCV, C_2 can be adjusted so that the received frequency is the same as that which is established by C_3. Once this is done, C_1 can be used to tune above or below the transmitter frequency (S_1 in the receive position) without disturbing the transmit frequency.

* 2280 Tokalon St., San Diego, Calif. 92110.

Construction

The construction consists of building the control panel, its case, and the L-shaped bracket that holds the new parts. Details are given in Fig. 2. The L bracket is bolted to the rear wall of the p.t.o. box after the components have been mounted and wired.

In preparing the p.t.o., the back plate must be removed and slid along the cable which protrudes from it. This is a little difficult to do, so take it easy. Next, cut C_{301} from the circuit, making sure that no other leads are snipped off. Solder a short length of insulated wire to the terminal post from which C_{301} was cut and feed it out through the nearest back-panel mounting screw hole.[1] This will prevent the need to drill a hole in the back panel of the p.t.o. The lead can then be connected to the movable arm of K_1.

If the constructor wishes to "remote" the VOX controls to the accessory box, as shown in the photo, the rear-apron VOX controls must be removed from the chassis. A plug-and-socket arrangement can be used by mounting these fittings in the holes formerly occupied by the

[1] On the model of the KWM-2 that we checked, it is not possible to route the wire through the mounting-bolt hole unless the hex nut is left off the p.t.o. back cover. Since this would result in a loose cover assembly, it might be better to drill a hole for the wire and secure the back cover in its normal manner. — *Editor.*

The remote tuning box for the receiver offset, and for the transplanted VOX controls, rests atop the KWM-2. Labeling was done with white decals. Cables from the control box attach at the rear of the transceiver. The case and panel for the outboard unit are homemade and can be built to any convenient size.

controls. The controls are mounted in the accessory box and attached to the KWM-2 by means of shielded cable. The anti-VOX, VOX gain, and VOX delay controls were transplanted in the author's modification. If this change isn't desired, the offset components can be housed in a much smaller cabinet. A short length of coax cable — the shorter the better — connects C_1 to J_1 by means of P_1.

Alignment

Alignment can be accomplished by allowing at least 30 minutes for the KWM-2 to warm up, then proceeding as follows: Set the dial to 15 Mc. (200 on the dial). Align the transmitting frequency by adjusting C_3 and L_{302}.

1) Set S_1 to the CAL position, with the KWM-2 in the receive mode.

2) Adjust C_3, then L_{302} if necessary, to zero beat with WWV.

3) Using the crystal calibrator, check the dial calibration at the 0 and 100 points. Juggle the settings of C_3 and L_{302} until perfect tracking occurs at the 100-kc. points, 0, 100, and 200 the dial.

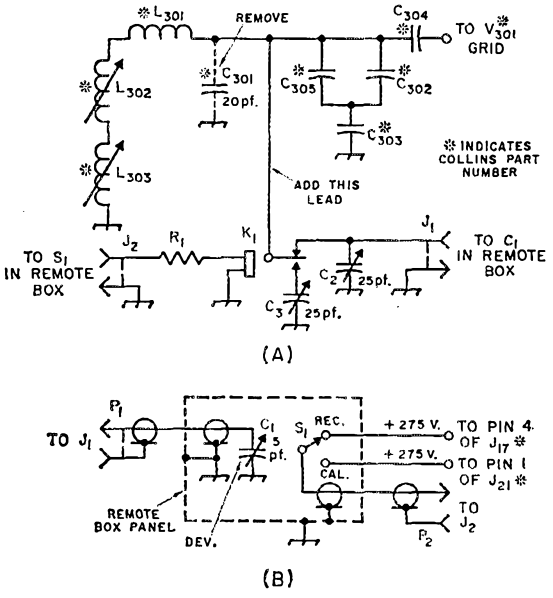


Fig. 1—Circuit modifications and additions to the p.t.o. of the KWM-2. At A, the part of the circuit which is built on the aluminum bracket is shown below that of the p.t.o. unit. At B, the portion of the circuit that is contained in the remote box is shown in schematic form.

C_1—5-pf. miniature variable.
C_2, C_3—25-pf. NP0 trimmer.
J_1, J_2—Phono connector.
K_1—2-pole double-throw 5000-ohm miniature relay. Use both sections in parallel to reduce contact resistance.
P_1, P_2—Phono plug on end of cable.
R_1—75,000 ohms to 0.1 megohm, 1 watt, depending upon ohmic value required to allow K_1 to pull in satisfactorily.
S_1—Phenolic rotary, 1 section, 1 pole, 2 positions.

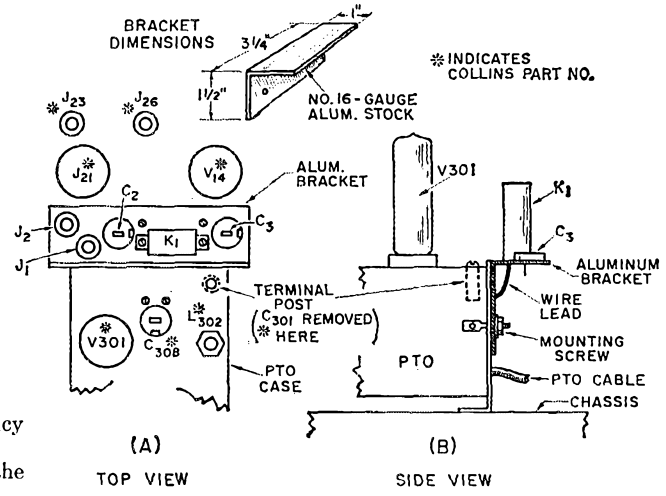


Fig. 2—General layout of the p.t.o. unit and the new bracket which is mounted on the p.t.o. back cover. Dimensions for the aluminum bracket are given in the inset. At A, a top-view sketch of the completed assembly. At B, a side view of the same.

4) Zero beat the calibrating signal at 100 on the dial.

5) Place S_1 in the RCV position and set the deviation capacitor, C_1, to midrange (half its capacitance).

6) Adjust C_2 for zero beat while listening to the 100-kc. calibrator signal. *Do not adjust L_{302} with S_1 in the RCV position as it will change the calibration of the transmitter.*

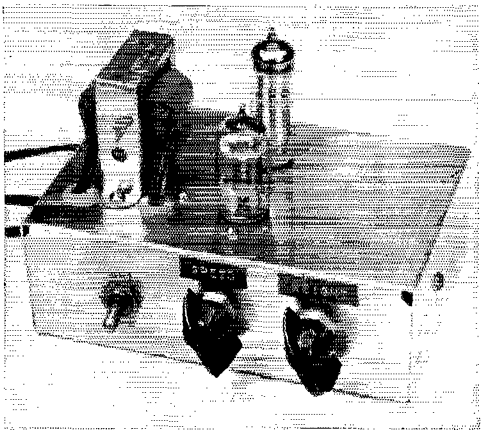
This completes the alignment. For normal operation, leave the receiver deviation control, C_1, set at zero (midrange). For offset tuning during receive, adjust C_1 above or below the zero setting for stations that aren't quite on the net frequency.

Some Final Words

Now that you have it working, here are some tips on the operation of the unit. First, when the transceiver is cold you will find that the zero deviation point will not be exactly the same as when the equipment is thoroughly warmed up. The transmit and receive frequencies can be made the same by switching back and forth from CAL to RCV and adjusting for the same tone from the calibrator. Don't forget: If the KWM-2 isn't completely warmed up, stay tuned to the received signal by following it with the main tuning dial and not with the deviation control, C_1. Otherwise, your transmitter frequency will differ from that of the station to which your receiver is tuned. The CAL position of S_1 should be used for calibrating purposes only. Make certain that S_1 is in the RCV position for normal operation.

I wish to express my thanks to Mr. George Rice, WB6NPC, for his assistance: especially for the fine photography. QST

Simple Self-Completing Circuit



The W9HFM keyer is housed in a 4 × 6 × 2-inch aluminum chassis. Power switch, speed and weight controls are mounted along the front apron. On top are the power transformer, the 12AU7 and 0B2 regulator.

A Single-Tube Electronic Keyer

BY ANTHONY M. DRURY,* W9HFM, ex-K8AAE

An electronic keyer is a device that generates dots or dashes. To produce good code, a keyer must be self-completing and make the correct space between dots and dashes. A slow letter "N" is a good illustration. The operator hits the dash side of the lever and immediately moves it over to the dot side and holds. The keyer makes a complete dash, a correct space, and then one or more dots, depending on how long the lever is held in the dot position. Many different circuits have been made to do this.

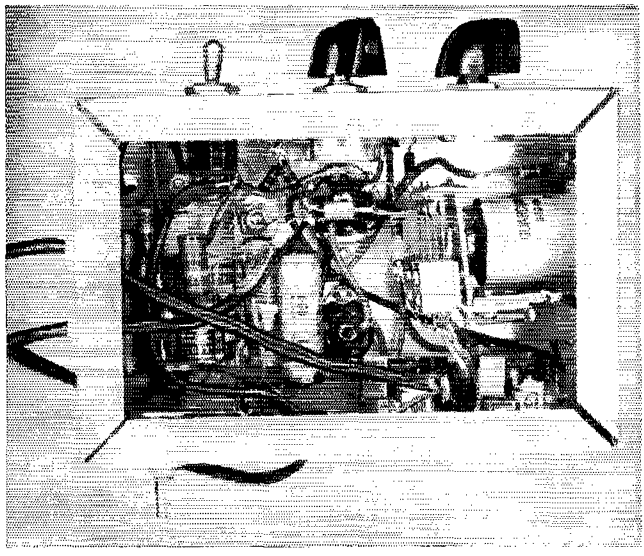
With some of the simpler circuits there have been problems of interaction between three controls — weight, speed, and dot-dash ratio. The dot-dash ratio control can be eliminated and a near-perfect ratio can be produced by using a divider, such as a bistable or synchronized oscillator. The circuit shown in Fig. 1 uses the latter.

Circuit Operation

In theory, a perfect dash can be formed by filling the space between two dots. That is what happens when the output of the dot generator is combined with that of the synchronized oscillator. Speed adjustment is accomplished by varying the frequency of both oscillators simultaneously by means of R_4. Referring to Fig. 2, it is seen that there is a large margin for error in tracking, if the weight adjustment is normal, because of the overlapping of the outputs from relays K_2 and K_3. The margin is equal to the width of a dot, and normally has a time one third that of a dash.

When the lever is pushed to the dot side, C_1 is charged to approximately +140 volts through the current-limiting resistor, R_1, biasing V_{1A} into heavy conduction. This causes K_1 and K_2 to operate, removing the charging voltage and closing the keyed circuit. C_1 discharges rapidly through V_{1A} until the grid of V_{1A} becomes negative in respect to the cathode. C_1 then continues to discharge at a slower rate, determined by the capacitance, the resistance of R_2, and the voltage setting of R_3. As conduction in V_{1A} falls off, K_2 opens and, at about twice the time interval, K_1 recloses. If the key is held closed, C_1 is recharged, and the cycle is repeated. It should be noticed

* 4433 Florence Ave., Downers Grove, Illinois, 60515.



Bottom view of the simple keyer. K_3 is mounted against the right-hand wall of the chassis, K_1 and K_2 against the rear wall. The relay mounting screws pass through rubber-grommet-lined holes to minimize relay noise. The control in the lower left-hand corner is R_3, the divider-adjustment control. The placement of other components is not critical, as is apparent in this experimental layout.

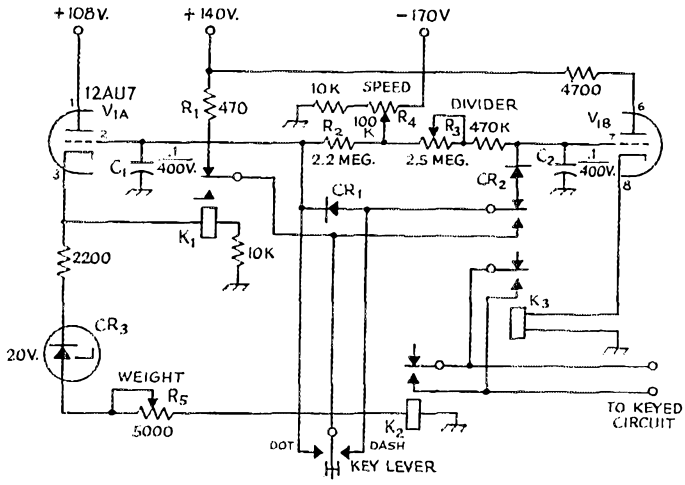


Fig. 1—Circuit of the W9HFM keyer. Capacitances are in microfarads; resistances are in ohms (K = 1000). Capacitors are paper; fixed resistors are ½-watt. Diodes are 400-p.i.v. silicon, 50-ma. or more. Key-lever leads should be shielded, with shield grounded to chassis. R.f. filtering of key leads is recommended.

CR_3—20-volt 1-watt Zener diode (G.E. Z4XL20, or similar).
K_1, K_2—S.p.d.t. relay, 2300-ohm coil (Sigma 11F-2300-G/SIL).
K_3—D.p.d.t. relay, 5000-ohm coil (Guardian IR-625-5).
R_3, R_4, R_5—Linear-taper control.
Other component labels are for text-reference purposes.

that, with the lever on the dot side, CR_1 is reverse-biased and does not conduct.

With the lever on the dash side, CR_1 and CR_2 conduct, and the charging voltage is applied to both C_1 and C_2. This causes all relays to function. K_3 is synchronized by K_1 because C_2 can receive a pulse only through the contacts of K_1. The contacts on K_3 serve two purposes. One is to prevent C_2 from receiving a pulse while K_3 is closed, and the other is to make the dash self-completing by insuring that two dots are produced while a dash is being formed.

CR_3 was found to be necessary to stabilize the weight adjustment.

Power Supply

The diagram of the built-in power supply is shown in Fig. 3. It consists primarily of positive and negative rectifiers operating from the same transformer secondary. The 0B2 provides a regulated 108-volt tap on the positive supply.

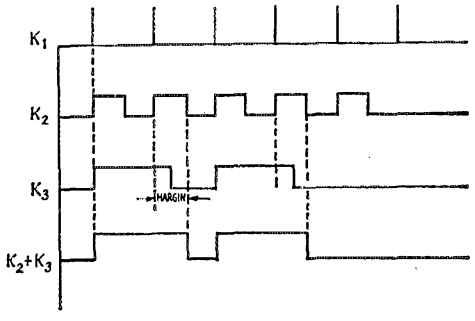


Fig. 2—Diagrams showing contact-closed time for the three relays. Notice that the contacts of K_1 are open (coil energized) for most of the dot cycle. Contacts close (coil deenergized) only momentarily to charge capacitors. Bottom line shows resultant of overlap of K_2 and K_3 when the key lever is in the dash position. K_3 may open at any time within the margin limits indicated without affecting the length of the dash.

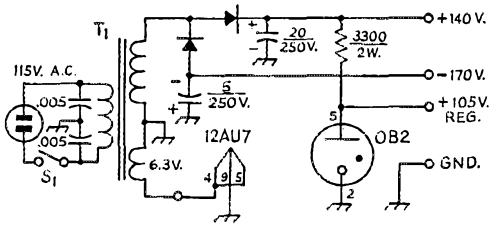


Fig. 3—Circuit of the power supply used with the keyer. Capacitances are in microfarads; resistance is in ohms. Capacitors are electrolytic. Diodes are 400-p.i.v. silicon, 50-ma. or more.
S_1—S.p.s.t. toggle switch.
T_1—Power transformer: 125 volts, 15 ma.; 6.3 volts, 0.6 amp.

Adjustment

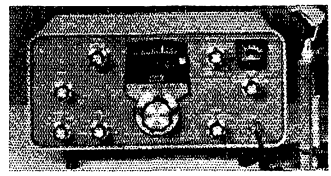
The only special adjustment required is that of R_3. It should be set so that K_3 divides by 2, and yet does not lengthen the dash. When listening to K_2 alone, it should sound exactly the same, whether the lever is pushed to the dot side or the dash side. Then, when listening to K_3 alone, it should have a weight midway between a dot and a dash. When these requirements are met, the keyer should work properly. Fig. 2 indicates the permissible margin of adjustment for K_3. K_3 may open at any time within the limits indicated without changing the length of the dash transmitted.

I have compared this keyer carefully with a W9TO keyer that I have, and I have been unable to detect any difference in operation. QST

Recent Equipment

To acquaint you with the technical features of current amateur gear.

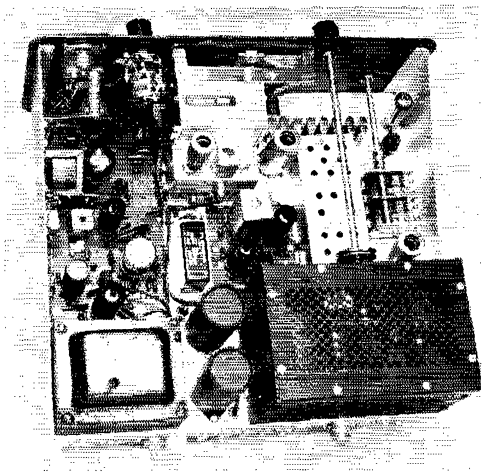
Heath SB-401 Transmitter



Is the SB-401 the same transmitter that we reviewed as the SB-400 in the January 1965 issue of *QST*, just two years ago? Yes and No.

Yes, it is the same transmitter because the overall specifications are the same. Power output, frequency range, carrier suppression, mixer products, harmonic radiation, third-order distortion — all of these are unchanged. The physical layout is unchanged; 99 44/100% of the components are unchanged. At first glance the front panel looks exactly the same.

But a second glance at the front panel will show you the major difference between the SB-401 and its predecessor. When shifting from independent transmitter operation to TRANSCEIVE, with the SB-400, it was necessary to raise the lid of the cabinet and replace one coaxial cable link with another — this was how you disabled the internal l.m.o. (linear master oscillator) and fed the l.m.o. output from the accompanying SB-300 receiver to the transmitter's l.m.o. mixer. In the SB-401, however, a front panel control mounted concentrically with the microphone and c.w. level control permits selection of either the internal l.m.o. or the external l.m.o. in the SB-301 receiver. This is a major contribution to operating convenience, assuming that some of us want to shift back and forth regularly between independent transmitter operation and transceive, and the solution is so simple that we wonder how come nobody thought of it two years ago. It would be a rather simple modification for any present SB-400 owner to tackle.



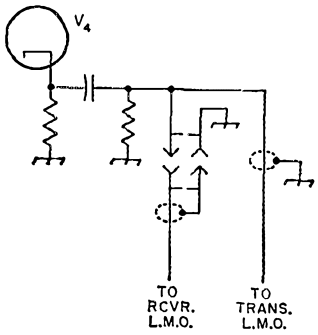
Top view of Heath SB-401 transmitter. Just in front of the power transformer at the left rear corner is the carrier-generator board. At the front center is the l.m.o. unit, and to its right are the heterodyne oscillator crystals. To the rear of the crystals (below, in this view) is the bank of slug-tuned coils for the heterodyne oscillator and the driver-stage grid and plate. The variable capacitor to the right of the coils is for the driver grid and plate. The final-amplifier components are enclosed in a shielded box.

The l.m.o. switching arrangement in the SB-401 provides only for control of the transmitter frequency by the receiver l.m.o., not for control of the receiver frequency by the transmitter l.m.o. This latter arrangement has found favor with a number of the DX gang, as it permits them to monitor their transmitting frequency rapidly when working a DX phone station outside the U. S. phone bands, and we have a couple of *QST* articles in the works on how to accomplish this with other transmitter/receiver combinations. It should not be difficult to make the same modification to the SB-301/SB-401 combination. Who wants to bet that the SB-302/SB-402 will have this feature built in?

Other differences between the SB-400 and the SB-401 include substitution of a 6BZ6 for a 6AU6 as the l.m.o. tube, and the addition of a sidetone level control (mounted on the chassis, not front or rear panel) so that you can adjust the strength of the keying monitor tone.

The SB-401 is supplied without the crystals for the heterodyne oscillator, on the assumption that many purchasers will also buy the SB-301, in which case the crystals would be excess, because the necessary r.f. signal would be taken from the receiver. Should the purchaser decide to use the SB-401 with some other receiver, however, a supplementary crystal kit is available.

The accompanying photographs show what the unit looks like, and the drawing of Fig. 1 shows the schematic difference involved in l.m.o. switching. What else is there to say? The kit is of excellent quality and went together rapidly and without difficulty. (No difficulty except for a couple of stupid mistakes by the assembler!) Having read in the January 1965 issue that the



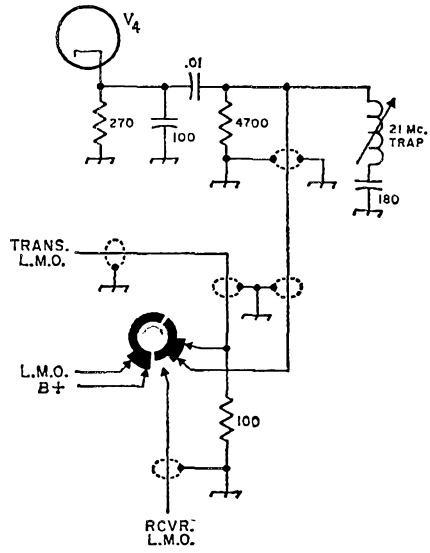


Fig. 1 above (left) shows the connection that was made manually in the SB-400 in order to connect the l.m.o. input from the receiver. At the right is the switching arrangement used in the SB-401 to accomplish this and to remove plate voltage from the SB-401 l.m.o. oscillator when using the transceive mode.

SB-400 took 100 hours of assembly time, we were prepared for a month-long project. However, in the interest of science, or something, we kept an accurate record of the time invested on this project, and ended up with 33 hours of sorting and assembling. There were two stupid mistakes and one bit of carelessness to rectify, and then the transmitter worked. We forgot to solder two of the connections on the driver coil assemblies, and somehow or other a minute bit of wire dropped across one of the tuning capacitors and put us out of business for a short period. Despite these faux pas, error correction and alignment took only a couple of hours and we were on the air.

A look at the output of this transmitter on the lab's spectrum analyzer shows that the distortion product emission is within claimed specifications, provided you don't insist on running the audio gain wide open and screaming into the microphone. To confirm what is shown on the monitoring scope, tests with a number of locals showed that the output was clean and not splattering all over my neighbors' receivers.

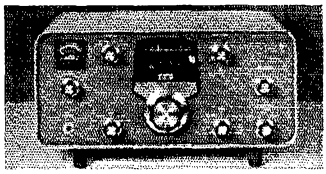
— *W1IKE*

Heathkit SB-401 Transmtter

Height: 6⅝ inches.
Width: 14⅞ inches.
Depth: 13⅜ inches.
Weight: 26½ pounds.
Power Requirements: 105-125 volts a.c., 260 watts.
Price Class: $285 ($315 with crystal kit).

QST ——— QST ——— QST

The Heath SB-301 Receiver



Most ham radio transmitters and receivers that belong to what might be termed "a popular series" have their profiles changed from time to time. The profile change usually takes the form of physical modification, circuit improvement, or both. The SB-301, successor to the popular SB-300, has been updated by having its circuit modified to provide greater operating flexibility and effectiveness. A few changes in the front-panel control labeling were made necessary by the circuit alterations, but these changes made little difference in the overall appearance of the equipment. It would be hard to distinguish between the SB-300 and the SB-301 were they placed side by side and given only a cursory inspection.

A "blow-by-blow" circuit description of the SB-301 is not given in this write-up because a thorough treatment was given the SB-300 by W1TS in the July 1964 issue of *QST*.[1] Rather, emphasis is placed only on those circuit and physical features that reflect a major change in the basic receiver.

Fig. 1 shows the path of the signal as it flows from the antenna terminal to the output of the

[1] The basic circuitry of the two receivers is similar.

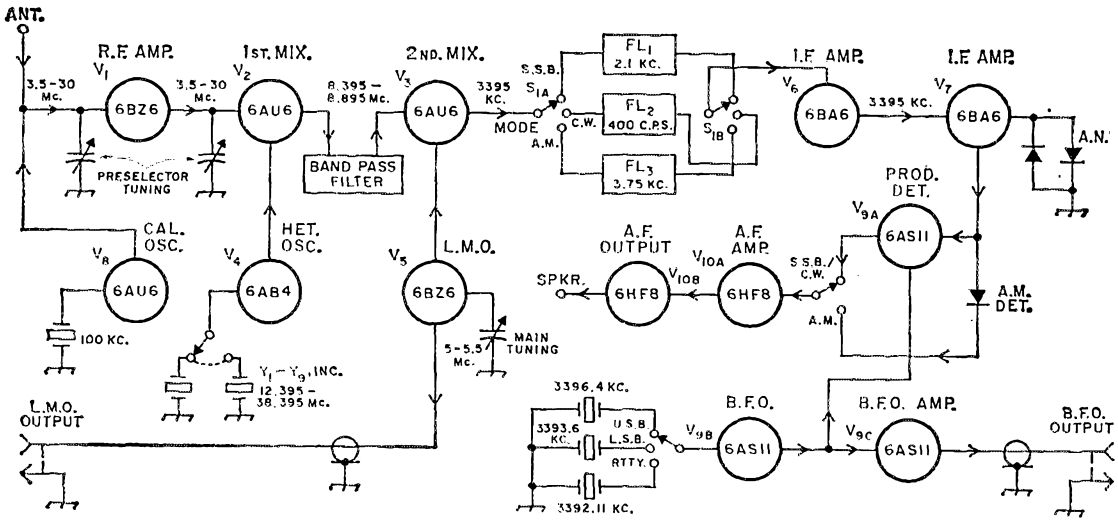


Fig. 1—Block diagram of the receiver. The a.g.c. detector diodes, the S meter, and some of the switching circuits are omitted in order to feature the more significant points in the design.

receiver. Some of the details which relate to circuit switching have been left out of the block diagram in order to simplify the illustration. It should be pointed out at this juncture that the receiver is furnished with but one i.f. filter, FL_1, for 2.1-kc. selectivity — excellent for s.s.b. reception and suitable for receiving a.m. and c.w. signals. Although all three filters are shown in Fig. 1, FL_2, a 400 c.p.s. c.w. filter, and FL_3, a 3.75-kc. filter for a.m. use, are optional accessories that must be purchased separately.

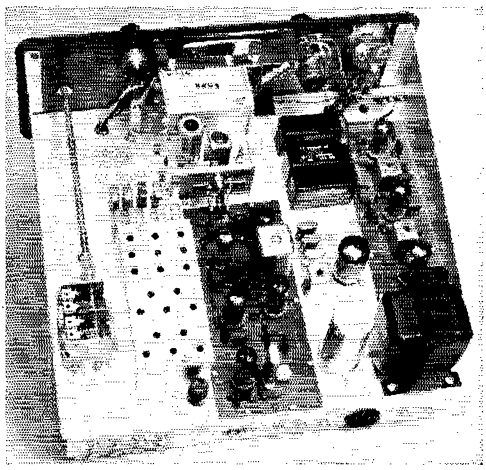
The Changes

An RTTY position has been added to the mode switch of the SB-301. When the receiver is switched to RTTY, a 3392.11-kc. b.f.o. crystal is switched in at V_{9B} to produce a carrier of that frequency. Because of this, the detected signals of 2125 c.p.s. and 2975 c.p.s. (850-c.p.s. difference) fall within the passband of the s.s.b. filter, FL_1. The 400-c.p.s. c.w. filter, FL_2, can be switched in if narrow-band RTTY operation (170 c.p.s.) is contemplated. The b.f.o. amplifier, V_{9C}, is inoperative during RTTY reception to prevent accidental transceiving should the receiver be connected to a transmitter for that mode.

A 15- to 15.5-Mc. range has been included in the circuit of the SB-301, permitting reception of WWV for calibration purposes.

Another improvement over the basic circuit of the SB-300 is the SB-301's a.n.l. circuit, which is activated by pulling out on the control knob for the audio gain control. The circuit, shown in Fig. 2, consists of two diodes used in a full-wave shunt configuration across the output of the second i.f. amplifier, V_7. The limiter operates in the i.f. range rather than in the a.f. range as is commonly done in many receivers. The circuit is self-biased and automatically adjusts itself to the level of the incoming signal. It is built on a miniature printed-circuit board which is attached to the main i.f. circuit board.

V.h.f. operation is made easier through the addition of a front-panel-controlled switching arrangement that permits the regular h.f. antenna lead to be connected to the input of the r.f. amplifier stage, V_1, during non-v.h.f. use. The same switch can be used to apply power to either of two outboard v.h.f. converters, while at the same time selecting the signal output lead from the converter in use and routing it to the



A view of the top of the SB-301 chassis. The l.m.o. assembly is at the front-center of the chassis. The three i.f. filters, are to the right of the l.m.o. The printed-circuit board for the i.f. strip is at the right edge of the chassis. The circuits for the 100-kc. calibrator, the mixers, the r.f. stage, and the heterodyne oscillator are located at the center of the chassis on the remaining printed-circuit board. The metal enclosure at the left-rear portion of the cha sis houses the r.f., mixer, and heterodyne-oscillator coils.

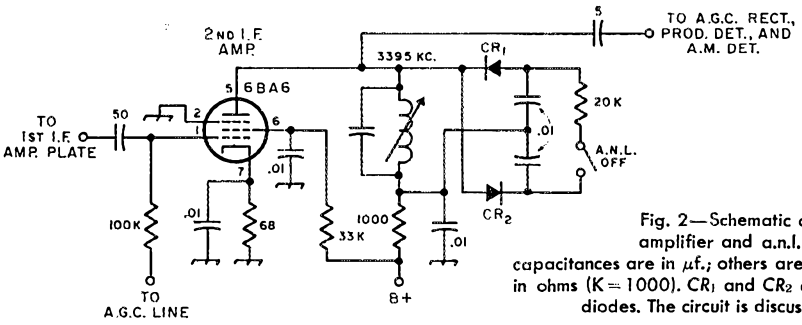


Fig. 2—Schematic diagram of the 2nd i.f. amplifier and a.n.l. circuits. Decimal-value capacitances are in μf.; others are in pf. Resistances are in ohms (K = 1000). CR_1 and CR_2 are small-signal silicon diodes. The circuit is discussed in the text.

input of V_1. The power socket for the converters is located on the rear apron of the receiver chassis and is wired to mate with Heath 6-meter converter (SBA-300-3) and the 2-meter version, the SBA-300-4.

The a.m. and the c.w. filters, FL_2 and FL_3, are rated somewhat differently than they were in the SB-300 model. Where the 400-c.p.s. filter was formerly 2.5 kc. wide at the −60 decibel point on the curve, it is now rated at 2 kc. at that same point — offering slightly better skirt selectivity. The a.m. filter was formerly 3.5 kc. wide at the −6 db. point on the curve and is slightly wider now — 3.75 kc. at the 6 db. point; both filters are rated as being 10 kilocycles wide at the −60 db. points on the curve. The wider nose selectivity should provide somewhat better fidelity during a.m. reception.

One more change is worthy of mention but does not relate to the circuit of the receiver. The Heath Company has taken a forward step (decidedly, in this writer's opinion) by changing over to what they call the "sub-pack" method of kit packaging. The components are packed in a number of individual cartons and envelopes, each marked with an identifying number. The numbers correspond to those given in the step-by-step wiring and assembly instructions, greatly simplifying the assembly of the equipment. The writer found that because of this technique, assembly time was somewhat less than with kits of comparable complexity. It took approximately 35 hours to build, test, and align the receiver. No "bugs" were found in the finished product and the instruction book was well written and easy to follow.

Performance

The receiver performance appears to be comparable to that of many higher-priced units that this writer has used. Precise testing was not carried out on the SB-301, but relative results from normal operational evaluation indicated excellent electrical and mechanical stability. A weak c.w. signal was tuned in on 15 meters and the 400-c.p.s. filter was switched into the circuit. No significant shift in the pitch of the c.w. note was detected while raising the receiver to a height of approximately 2 inches above the desk top, then letting it drop. The long-term stability of the receiver's l.t.o. and b.f.o. proved to be excellent.

No difficulty was noted when a check was made of the dial calibration. The tuning is smooth

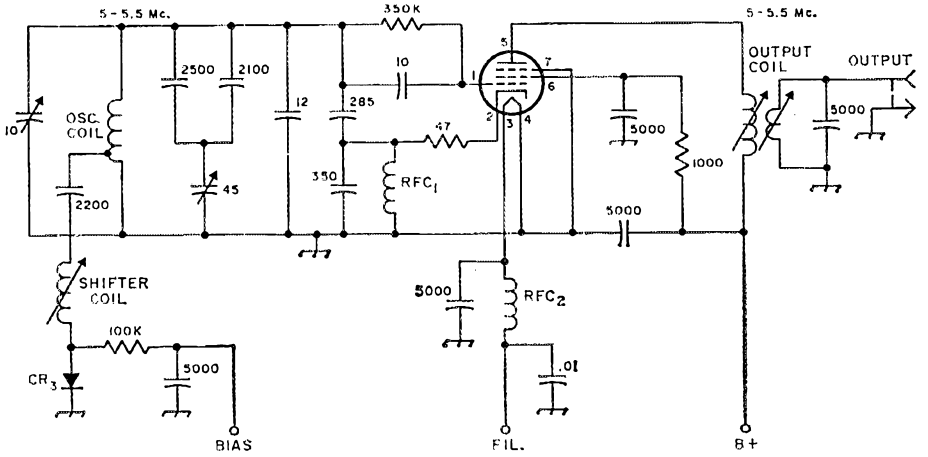


Figure 3—Schematic diagram of the Linear Master Oscillator. Capacitances are in pf. Resistances are in ohms (K = 1000). CR_3 is a varicap diode whose capacitance changes when the bias voltage is changed by the mode switch. This in turn shifts the frequency of the l.m.o. The frequency shift is used when going from lower to upper sideband. The frequency change is 2.8 kc., preventing the need to retune the receiver when switching from one sideband to the other.

and the calibration holds across the tuning range of the receiver as specified by the manufacturer.

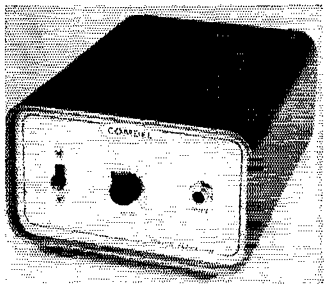
As a matter of personal curiosity the writer checked the S-meter calibration to see how many microvolts were required to secure a reading of S9. On all bands but 10 meters the S meter provided an S9 reading when a signal of approximately 50 microvolts was fed into the antenna terminals. Approximately 150 microvolts of signal were required to raise the meter to S9 on 10 meters. — *W1CER*

Heathkit SB-301 Receiver

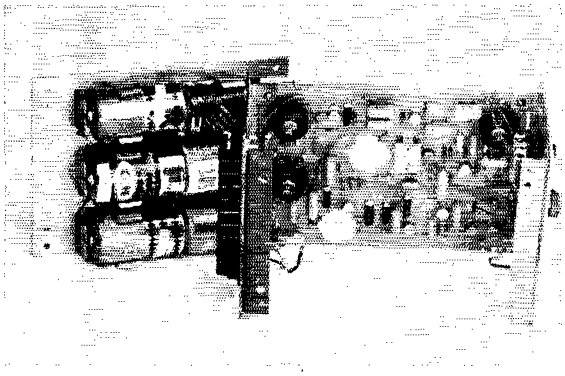
Height: 6⅝ inches.
Width: 14⅞ inches.
Depth: 13⅜ inches.
Weight: 17 pounds.
Power Requirements: 115 volts, 50/60 cycles, 50 watts.
Price Class: $250.
Manufacturer: The Heath Company, Benton Harbor, Michigan 49022

QST ——— QST ——— QST

Comdel CSP-11 Speech Processor



THE envelope of voice signals in s.s.b. transmission bears little resemblance to the actual audio envelope, and in general, the more one attempts to raise the average-to-peak power ratio in the original audio the worse that ratio becomes in the single-sideband output. Ordinary audio clipping therefore doesn't produce the increased "talk power" it is known to give in an a.m. system. To be effective in s.s.b., speech processing has to be tailored to fit s.s.b. peculiarities.



All components mount on a printed-circuit board 5 by 6½ inches. A plate of the same size mounts six "D" cells for power supply.

This special tailoring is the feature of the Comdel CSP-11. The audio signal is not clipped at all. What *is* clipped is an actual s.s.b. signal generated right in the package. The clipped sideband is then filtered and detected to get audio again. The audio that comes out has relatively little recognizable distortion, but the average-to-peak power ratio has been increased in the order of 10 db. — and the waveform is of a type that will go through an s.s.b. system without asking for an increase in peak power. The CSP-11 simply goes between the microphone and the microphone input jack on the transmitter; no internal transmitter connections are needed.

Fig. 1 is a block diagram of the circuit, which uses transistors and diodes throughout. After preliminary a.f. amplification, the signal goes into a balanced modulator where it is mixed with the output of a 16-kc. oscillator. The lower-sideband output of the modulator is filtered out, leaving the upper sideband only. The filter

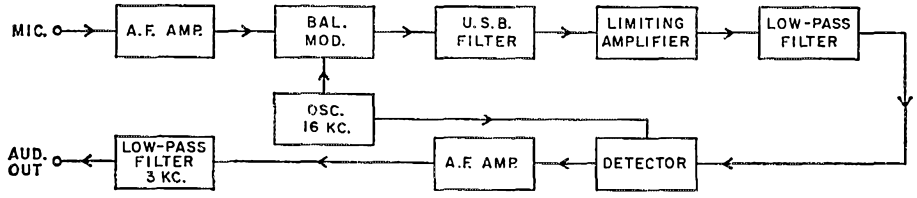


Fig. 1—Block diagram of the CSP-11 Speech Processor.

Comdel CSP-11 Speech Processor
Height: 3⅞ inches.
Width: 5⅝ inches.
Depth: 8¼ inches overall.
Weight: 28 oz., less batteries.
Power Requirements: 9 to 12 volts d.c., 18 ma.
Price Class: $110.
Manufacturer: Comdel Inc., 218 Bay Road, Hamilton, Massachusetts 01982.

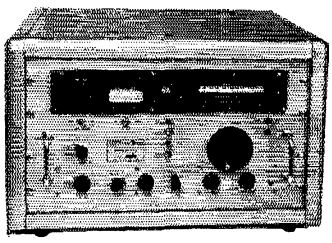
is followed by a limiting amplifier, and the clipped signal then goes through a low-pass filter which removes the harmonics generated by clipping. As these harmonics are all at frequencies higher than 32 kc. they are easily suppressed, and since (unlike the straight audio clipper) they are far removed from the actual speech band they are not left in the signal to cause distortion. The processed s.s.b. signal is then detected in the customary way, and the new audio is given some further amplification. Finally, the signal goes through a 3-kc. low-pass filter and is ready to be applied to the transmitter.

Since this is a clipping process there is no delay such as is present in some degree in any a.g.c. or compressor system, nor is there any "hangover" period during which the gain comes slowly back to normal after a voice peak. The internal audio gain is ample for setting the clipping level with communications-type microphones. With proper adjustment of the gain control on the panel, the IN-OUT switch can be thrown to either position without affecting the peak output level. This is the only adjustment necessary.

The CSP-11 is intended for operation from a 9-to 12-volt supply capable of furnishing 18 ma. There is room in the cabinet for six "D" cells, as shown in the photograph, but an external supply can be used if desired.

— *W1DF*

Next Month



ITT Mackay Marine Receiver

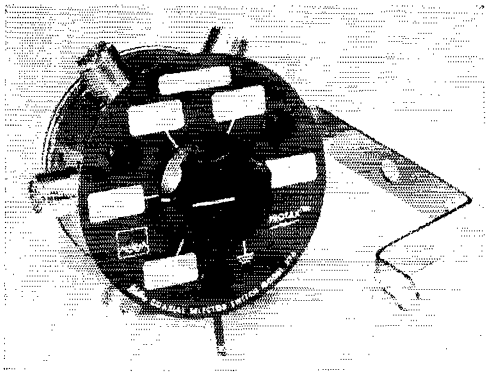
• New Apparatus

Waters Protax Coaxial Switches

WATERS Manufacturing Inc., Wayland, Massachusetts, have added a new series of coaxial antenna switches to their line of amateur products. Trademarked "Protax," these switches are designed to select one of up to five or six antennas, depending upon the model, while simultaneously grounding all the unused feed lines. Two switch configurations are available in the series. Model 375 is a 6-position unit in which all terminals, except the one switched to and the input, are grounded; model 376 is similar electrically, except that in the sixth position, all the connectors, (except the input connector,) and therefore *all* the antennas, are shorted to ground. The grounding feature is included to protect equipment from transient voltages picked up by the antenna system when an antenna is not being used or when the station is closed down (except from a direct lightning strike, which would likely destroy the switch).

Protax switches are rated to carry 1000 watts from d.c. through 150 Mc. with an s.w.r. of less than 1.3:1 over the range. The switches have a current rating of 5 amperes and a voltage rating of 500 volts r.m.s. Switch sections are ceramic with silver-plated contacts and have 60-degree indexing. Insertion loss and cross talk are said to be negligible.

Protax switches are sealed units employing standard SO-239 coaxial fittings. Model 375 uses



axial connectors; model 376, as shown in the photograph, has radial fittings. Either antenna switch will mount behind a panel up to ¼-inch thick. In addition, model 376 can be wall mounted (bracket furnished, as shown in the photograph). Included with each switch are an escutcheon plate, which can be used as a drilling template, a molded plastic knob, and the necessary mounting hardware. Four mounting holes are required: three 7/32-inch holes for the escutcheon plate and one 13/32-inch hole for the center shaft. Model 375 is 4⅛ inches in diameter, 2⅜-inches deep and weighs 13 ounces; model 376 is 4 inches in diameter, 2-inches deep and weighs 13⅛ ounces. Model 375 is in the $14.00 price class; model 376 is in the $13.00 price range.

— *W1YDS*

Technical Correspondence

FREQUENCY SHIFTING W2YM's VFO FOR RTTY

Technical Editor, *QST:*

In the old version of the exciter at W1SNN used for f.s.k. the conventional Clapp circuit was used for the oscillator. A diode switch was utilized to shift frequency at both 170 and 850 c.p.s.

Since a new version of a v.f.o. was to be included in an all-solid-state exciter, the decision for a better frequency switch was made. W2YM's v.f.o. and amplifier were taken from the December 1966 QST for the v.f.o., an extremely stable unit.

The problems encountered with the diode switch, including its temperature sensitivity (very noticeable on narrow shifts), can be eliminated by using a reed-switch relay.

The switch used at W1SNN was very small, one-and-one-half inches long with the coil, and was mounted right inside the oscillator assembly in series with the shift capacitor. The coil was shunted with appropriate values of resistance, a total of 180 ohms, and put directly in series with the local-loop circuit. If the user desires, he could use fewer turns and larger wire in the reed coil and do away with shunt resistors. In any case, the various manufacturers can supply coil and coil current data.

The reed chosen at this station is a Hamlin DRG-DTH, Form C, s.p.d.t., having a d.c. rating of 20 watts and a life expectancy of 100×10^6 operations at these ratings. The reed costs $5.00; the coil can be made by the user. Many other switches, smaller in size and with life expectancies that perhaps exceed that quoted, are available from countless manufacturers. At this point, I put forth the idea for improvement.

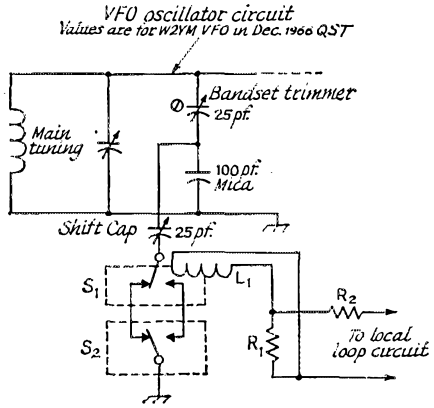


Fig. 1—Frequency-shift keying circuit, using reed switch, applied to the W2YM v.f.o. described in December 1966 QST.

L_1—Actuating coil for reed switch; number of ampere turns depends on type of switch used.

R_1, R_2—Shunt and series resistances, respectively; adjust to pass 60-ma. loop current while allowing proper current through L_1.

S_1—Reed switch (Hamlin DRG-DTH used by W1SNN).

S_2—Toggle switch for turnover.

The circuitry used is shown in Fig. 1 and demonstrates why the Form C switch is chosen. To answer the possible questions of how fast the switch can go and whether it causes any signal bias, some manufacturers show 2000-c.p.s. drives for switches. The Form C switch does not bias my signal. — *Sterling M. Olberg, W1SNN, 79 Apple D'or Road, Framingham, Mass.*

[EDITOR'S NOTE. The reed switch and actuating coil are available as a combination from the Coto-Coil Company, Inc., 65 Pavilion Ave., Providence, R. I. 02905, for $5.00 postpaid. Orders should specify type SP-12/DRG-DTH. The coil has a resistance of 400 ohms and will operate the switch with a current of 20 ma.]

KEEPING FILAMENTS HOT

Technical Editor, *QST:*

The suggestion by W2NXB ("Technical Correspondence," December 1966) that equipment be left running continuously for long-term stability is a good one. This is a philosophy I learned in the Army in World War II, when we never turned receivers off except for periodic servicing; older Army ops told me that this came from commercial practice.

However, it is not necessary to maintain plate and all filament voltages on all tubes to achieve the stability discussed by W2NXB. I have found that a separate filament supply which keeps all oscillator filaments warm 24 hours a day is adequate to meet amateur requirements. At least one commercial communications receiver (SX-101A) has a separate filament transformer wired directly to the a.c. input cable ahead of the "on-off" switch for this purpose.

In working over a BC-312 I included this arrangement and it cut the receiver's minimal drift down considerably. For an amateur who builds his own gear, it would be simple to put all oscillator and other frequency-sensitive stages on a separate filament supply which is never turned off. The modification is not too complex in commercial equipment, and can be done so that the gear can be "unmodified" for resale.

If the ham station is in a basement or other damp location, it might be advantageous to wire *all* of the tube filaments to such a continuously-running supply. This would serve the dual purpose of maintaining frequency stability and holding the ambient temperature at a level to keep the equipment dry. Such a supply must be, as W2NXB points out, properly fused. But I have a strong feeling that plate voltages should be removed from unattended equipment, especially where other people than amateurs have access to it.

Of course, the introduction of such devices as the new FET oscillator described by W2YM in the December issue of *QST* may make this whole discussion academic in time. — *Julian N. Jablin, W9IWI, 9124 N. Crawford Ave., Skokie, Illinois 60076.*

ALL-BAND ANTENNA

Technical Editor, *QST:*

With reference to the article on a Center-fed Zepp for 80 and 40 in May 1966 *QST:*

I set out to accomplish several things with an antenna to be installed on a California lot which runs east-west:

1) One pole.

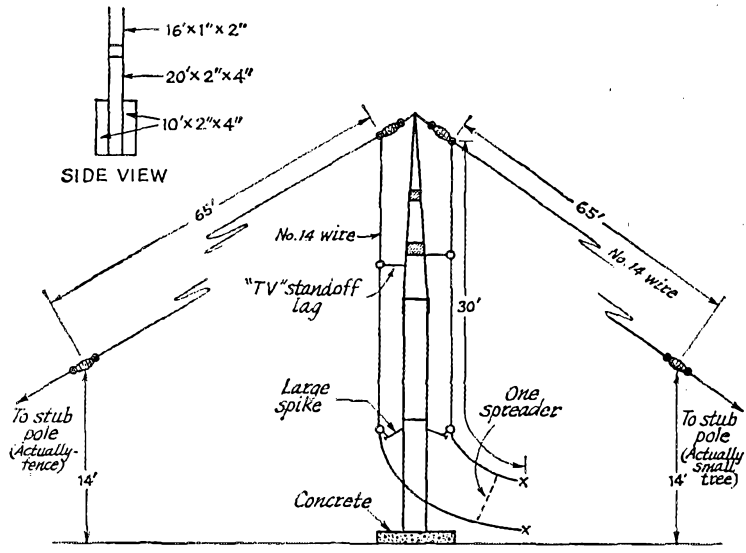


Fig. 2—The W6PIZ all-band antenna. Power is applied through a series- or parallel-tuned link-coupled matching circuit at X-X for operation on 3.5 through 30 Mc. (see text). For 2 Mc., and also for certain types of work on 3.5 and 7 Mc., points X-X can be connected together and the antenna worked against ground.

2) No guys.
3) Good for short skip up and down the West Coast on 80, 75 and 40 meters.
4) Throw lobes across populated DX areas on 20 and 15 meters with a fairly low radiation angle.
5) Allow some omnidirectional DX on 40 meters.
6) Keep away from anything with critical antenna length or critical tuning.
7) Minimum cost.

Fig. 2 shows the arrangement I ended up with. Results have been exceptional for a simple system of low height.

I use No. 14 wire for the antenna. The feeders are also No. 14. The center is mounted on an unguyed wooden pole about 34 feet high. Each section of the antenna is 65 feet long and the ends are only 14 feet high. Thirty-foot feeders are used with series tuning on 80 and 40 and parallel tuning on 20, 15 and 10 meters. Loading from 3.5 to 30 Mc. is excellent and not at all critical in tuning. The fact that the feeders are less than ⅛ wave on 80 allows reactance to be tuned out in the feeder-tuning arrangement on that band. The antenna is a bit long for the high end of 75 meters, but tuning there is good (this length was picked because of the slightly longer physical length required on the upper bands for end effect).

I have the antenna itself running east-west, giving some directivity north-south for QSOs with short skip up and down the west coast on 80 and 40 meters (it was found in an earlier antenna . . . vertical . . . that a vertical was not satisfactory for high-radiation-angle short-skip operation). On 20 and 15 the lobes tend to cut across major population DX areas. The tilt of the wire, which lowers the vertical radiation angle plus apparently some lobe addition, seems to give better results in the desired DX directions on 20 and 15 meters than 33-feet-high half-wave horizontal antennas oriented in the correct directions. Quite a bit of omnidirectional DX has been worked on 40 meters, undoubtedly because of the antenna tilt. DX operation on 15-meter c.w. has been really exceptional. Quite often I hook a DX station through the pileup when local beam stations miss (power output is about 150 watts). Since 10 has opened up I have used the antenna quite a bit on that band with very good results for both North American and DX contacts.

As a result of playing around on 160 meters with the bottom of the feeders connected together and working the antenna as a "T" against ground, I decided to see what happened when it was operated as a top-loaded vertical on 80 and 40 meters. The feeders were tied together and the antenna worked against a ground consisting of two 8-foot rods in water-soaked earth. On 80 this places the maximum-current point directly at the top of the vertical section (⅛ wave long) and on 40 gives the effect of a ¼-wave vertical with maximum current at the bottom. This arrangement gave much better results than the Zepp where low-angle radiation was required, and less effective results than the Zepp where medium- and high-angle radiation was required. An exception is directly off the ends on 80 meters, where the vertical and Zepp seem to give the same results. The Zepp arrangement is therefore now used for short and medium skip on 80 and 40 and the vertical arrangement for long skip or DX. In receiving, the signal-to-noise ratio decreases greatly with the vertical arrangement (vs horizontal), thus somewhat offsetting the overall advantage of the vertical for DX operation. If this condition is extreme, I use the Zepp for receiving and the vertical for transmitting, for DX operation. It appears that the vertical transmitter and horizontal receiver is by far the best DX arrangement for metropolitan areas, but most likely the vertical for both would be best for rural areas where the QRN is lower. — *Dave Hardacker, W6PIZ, 1547 Wellesley Ave., Los Angeles, Calif. 90025.*

"MODERN FILTER DESIGN" TOROID

Technical Editor, *QST:*

I have just finished Ed Wetherhold's excellent "Modern Filter Design" network. The 3.11-henry toroid was purchased from a local Allen Organ store for $3.00. It took some time to get but they were not at all shy about ordering it from the factory when they found what it would be used for. — *Paul White, W6BKX, 63 Homestead Blvd., Mill Valley, Calif.*

Hints and Kinks For the Experimenter

SURGE SUPPRESSOR

FINDING it difficult to readily obtain switching transistors, I decided it would be wise to protect the transistors in my mobile supply from surges in the car's d.c. system. Such transients can appear when the starting motor is engaged or when the heater is switched on. Most manufacturers give little thought to surge suppression other than to suggest that transistorized units be left in the "off" position when the starter is engaged.

To protect my Drake TR-3 mobile power supply, I use the circuit shown in Fig. 1. Surges are reduced by a 1000-μf. electrolytic capacitor, C_1, connected directly across the battery. C_2 and RFC_1 help to suppress r.f. transients. Such noises can be deadly to transistors. CR_1 clips all large positive-going spikes that exceed the Zener voltage. Negative-going pulses are limited by the low forward-voltage drop, 0.8 volt or so, of the silicon diode. Because it was on hand, a 56-volt Zener diode, Motorola 1N2999, was selected for CR_1; however, a lower voltage Zener should be used if available, since it will start suppressing positive-going spikes at the lower voltage. In any case, the voltage rating of the Zener must be greater than the d.c. voltage supplied to the suppressor. The filter was built inside a small aluminum box as shown in the photograph.

Heavy gauge wire should be used between the battery and the suppressor, and between the suppressor and the power supply. The author employed No. 10 wire between the filter and the minus terminal of the battery, not depending on the car body for a ground return. No. 8 insulated wire was used between the plus side of the battery and the suppressor. Large-conductor cable is available from most electrical supply houses.

The Drake DC-3 power supply is normally furnished for use in cars that have negative ground systems. However, the transistor cases on the bottom of the supply do not operate at ground potential. To prevent contact between ground and the transistor cases and to avert possible damage to the DC-3, I mounted the power supply on a wooden board. As shown in Fig. 2, the assembly was installed behind one of the headlights in the author's Chevelle. Since this space is in front of and to one side of the fan, little heat from the engine reaches the DC-3. In addition, a good quantity of air flows through the headlight mounting when the car is in motion, keeping the supply cool. — *Stewart J. Wolfe, W8ZTX*

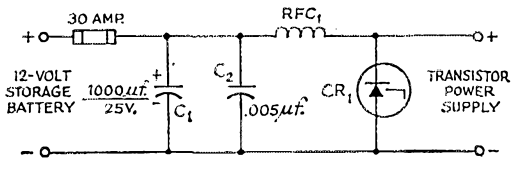


Fig. 1—Schematic diagram of surge suppressor.

C_1—Electrolytic.
C_2—Mica.
CR_1—See text.
RFC_1—12 turns No. 10 enamel, closewound on 10K or higher 25-watt resistor.

Fig. 2—Partial view of the Chevelle's engine compartment, showing the surge suppressor and power supply mounted on one of the side walls.

EMERGENCY SOLDER LUG

EVER need a solder lug when wiring a project and find none in the parts cabinet? Here is a quick and easy way to make one. Locate a terminal strip; even a used and partly damaged one will do. Drill through the hole in the tie point where the lug is mounted to the bakelite strip. Use a drill just large enough to free the lug from the insulation. — *Don Raasch, WA8MAS*

ICE-BREAKING INSULATORS

WHERE there's much icing on an antenna, I have found that instead of using, say, a seven-inch insulator, it is better to connect two four-inch insulators in series. This combination makes a hinge which, with the action of the antenna in the wind, breaks the ice. — *Eric S. Holden, VO1BH*

NCX-3 OUTPUT STAGE

NATIONAL NCX-3 users should check the output stage of their transceivers, especially if the transceivers are used in mobile service. A recent failure showed that the soldered connection had broken between the braided-metal plate lead and the plate cap of one of the 6GJ5 tubes. The connection to the other 6GJ5 was being made by only one strand of the braid. As manufactured, this connection between the braid and the plate cap depends entirely upon the soldered joint for strength. To reduce the possibility of a plate lead becoming undone, wrap the connector and the braid with three turns of No. 18 or smaller tinned copper wire. Cover the entire connection with a full flow of solder. — *A. A. Wicks, WB6KFI*

IS YOUR RECEIVER FUSED?

SEVERAL manufacturers of otherwise electrically sound communication receivers, possibly in order to cut manufacturing costs, have left out one basic and important component: a fuse in the a.c. line. A young local amateur with a very popular medium-priced receiver had the following experience which illustrates the grief that the lack of a simple fuse can cause.

The electrolytic capacitor in his receiver power supply shorted when the clock timer turned on the receiver in the early morning. Before the 15-ampere breaker in the house circuit kicked out, the capacitor took with it the choke, rectifier and power transformer. The latter caught fire and burned all the surrounding wiring before the fire smothered itself out. Repair of the damage required the purchase of $10.00 worth of components and eight hours of labor.

The solution to the problem is simple. Look at your receiver's schematic or check its wiring. If there is no fuse, remove the power plug from the line cord and replace it with the type of plug that holds two type 3AG fuses. A pair of two-ampere fuses should be sufficient for most commercial receivers. — *John D. Birle, W8ELE*

WIRE DEVICE PROTECTS MOS TRANSISTORS FROM DAMAGE

DESTRUCTIVE damage can be done to metal oxide silicon (MOS) transistors when an electrostatic potential is applied even momentarily to the transistor leads. Sufficient electrostatic potential to be damaging can be generated by simple handling. Adequate protection during storage and shipping is provided by either soldering the leads together or by wrapping foil around the leads. Neither method is suitable, however, when the MOS transistor is to be placed in a circuit where the leads must be separated for assembly.

The solution is shown in Fig. 3. A loop of flexible, small-diameter, nickel wire, attached to a music-wire spring, can be slipped over the MOS transistor case and released, so that the music-wire spring tensions the loop of nickel wire around all the transistor leads, shorting them together. This permits the leads to be handled without damage to the transistor and makes it possible to safely connect the transistor in the circuit.

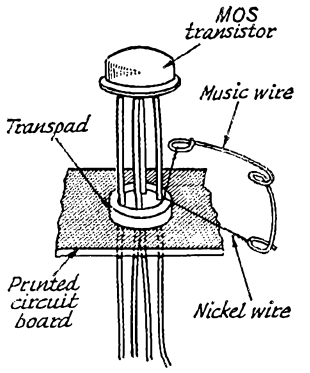


Fig. 3—Metal oxide silicon (MOS) transistor protected from destructive damage by wire device.

In constructing the device, a length of 0.033-inch diameter wire is bent to form a spring. A piece of 0.007-inch diameter nickel wire, long enough to form a single loop near the center of its length, is then fastened to the two outer loops of the music wire and soldered.

To attach the device to an MOS transistor, squeeze the spring so that the nickel-wire loop can be slipped over the transistor case. Once beyond the case, the spring can be released; all the leads of the transistor will be shorted together by the taut nickel wire. The protective means provided by the manufacturer, e.g., twisting the leads, wrapping foil around the leads, or soldering all the leads together, may then be removed without damage to the transistor. A transpad, which is a small disk having holes in it spaced to suit the transistor leads, can be slipped over the leads to serve as a retaining disk.

The nickel-wire protected transistor can be soldered into a printed circuit board or into circuits using other types of construction techniques. If the circuit configuration allows, the protective device may be removed without cutting the nickel wire and thus used over again. It can be employed on MOS transistors having any number of leads, since the leads always lie in a circle. Should it be necessary to take the MOS transistor out of the circuit, reattach the protective device to the transistor being removed. — *NASA Tech Brief 66-10419*

COAX CABLE GUIDE

THE use of a plastic drinking straw as a guide or sleeve to assist in installing small coaxial cable in window frames is a great help. Often the hole that is drilled in the frame does not pass through continuously solid material, and the coax ends up in the wall space. The straw guides the wire easily. Use the large milkshake size. —*Lawrence Leveson, W2KKT*

Some Facts About The Military Affiliate Radio System

*Part II***

LIFE IN MARS

BY HERBERT W. GORDON,* W1IBY

What MARS Will Expect of You

MARS will expect more than lip service. Because it is quasi-military or semiformal, it is understood that individual members will be expected to observe and respect a chain of command. MARS members are expected to furnish a minimum number of hours of participation per month, varying between 6 and 8 hours per quarter minimum. MARS will expect that when you join the organization you will have equipment operational on MARS frequencies including antennas, receivers, and transmitters. You should not join with the idea of expecting them to provide you with this basic equipment. They will augment your station facilities and they will improve your technical competence, but you must provide the first basic station and provide them a minimum amount of time. Those individual amateurs possessing dual frequency capabilities such as h.f. and v.h.f. will be of greater value to the program. MARS will expect you to learn their language and to observe their rules and regulations. Because MARS offers so great a variety to the traffic handler and the experimenter and to those who like to supervise, there are several areas within MARS where one can become proficient and enjoy himself.

If you are the kind of individual seeking recognition, you will find ample opportunity or outlet for your initiative and enthusiasm in MARS, but MARS is not the kind of organization in its daily operation that provides large-scale personal recognition and amateurs who join MARS should not be deceived about the degree of personal attention they will receive. Most MARS nets are limited in number to 25 or fewer so as to provide a larger measure of personal recognition. Those possessing a flair for such activities will become Net Control Stations, net monitors, or net managers or even officers on a higher level, but the largest number of individuals will be expected to participate in the handling of traffic and monitoring of their respective stations in case traffic is coming their way. Obviously, it is possible to do something else in the shack while you are listening to a net. A good operator, however, will soon find that he can sharpen his skills by observing the practices that take place on the air and, knowing his own geographic area, he will soon be in a position to initiate or receive messages on an operational basis. Some individuals so love their MARS work that they put in 20-, 30-, or 40-hours a month while the greater bulk of individual members is content with 2 hours a week. The respective MARS organizations will expect sincerity and personal effort on your part in the furtherance of their programs. They will not want you to take traffic unless you are willing to relay or deliver it, and messages originating in MARS stations should be relayed insofar as possible via MARS stations. They may cross from one MARS organization into another during their relay, however. What we don't want is to have a message originating in a MARS station overseas to get out of fully responsible hands.

What You Will Expect of MARS

Aside from the patriotic thrill of knowing that you are doing something for our country, there is a rich, personal enjoyment each time that you initiate, relay, or deliver a bona fide message to or from one of our servicemen overseas to his family or friends near you. The fact that this type of thing has the blessing of our Government is in itself a satisfaction, but when you consider that our Government through the individual military services additionally provides correspondence course training in electronic subjects and that certain types of electronic material in excess of their requirements is available, you

* Woodchuck Hill, Harvard, Mass. 01451

** Part I appeared in Feb. 1967 *QST*.

have a real opportunity to benefit. MARS provides, for those who have been in the program as active members 6 months or longer, an opportunity to enroll for correspondence courses in a number of electronic subjects varying with each branch but averaging at least ten courses. These are equivalent to high-quality commercial correspondence courses costing upwards of several hundreds of dollars and they do not cost you anything except postage. There is no room for tomfoolery in this advancement program. Each person taking such a course is expected to prove his competence before final accreditation is supplied. The courses offered cover elementary electronics to sophisticated radar, and some of the courses accredited count for degree credit with institutions of higher learning. The individual MARS member is encouraged to advance his technical skills by enrollment in this activity. Individual MARS members facing military service may expect help from their MARS affiliation. Be sure to tell your inducting officer of your MARS background.

The excess gear which has been available through MARS for several decades is material no longer considered modern by the services or is defective and considered to be uneconomically repairable. Large stocks of such material exist. This material is channeled through specific authorities to those individual members who either need the material or who have demonstrated that they deserve such gear. Obviously, the station with minimum equipment operated by an individual putting in a considerable amount of personal effort deserves recognition. On the other hand, there are a number of instances when a particular device may be made available to a large number of members. Certain kinds of equipment are connected with certain branches of the service. For example, Army MARS members might end up with an emergency generator; Air Force members, with test or airborne equipment; and Navy members, with sonar equipment. The better quality issue is loaned on a hand receipt basis while lesser value material is available for adaptation or component recovery. Excess furnished by MARS may not be sold or bartered for profit, but it may be given to other MARS members on a similar basis.

An interesting sidelight to MARS is the fact that practically all the teletype in amateur use originated with the military MARS distribution to its members, many of whom have become quite expert in this field, so if you entertain thoughts of going RTTY, chances are a MARS member near you can help you out.

There is one more intangible benefit to be derived from MARS and that is the knowledge that when you go on the air no matter how little power you may possess, you will be treated with respect and your signal heard. It is not like knocking your head against a stone wall in the ham bands. On the other hand, I should point out that the whole schedule of powers and tolerances on MARS frequencies is completely different from the schedule imposed by the FCC on the ham bands. For example, in MARS we deal with power output from the transmitter into the transmission line. Because we operate on discrete frequencies, it is considered good practice to use only as much power as necessary consistent with the schedule of power provided so as to avoid the risk of interference with other service and adjacent channels. This, of course, is somewhat different from the operation in our ham bands.

Summary

MARS messages employ a different format and even a different language than we use as hams on the amateur bands. To begin with, all our efforts in message handling are directed at reliability, accuracy, and speed; and in this order. We are taught that conciseness and a uniform procedure are necessary. MARS members use prowords to clarify and make more precise their communications skills. Our phonetics are not chosen to amuse but are based on the standard form of the International Civil Aviation Organization (ICAO). We say al fah bra voh char lee — not adam baker, etc. We try to emphasize certain syllables in our pronunciation of numerals, and our message heading uses a "group count" instead of a "check count."

The DD 630 application common to all three agencies requires each member to sign a loyalty oath, in effect pledging that he or she is not a member of any organization endeavoring to overthrow our Government. In these days of protestation, it is nice to have a place where we can confirm our American ideals. Both men and women in all walks of life participate in MARS, and it is not necessary to give up RACES or CD work in order to join with us. Rather, the opposite may be expected — in any communication emergency, you can count on MARS help.

Callsigns: Both the Army and the Air Force issue callsigns which retain your original identification letters, changing only the prefix according to the following table:

Original Callsign Starting With	*Army Designation*	*Air Force Designation*
W	A	AF
A	AA	AFA
WA	AB	AFB
WB	AC	AFC
WC	AD	AFD

Navy MARS callsigns are completely different from your amateur callsign. They use NØ plus 3 letters assigned against the master plan according to your date of enrollment. They are assigned without regard to station location. A typical Navy call would be NØDEF; a typical Army call, AA2USA; while an Air Force call could be AFB3BJU. MARS callsigns may not be used outside specifically assigned military frequencies.

602 Stations. Our Government has found that amateur stations operating on Naval ships at

sea or in various military depots and bases constitute an invaluable means of strengthening morale. Such bases, when Government-sponsored, are called 602 stations and are manned in many places by servicemen who are hams. Their communications nets usually operate days during regular working hours but after hours, these same stations are frequently manned by volunteer MARS members who live nearby.

Net Activities. Although traffic nets constitute the greater percentage of MARS activities, there are technical nets, command nets, training nets, and local supervisor nets.

MARS activities take place outside the amateur bands, and ham band only equipment will not generally suffice for MARS. Before applying for MARS membership, you should be familiar with the limits of frequency covered by your transmitter and receiver. Unless you are willing to slightly alter or modify your gear or otherwise change the frequency coverage so as to tune the MARS frequencies used by MARS in your area, you should not apply. In similar vein, it will do MARS little good for you to join if you haven't the time to operate or a decent antenna system from which to radiate. MARS wants more members -- yes — but not members they have to wetnurse.

Certain geographic areas are stronger in one branch of the service than others. Some states have few, if any, members. Minnesota, for example, has about 35 Army members — too few for such a large state. Maine has only about 15 Air Force members — totally inadequate for decent coverage. Contrarily, New York has over 700 Air Force members, Ohio more than 300, Massachusetts more than 150 and more than 70 Army. So as to permit the broadest geographical distribution in any section of the country, the services are studying ways of starting-sharing a joint net between MARS service groups, and this looks most promising for the years ahead.

AF MARS is sanctioning automatic repeater stations for VHF between sections of the dense Northeast, a procedure which should appeal to the most venturous experimenter; further expansions are being planned. Crossband operation is a nightly occurrence. On traffic relay work, any qualified MARS station may phone patch directly into Viet Nam with the permission of the Pacific Gateway Station.

Teletype at 60 w.p.m. is rapidly becoming commonplace as more and more traffic is passed on MARS. This mode is the coming thing and each branch transmits its command broadcasts from Washington RTTY and c.w. The Navy station is NAV, the Air Force call is AIR, and the Army WAR, and any amateur knowing their schedule may copy their broadcasts.

Our country is at war, not officially but practically, and I feel we, as individual amateurs, should realize this and volunteer the use of our time and equipment in the furtherance of these Government-sponsored amateur military activities. It is very likely that if things get worse our Government may elect to preserve our amateur rights on the strength of the degree of the amateur's interest in these programs.

Where To Apply

Army:

- . . . *HQ, 1st US Army, Ft. George G. Meade, Maryland 20755*
  For: Conn., Maine, Mass., N.H., N.J., N.Y., R.I., Vt., Del., D.C., Ky., Md., Ohio, Pa., Va., W.Va.
- . . . *3rd US Army, Ft. McPherson, Georgia 30330*
  For: Ala., Fla., Ga., Miss., N.C., S.C., Tenn.
- . . . *4th US Army, Ft. Sam Houston, Texas 78234*
  For: Tex., Ark., La., N.Mex., Okla.
- . . . *5th US Army, Chicago, Illinois*
  For: Colo., Ill., Ind., Iowa, Kansas, Mich., Minn., Mo., Nebr., N.Dak., S.Dak., Wisc., Wyo.
- . . . *6th US Army, The Presidio of San Francisco, Calif. 94129*
  For: Calif., Ariz., Idaho, Mont., Nev., Ore., Utah, Wash.

If interested in joining Army MARS, you should write to the MARS Director at the headquarters listed for your appropriate state. The Office of Chief, MARS, is in Room 5A522, The Pentagon, Washington, D.C. 20330.

Navy:

. . . If interested in joining Navy MARS, write to Chief, Navy MARS, OP-945N, The Pentagon, Washington, D.C. 20350.

Air Force:

- . . . *Eastern Communications Region (AFCS), Westover Air Force Base, Mass. 01022*
  For: Conn., Del., D.C., Maine, Md., Mass., N.H., N.J., N.Y., Pa., R.I., Vt., Va., W.Va., Fla., Ga., N.C., S.C.
- . . . *Central Communications Region (AFCS) Tinker Air Force Base, Oklahoma 73145*
  For: N.Dak., S.Dak., Nebr., Minn., Iowa, Wisc., Mich., Ill., Ind., Ohio, Kans., Mo., Ky., Tenn., Ala., Miss., Ark., La., Okla., Tex.
- . . . *Western Communications Region (AFCS), Hamilton Air Force Base, Calif. 94935*
  For: Wash., Ore., Idaho, Mont., Wyo., Calif., Nev., Utah, Colo., Ariz., N.Mex.

The headquarters of the USAF Chief MARS (AFOCCOM) is located in Room H-243, T-E Building, 4th & Adams Drive, S.W., Washington, D.C. 20333.

Oversea amateurs can apply through their AFCS region or Area headquarters or to the Command MARS Director at Hq. AFCS, Scott AFB, Illinois 62225.

When writing to the individual commands, please indicate your desire to join and ask for the appropriate DD Forms 630 (application forms) and the questionnaire relative to their

MARS organization. The DD Form 630 must be completed in triplicate and sent back with the completed questionnaire to the address indicated for your particular state or area. It will probably be necessary that you have a photostat of your amateur license for the MARS license will be issued concurrent with the FCC license. You may not apply for a MARS license unless you are at least 16 years of age and have a valid FCC amateur license with at least 6 months to run. Novices and technician grade licensees are not restricted to the frequencies used in MARS. A technician grade licensee can operate on 3295 kc.; however, a novice licensee can retain his MARS membership only as long as he retains a valid FCC license.

Membership in MARS is purely voluntary. It is not a substitute for nor does it impose any obligation for military service in the Armed Forces of the United States. QST

March 1942

. . . Many thousands of amateurs are now in the service and the call is out for more, many more. "Reactivation" of hams, as previously announced has bogged down and a new approach is being worked out. Warner uses so many alphabet designations, I can't remember what they all are. OCD, ARP, CDC, DCB are a few! A place for civilian-protection work seems surely in the offing. The League intends to carry on, of course, and Warner urges all hands to maintain their membership, no matter where they may be sent. A number of new projects are mentioned.

. . . George Grammer, W1DF, explores the field of what amateurs can do while their transmitters are cooling off for an indefinite period. There is, of course, no restriction in listening, except for the ever-present need for secrecy. There is a great deal of activity between the ham bands. Many hams have never listened to 600 meters and up. There are and will be more unidentified code stations on the air. Some sound like hams, chirpy notes and all. What they say is unintelligible. Maybe they are secret German stations in foreign embassies. Maybe I'm ahead of my story on this one! George discusses a whole raft of activities in which the erstwhile silent ham may find a great interest.

. . . Byron Goodman, W1JPE, has an interesting article on "wired wireless. He shows how to latch on to the power lines safely and discusses the limitations as to frequency, power and distances which might be covered. We have to take the power lines as we find them.

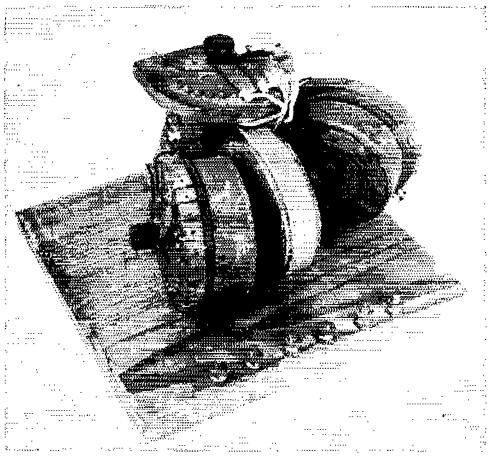
. . . H. G. Miller has a nice article on the "Panoramic Radio Spectroscope." Here, for the first time in *QST* is the basic dope on this exciting new tool by which one can keep track of adjacent frequencies over say 100 kc. Surely a boon to DXers.

. . . Don Mix, W1TS, describes an audio amplifier and microphone arrangement used for the detection of weak aircraft. Lots of problems to be worked out. Out in the country, in a quiet location it is a great improvement over the unaided ear.

. . . The "Cyclotron" is introduced to *QST* by J.S.V. Allen, W8UNS. He had a deal to do with the development of the 40 kw. rig at Ohio State University. The cyclotron is a most interesting device and this piece shows how it works.

. . . R. S. Naslund, W9ISA, shows a novel semi-automatic key for both dots and dashes. He also describes the "Valiant" keyer, one of which we have in the museum.

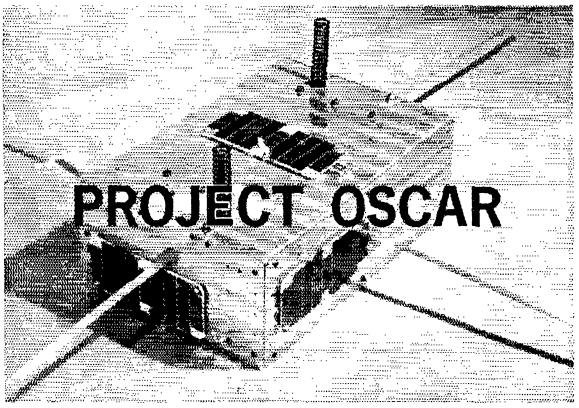
. . . Ed Tilton, W1HDQ, has some thoughts on u.h.f. antennas and beams. Several arrays are described. — *W1ANA*



From the Museum of Amateur Radio

We are very proud of this unique and important piece of historic wireless apparatus. This is the first attempt by DeForest to make a compact long-wave three-coil tuner on a hinged mount. It was made by DeForest's Chief Engineer Robert F. Gowen, 2XX. The coils are ordinary layer wound with paper separators and impregnated with beeswax. Switches allowed for quick adjustment of the frequency range. This hurriedly made model was followed by another, somewhat more dressed up and this in turn by the well-known honeycomb coil and mount. The tuner is from the personal collection of Mr. Gowen and we have it through the generosity of Mrs. Gowen.

— *W1ANA, Curator.*



A Progress Report

BY HARLEY C. GABRIELSON,* W6HEK

DURING the first quarter of 1966, Project Oscar, Inc. was engaged in the ground support of activities related to the Oscar 4 satellite operation. When that activity was completed, in March, attention was turned to the business of laying the foundation for future Oscar satellite launches. This is a report on the several facets of the activities which have been taking place and which are proceeding at this time.

Election of Officers

The annual meeting of Project Oscar, Inc., was held on the campus of Foothill College, Los Altos Hills, California on 19 January 1967. Seven members were elected to the Board of Directors: Stan Benson, K6CBK; O. H. Brown, W6HB; E. F. Carter, K6GT; H. C. Gabrielson, W6HEK; L. Ginner, K6GSJ; H. F. Shepherd, W6QJW; and J. Sherman, W6KAS. There are six additional directors carried over from the previous election: W. W. Eitel, W6UF; E. Hilton, W6VKP; W. I. Orr, W6SAI; C. Pearson, WA6CXV; M. C. Towns, K6LFH and R. C. Walton, W6CYL. Oscar directors are elected to serve two year terms, with seven elected every second year and six in the alternate years.

The first board meeting of 1967 was held immediately following the annual membership meeting to name the operating officers for the year 1967. Bill Eitel was reelected to the post of Chairman of the Board, with John Sherman named as Vice-chairman. The newly constituted Board of Directors reelected the incumbent officers for another term. Harley Gabrielson is President, Lance Ginner — Vice president, Ed Hilton — Secretary, and Bob Walton — Treasurer.

* 1150 Polk Avenue, Sunnyvale, California, 94086

Project Oscar, Inc. is an affiliate organization of the ARRL and receives League financial support. This report reviews the activities of Project Oscar, Inc. during 1966 and describes their current status.

Oscar Organization

Operating policies of Project Oscar, Inc. are established by the Board of Directors and are carried out under the direction of the President. The operating organization has been divided into three functional areas: Headquarters operations are managed by Hank Brown, W6HB; publicity and information services are handled by M. C. Towns, K6LFH; flight hardware development and launch operations are directed by Lance Ginner, K6GSJ. Policy guidance is provided through the operation of several standing committees made up of members of the Board of Directors. During 1966, two definitive policy documents were developed by the standing committees and were approved by the Board. These policy statements apply to membership in Project Oscar, Inc. and to the development of flight hardware within the Oscar program. Copies of these documents are available on request.

Oscar Headquarters

Oscar has been housed in a "temporary" building on the campus of Foothill College, Los Altos Hills, California for the past three years. It is from this location that W6EE transmits Oscar orbit prediction bulletins and that some of the nuts-and-bolts work of Oscar is performed. Negotiations are under way which should eventually lead to the housing of Oscar in a more permanent site on the campus. The College is establishing a Space Science Center which will ultimately house on Electronics Museum and several non-commercial scientific organizations — of which Project Oscar, Inc. is a typical example.

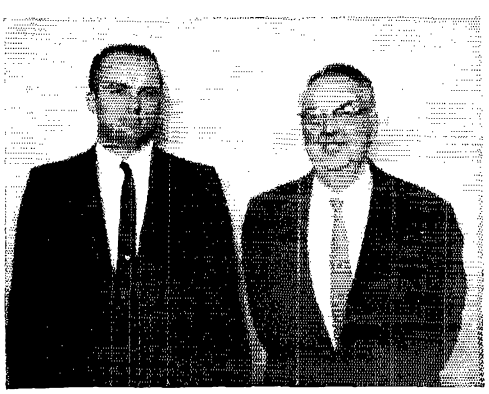
The first part of 1966 saw W6EE in active operation in support of the launch and tracking of Oscar 4. This operation was primarily in the capable hands of Walt Read, W6ASH and Keith

Colgan, WA6ZMA. That operation halted in March when the satellite ceased its transmissions. Since that time, the headquarters station operation has been limited to its use for point-to-point communication in support of equipment development. Work is currently proceeding on the improvement of the communication facility and the tracking facility so that it will be in full readiness for future operations.

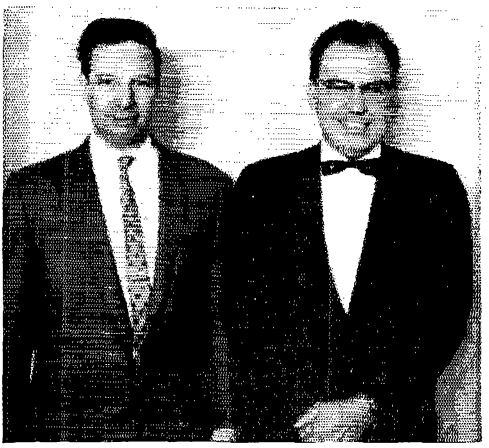
Publicity and Information Services

The Oscar Newsletter has been distributed regularly, on a quarterly basis, to all interested parties. Its distribution list amounts to about 1000 names at this time, with about 600 of these in the United States. During 1966, arrangements have been established with groups or individuals in 15 countries to distribute the Oscar Newsletter. The Oscar mailing list operation has been automated by reduction to teletype punched tape. These arrangements have improved the performance and eased the labor involved in the dissemination of Oscar information. Those readers wishing to get their names on the regular Oscar Newsletter distribution list may do so by sending a request to Project Oscar, Inc., Foothill College, Los Altos Hills, California, 94022.

Among its other activities, Oscar provides speakers and exhibit materials for many occasions. There are two full-scale models of the Oscar 3 satellite which are available, on request, for display purposes. These units are of present interest because they also represent the mechanical configuration of several of the satellites currently under development. Several of our members are also available to give talks about Oscar, although this activity is normally limited to the vicinity of the San Francisco Bay Area. We would be happy to discuss any requests for this type of assistance with any group requesting it. Oscar is also cooperating with the Community Services Office of Foothill College in the presentation of a seminar in the field of satellite tracking.



Lance Ginner, K6GSJ (l.), who is responsible for the development of Oscar satellite packages and, Hank Brown, W6HB, who is responsible for operation of the Oscar Headquarters communication and tracking facilities.



Harley Gabrielson, W6HEK, President of Project Oscar (l.) and Bill Eitel, W6UF, Chairman of Oscar Board of Directors.

Flight Equipment Development

The most common question we receive is "when will Oscar 5 be launched?" Unfortunately, there is no pat answer to that question since we do not have a complete launchable package in our hands at the time of this writing. Once a suitable unit is received and is found to be acceptable, then we shall initiate the necessary requests for permission to operate and to launch. This can take several months to obtain the requisite authorizations. All launch information that is available to us will be released as soon as possible through Oscar Newsletters, through amateur journals and on the air by way of bulletins from W6EE and W1AW.

A very considerable amount of development effort is under way in the building of satellites. Early in the Oscar program, satellite development was limited to one design at a time so that all of the available effort could be concentrated on it. This approach has been changed to encourage several groups to proceed with parallel developments. As the several groups complete their work, there should be a more or less steady flow of launchable hardware into the system and a greater possibility of maintaining regular Oscar launches.

Groups that believe they have the ability to develop satellite packages are encouraged to do so within the guidelines established by the Oscar policy document on that subject. Participating groups will be assigned a liaison engineer from the Headquarters membership to provide the necessary coordination and support. The liaison engineer maintains continuing communication with the development group, and has access to a considerable amount of technical consulting support to provide any guidance and assistance that may be needed. The following projects are currently in process:

(*Continued on page 168*)

How to Operate in a DX Contest

In Two Parts — Part II — Winning a DX Contest

BY LAWRENCE Le KASHMAN,* W9IOP

Part I, Feb. QST, was directed to the new country seeker. This concluding article is addressed to the DX contest competitor interested strictly in a high score and in winning the contest.

WE must make the assumption that at this point we're talking to an experienced DX man who now feels his oats and is ready to compete against his regional brethren. In every DX contest, with the exception of the smaller national activities which are based upon maximum number of contacts with the nationals of that country, the objective is a combination of contacts and countries. Speaking generally, the maximum number of countries has to be the primary objective. With good planning for the maximum number of countries, the QSOs generally generate in adequate numbers. It is a rare instance when a station wins a regional competition without having the greatest multiplier. The first basic rule thus is to plan your operation to give you the greatest opportunity for maximum multiplier. It is an enormous temptation to sit on 14 Mc. when it is wide open to Europe, working one Czechoslovakian after another with excitement and good fellowship. But assuming reasonable conditions, you can count on masses of Czechoslovakians when the band is opened to Europe. At the very same time perhaps 7 Mc. is open to the Far East with the Japanese, Philippines, and some of the genuinely exotic calls making their brief appearance which represents your only chance to work them in a 24-hour period. This self discipline is essential if you want to be a winner. The best technique for effectively spreading your operating hours is to work out a chart based upon CRPL forecasts and your own knowledge of local conditions. Be careful, though, don't let habit mislead you. Just because you have had no reason to operate 14 Mc. at 4 in the morning is no reason to assume that the band is closed especially if the forecasts show the possibility of an opening. A typical planning chart is illustrated in fig. 1. There is nothing complex about following this chart. An experienced operator can spin his dial across the band to determine whether it is open and specifically open to his part of the country. The caution area is a band which may be at the maximum usable frequency and which appears dead simply because of lack of activity. Under these conditions if you have quick band changing, a CQ DX even in the middle of a DX contest is not an ill-conceived plan. If you do not have

* Electro-Voice, Buchanan, Michigan 49107.

GMT Local	3.5 Mc.	7 Mc.	14 Mc.	21 Mc.	28 Mc.
00-02 7p-9p	EU-AF	EU-AF-MED-CAS-SEA-SAM	AF-SAM-PAC-AUST-CAS-FE	SAM-PAC-AUST-FE-SEA-CAS	
02-04 9p-11p	EU-AF-SAM	EU-AF-MED-CAS-SAM	SAM-PAC-AUST-CAS-FE	PAC-AUST	
04-06 11p-1a	EU-AF-SAM	EU-AF-PAC-SAM	SAM-PAC-AUST-FE		
06-08 1a-3a	PAC-SAM	EU-AF-PAC-SAM	SAM-PAC-AUST		
08-10 3a-5a	PAC-SAM	PAC-SAM-AUST-FE	SAM-PAC		
10-12 5a-7a	PAC-AUST-SAM-FE	PAC-SAM-AUST-FE	SAM-PAC		
12-14 7a-9a	PAC-AUST-FE	PAC-AUST-FE-SEA-CAS	EU-AF-MED, SAM-PAC-FE-SEA-CAS-AUST	SAM-CAS-AF	
14-16 9a-11a		PAC-FE	EU-AF-MED, SAM-PAC-FE-SEA-CAS-AUST	SAM-CAS-AF-EU-MED	EU-AF-SAM
16-18 11a-1p			EU-AF-MED, SAM-PAC-FE-SEA-CAS-AUST	SAM-PAC-SEA-AF-EU-MED	AF-SAM
18-20 1p-3p			SAM-PAC-AUST-EU-AF-MED	SAM-AUST-PAC-SEA-AF-EU	PAC-SAM
20-22 3p-5p			SAM-PAC-AUST-EU-AF-MED	SAM-AUST-PAC-AF	PAC-AUST-SAM
22-24 5p-7p			SAM-PAC-AUST-FE-EU-AF-MED	SAM-AUST-PAC-FE-SEA-AFR	

AF-Africa, Aust-Aust. & New Z., CAS-Cent. Asia; EU-Europe & USSR, FE-Far East, MED-Mediterranean; PAC-Pacific, SAM-So. America & Carib., SEA-S.E. Asia

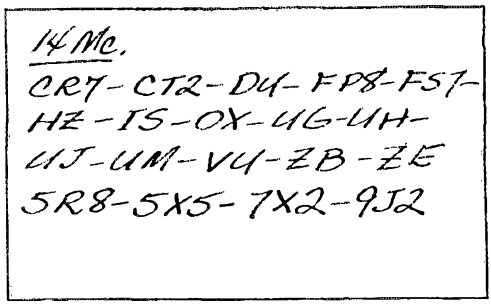
Fig. 1—This summary propagation forecast chart is made from CRPL publications. Numerical value of 1 to 4 is for condition forecast with 1 as minimum and 4 as maximum. The chart is a guide to the best possible paths to be used at any particular hour. The paths to the rarer parts of the world should be used as first choice in all instances. It is much more disastrous to miss a one-time 7-Mc. opening to the Far East than a 7-Mc. opening to South America, which is almost surely to be repeated.

rapid band change, then you will have to depend upon listening for other stations. In general if a band is open, you will hear activity *but not necessarily*.

If you're going to run up a big score in a contest with quotas, take advantage of this rule (whether you like it or not). On the low frequencies, the West Coast will give you far less trouble with the Pacific after the initial hours of the contest have passed. You would do better to concentrate on Africa and South America on 7 Mc. as a typical example, if you're located in the Midwest, and leave the Pacific until the more formidable West Coast stations have made the easy contacts. Thus when you lay out your operating schedule, you must keep in mind the areas of the country with which you must compete.

If there is a fair opening to Europe on 80 meters in the early evening, and a good opening on 40 meters during the early part of the contest, you had better work 40 meters on the assumption that you are not going to break through the East Coast on 80. But as the contest progresses you must go after multipliers on the low frequencies, so later concentrate on 80 hoping that the more prominent competitors on the East Coast have already got their easy European contacts. Lest you forget, on the low frequencies European activity is frequently represented only by a group of very active and consistent contest men and they will be on looking for as many QSOs as they can get. Keep in mind also that if you do hear the skip areas which are favored first giving very poor reports to DX stations, that the chances are not good that signals will pick up as skip lengthens. Attenuation over land is the bugaboo of the landlocked DX men, and it's a fact of propagation conditions with which we simply must live.

Perhaps the most perplexing question which faces the contest man out for a score is the relationship of multipliers to contacts. How much time should be invested in going after a new country at a time when QSOs are relatively easy to get? A consensus indicates that in the early hours of a contest it is reasonable to concentrate, without regard for multipliers, on the maximum number of QSOs that can be generated. This makes sense for two reasons. First, it gives you a nice base upon which to build a substantial score and second, surprisingly, many multipliers which fall into the rare or semi-rare category appear just in casual operating. But be cautious of band conditions. Do not assume that you have a second weekend in a multi-weekend contest to accomplish what you don't do the first weekend. Conditions are not that predictable. And operating schedules of DX stations are not that predictable. You may hear a very active station from Luxembourg the first weekend who is busy and you put it aside because you know you'll get a clear crack at him the second weekend. But maybe the man who went to Luxembourg on his vacation isn't there the second weekend. Maybe on the second weekend, conditions are good to the Pacific with no openings to Europe. In short, you must play each weekend as a complete contest unto itself.



A prompter's card, like the example shown here, is prepared at the end of the first weekend of a multi-weekend contest. A card is made for each band and shows areas of required multipliers. The back of an old IBM punch card can be used, or a 3 × 5-inch card would be just as practical.

Be sensible and be careful. In your enthusiasm for a big score, don't crowd the edge of the band and find yourself with a citation for off frequency operations. In your enthusiasm for making a contact, be accurate. Don't count as a completed QSO what is actually a contact directed at someone else. You should know from listening if other stations are on with calls similar to yours. If in doubt, don't count the contact and try for a repeat. I have taped many hours of DX contests in which a DX station comes back to one specific station and no less than 7 totally dissimilar calls come back, acknowledge, send a number and apparently log it, as a successful contact. Above all be a good sport . . . remember it's only a hobby! QST

Strays

The Ottawa Amateur Radio Club and the City of Ottawa announce a new award. Work 10 members of the Ottawa ARC and send a copy of your log to Jack Barlow, VE3CEB, 191 Clare Ave., Ottawa. All stations submitting logs will receive a certificate from the City of Ottawa. Each month there will be a drawing of certificate holders and the winner will receive free hotel accommodations and meals for two for a weekend in Ottawa, compliments of the City Government and the OARC (transportation excluded).

—•••—

Did you notice the name Ralph Barber, W2ZM, listed in the "Silent Keys" column in *QST* for January 1967? Ralph was the radio operator on the ship *Carpathia*, the sister ship to the *Titanic* that sunk in 1912. W2ZM operated the ship's wireless and took part in the rescue operations.

A look at the future, perhaps, with the aid of **W1DYE/1** who filed his logs with the help of the 1620 computer. On the small computer Den figures it took about ½ hour to do the work (AFTER the cards were punched) and using a big System 360 an estimate of about 3 minutes. A major catch *here* is that the time needed to punch the cards for everyone's entries would require the entire Hq. crew to work on the SS!

COMPILED BY ELLEN WHITE,* W1YYM

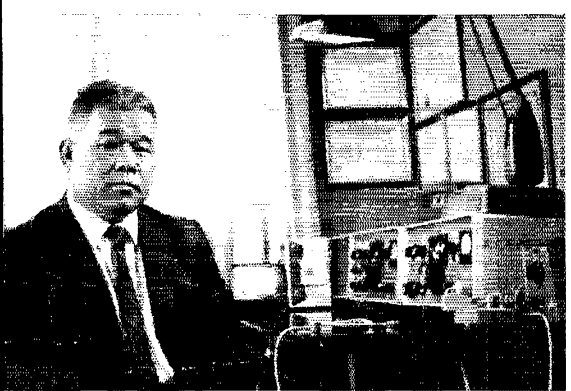
In a nutshell the 33rd ARRL Sweepstakes was indeed a great one — *the* year for a terrific phone showing and extra effort by the west coast. Going to press for March *QST*, the earliest this author can recall making this compilation, we can report that the 1966 Sweepstakes of November 12-14, 19-21, was no record breaker in terms of gross numbers (with close to 1900 reports received) but did show an ever-increasing proportion of phone interest. Just five years ago the general proportion of c.w. to phone averaged out to about 3 to 1, this year the ratio became much closer, about 5 to 4!

Let's take a look at the top ten c.w.: *single operator* **W6CUF 150,468,** WA6SBO (W1YNP/W6EGP, opr.) 142,201, W6RW (K9ELT, opr.) 139,469, W9IOP 134,325, W4KFC 133,469, W3BES 133,368, W8UM (W8CQN, opr.) 132,813, W1BGD 130,188, W2VJN 127,656, W9YT (K9ZMS, opr.) 124,858: *multioperator* **K5LZO 157,800,** K2ZWI 117,600, WA3EPT 97,900, WA0DKA 84,310, W0YC 81,428, WA2HSP 81,295, W0EEE 79,242, W9HHX 70,290, WA9LUD 69,530, W2SZ 67,620.

Top ten phone: *single operator* **W7ESK 202,050,** K5LZO 180,113, W2RLM 166,780, K8DOC (K8TAH, opr.) 165,165, W3GRF (K1ANV, opr.) 164,141, K3JJG/3 158,118, W3BES 155,224, W7DK (W7BSW, opr.) 152,425, WA5HID 146,880, W8UM (W8FAW, opr.) 146,197; *multioperator* **WA0CHH 138,937,** WA8GUF 120,225, W0HSC 104,142, W0EEE 100,764, WA7BKW 90,894, K6BPC 88,760, W2SZ 87,016, WA6URY 85,697, W9HHX 85,555, K4WJV/4 85,145.

Now for a closer look at the stations in the top three of each of the above groups: W6CUF, top single operator c.w. used a KWM-2 and 75S-1 with a half-wave dipole on 80, 2 elements on 40 and a TH-6 for 20-15-10. Jim was licensed back in 1948 and is an old pro at winning SCV awards. Second place c.w., WA6SBO keyed by W1YNP, is what Bob calls a "classic station" one thousand feet above the city of San Diego with dipoles on 80, 2 elements on 40, 5 elements on 20 and 5 on 15 with a mean height of 75 feet. The station equipment included an HT-32B and 75A-A. Third place c.w. W6RW, manned by K9ELT, is another big antenna set-up with 5 elements apiece on 15 and 20, 3 elements on 40 and a zepp on 80. Phil reports that the station lineup at W6RW included a 310-B, 4-250A, 75A-4 and R4-A. Multioperator c.w. leader K5LZO, aided by WA5LES, topped the 1000-QSO figure in a terrific 5-band operation. Chuck reports they ran high power, made the clean sweep, and even forwarded a photo! Radiators include an Inverted Vee for 80, 2-elements on 40,

* Deputy Communications Mgr., ARRL.



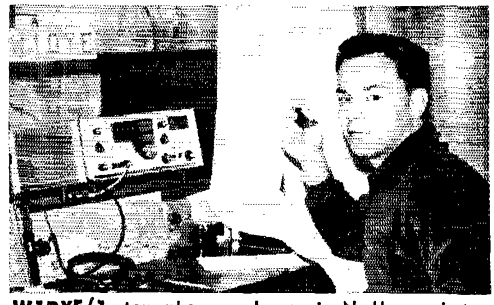
KH6IJ, active in both sections for over 900 exchanges, is among the most sought-after multipliers in any contest. Nose's new QTH, just behind Diamond Head, houses a 32S-3/4-1000A, 75S-3B. The antenna in use for the SS test was a Tri-band Yagi.

a 3-element beam plus a 2 element beam on both 20 and 15 and a 4-element plus a 2-element beam on 10; antenna heights between 35 and 70 feet. They found participation excellent and conditions very favorable particularly for 15. Vermont proved to be their toughest section. The station gear included the following: 75S3-B, 2-B, 32S-1, CE-100V, p.p. 4-400A and 4-811A. Second high multioperator c.w., K2ZWI of W. N. Y., posted 117,000 points through the efforts of K1USD and K2IMK and an SB-400, R4-A, trap dipole and 3-element tribander. Third c.w. high multioperator, the WA3EPT crew of the Hopkins Amateur Radio Club, looks for 100-K *this* year, or bust. The group ran high power, HX50-A, Ranger-4-250As and used a pair of HQ-129Xs and an SX-101A. Dipoles were used on 80 and 40. Additionally, 40 saw service from a vertical *plus* a 3-element optimum spaced beam while a quad turned the trick on 20 and 15.

Looking at the phone leaders we find that the top SS tally by anyone was submitted by Rush Drake, W7ESK, topping 200-K with over 900 phone two-ways and a clean sweep of the sections. The gear: a 32S-3/75S-3 — the antennas present an eye-popping rundown; 10 meters, 4 stacked 3 elements (top at 110 ft.); 15 meters, 2 stacked 3 elements (top 115 ft.); 20 meters, 2 stacked 3 elements (top 120 ft.); 40 meters, 2 elements at 105 ft. and 80 meters, a dipole at 110 feet! Second high solo phone, K5LZO also topped all c.w. totals, including his own multioperator c.w. sum! With the exception of the amplifiers shown in the preceding paragraphs, all the gear was the same. Chuck feels that ten proved very helpful during the first few hours of the test and that the low power contact rate should increase over the next few years as 10 and 15 play a larger role in the SS. The number three "show" spot on phone includes another score higher than any of the code totals, W2RLM of the N.Y.C.-L.I. section operating from Northport, Long Island for 785 exchanges in 72 sections. The transmitter used as a TR-3 and receiver an RME-6900. Antennas were a Mosley CL-33 up 80 feet, an Inverted Vee for 75 and two half-waves in phase for 40.

The top phone multioperator score, 139-K by the WAØCHH crew (manned by some of the best of the St. Louis Contest Operators), itemized 620 two-ways and a clean sweep. The group used a TR-3 on 80 and 40, a TR-3 on 20 and a Galaxy 5 on 80, 40, 15 and 10; none operated simultaneously in case you're confused! Radiators were dipoles plus 4 elements on 20 and 3 elements on 15 and 10. WA8GUF of Michigan posted number 2 spot in the phone multioperator grouping with 120-K, 575 exchanges and 70 sections. WA8s GUF HHO and RGT manned the station which included an HT-37, T4-X, R-4, 3-element beam and assorted dipoles. At the time of this writing no equipment breakdown was available from third-spot multioperator phone WØHSC.

This makes 6 in a row for reliable **VE6MA**, activity in both modes and top Alberta c.w. score.



W1DYE/1, top phone and c.w. in N. H., against a backdrop of computerized SS logs.

K4GSU/3 found the going tough in Maryland and looks forward to a return to Kentucky! Bill's winning 118-K c.w. effort led a difficult section. Gear shown includes an HT-46, homebrew pair of 6146A's, Handbook Keyer, T-O Keyer v.f.o. and 75S3-B.

It took three years doing but here's a picture of **K5LZO** (left) aided by **WA5LES** for 158-K during the c.w. SS. Chuck, K5LZO, operated solo during the phone portion for one of the top single-op. tallies, 180-K leading So. Texas and the West Gulf Division.

For the second year in a row, a message credit bonus of 1000 points was offered for a post-SS message origination. The message, a brief resume of test results, was tried by hundreds of participants. Many failed, however, pretty much for the same reasons as the past year — no message precedence, inadequate (or missing) handling data, incorrect word count.

—•••—

In order to make this unusually early issue of *QST* several of the customary "bits and pieces" just had to be overlooked. In the coming months we hope to have a new face to introduce to you in the field of contest reporting, one who has had more than a small hand in producing these results — WA2BAH/1.

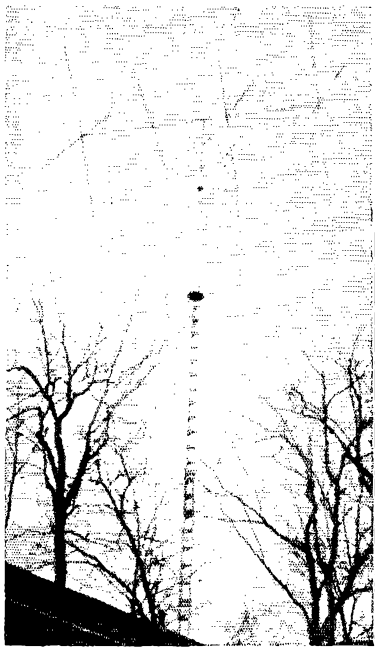
A reminder too, all section and club awards are scheduled for mid-March mailing. Stand by!

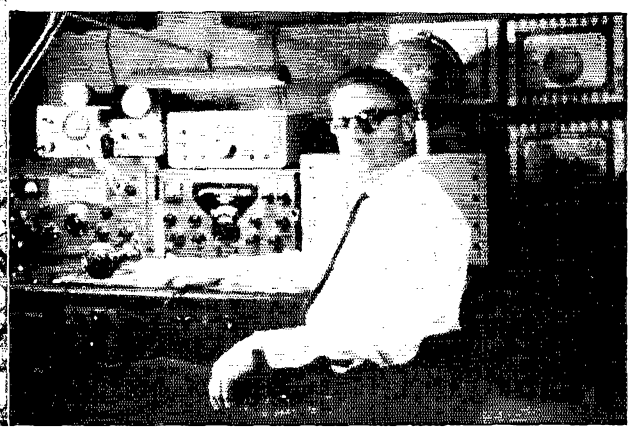
Club Scores

Did *your* club qualify for listing in the club box? If your group is affiliated, submitted a "secretary's letter" and had a minimum of three valid entries then your club name will be shown in the total of 43 clubs to qualifying this year, up nicely over last year (when only 33 so qualified). On the negative side, approximately 3 dozen clubs failed to make this listing through non-compliance with the rules.

A comparison with the previous SS reveals the same number one and two positions, PVRC and FRC, respectively. Number six last year but number three this year is the Connecticut Wireless Association moved along under the guidance of W1BGD. Brand new to the list and just recently affiliated, the St. Louis Contest Operators of Missouri presented a fine 841-K aggregate for number four position. Other significant position changes this year: the SJRA up from 8 to 5; the Germantown RC up from 9 to 7; the Indian Hills RC (which did not appear last year) showing up as 8 this year; ditto the University of Rhode Island RC shepherded along by K1LPL for the 9th spot.

The SJRA reports that a brief but extensive campaign to bolster activity seemed to have been quite successful with a score increase over the previous year, with but a few more entries. Their theme has been, and will continue to be, "the fun of amateur radio." Their entry by WA2HSP proved to be the most accurately done of all the bigger groups. The Miami Valley AR Contest Society reported that the annual "November madness" kept them on their toes while awaiting the Field Day in June and the opportunity to again challenge one and all for their undisputed title as kings of the 2-A Class. The Germantown Radio Club reports their club's main concern is the development of excellence in the technical and operational aspects of communications. They feel that contests such as the SS provide them an excellent opportunity to develop the latter. Their fine report by K3DVS, pays tribute to their club trustee W3LUW who conceived the organization several year ago. The group feels that his untiring efforts and most generous financial help have made the club what it is today. For his help to hundreds over the years the group names Don their "ham" of the year. The Chesapeake ARC finds the SS the proving grounds for operator improvement and advancement of proficiency. This year,





Numerous E.N.Y. phone logs were prefaced by comments similar to— "Who is **W2BIU?**" It suffices to say this is old contest pro WØEDX putting to good use a 32S-3 and a modified 75A-4 and 75A-1. Al used a wide-spaced tri-band quad up 75 feet and a 50-ft. high dipole for 40 and 80. His final result topped 130-K. He reports having a lot of fun with a slightly depressing sidelight, having one of the earlier license dates.

CWA tried a little different approach to the SS. Quotas were assigned to each member as his expected contribution to the club aggregate. The group was motivated by their desire to keep up their first string record in contests, number 1 spot in the SS (*after* PVRC and FRC, hi!), the record breaking PJ5ME 1966 DX score up through the 1967 FD where they hope to regain command of the 2-A standings.

The following list, a popular comparison the past few years, shows a breakdown of the top ten clubs by mode.

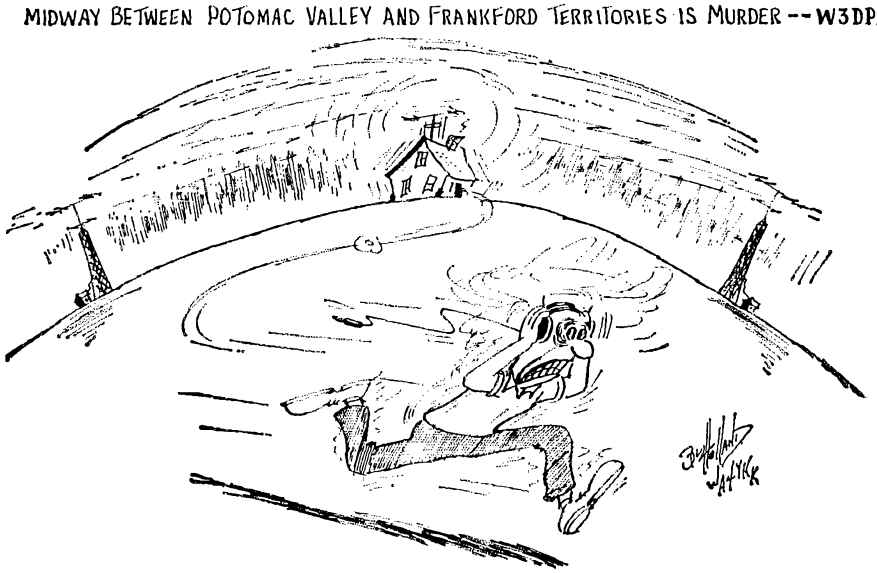
C.W.	Position	PHONE
Potomac Valley RC	1	Potomac Valley RC
Frankford RC	2	Frankford RC
Conn. Wireless Assn.	3	St. Louis
South Jersey	4	Miami Valley
Indian Hills	5	Germantown RC
Univ. of R. I.	6	Conn. Wireless Assn.
St. Louis	7	South Jersey
Wisconsin Valley	8	Indian Hills
Miami Valley	9	Univ. of R. I.
Germantown RC	10	Wisconsin Valley

CLUB SCORES

Club	*Score*	*Valid Entries*	*C. W. Winner*	*Phone Winner*
Potomac Valley Radio Club	3,491,545	69	W4KFC	W3GRF[1]
Frankford Radio Club	2,297,833	53	W3BES	K3JJG/3
Connecticut Wireless Assn.	940,852	22	W1BGD	W1BGD
St. Louis Contest Operators (Mo.)	841,129	25	W0TDR	KØLGZ
South Jersey Radio Assn.	703,708	34	WB2TEN	W2ORA
Miami Valley Amateur Radio Contest Society (Ohio)	605,951	17	W8ZJM	WA8MCR
Germantown Radio Club (Pa.)	572,424	19	WA3DCM	WA3CQW/3
Indian Hills Radio Club (Ohio)	561,576	20	W8AEB	W8AEB
University of Rhode Island Radio Club	475,305	7	K1LPL	K1LPL
Wisconsin Valley Radio Assn.	423,734	15	W9RQM	W9RQM
West Park Radiops (Ohio)	410,974	31	WA8PJA	WA8KTI
Suffolk County Radio Club (N. Y.)	384,105	22	K2ZYR	WA2QEB
Communications Club of New Rochelle (N. Y.)	381,605	7	K2AJA	.....
Rochester Amateur Radio Assn.	376,607	23	W2GB	WB2RCB
Niagara Frontier DX Assn. (N. Y.)	359,660	8	WB2VON	WA2BEX
Nittany Amateur Radio Club (Pa.)	351,116	17	K3KMO	K3KMO
Lincoln Amateur Radio Club (Nebr.)	333,771	5	.....	WAØMOB
Red Bud Amateur Radio Club (Mich.)	325,736	4	W9IOP	.....
Central Michigan Amateur Radio Club	318,083	9	W8VPC	W8VPC
Buckeye Shortwave Radio Assn. (Ohio)	272,573	13	W8OYI	W8VQI
North Dakota State University Amateur Radio Society	255,493	4	.....	.....
Westside Amateur Radio Club (La.)	239,430	7	W5BUK	.....
Order of Boiled Owls of Ohio	208,481	4	W8ETU	.....
Huntsville Amateur Radio Club (Ala.)	201,696	5	.....	W4USM
Arrowhead Radio Amateurs (Minn.)	172,525	4	.....	.....
Argonne Amateur Radio Club (Ill.)	145,332	5	W9RCJ	.....
Boeing Employees Amateur Radio Society (Wash.)	131,015	12	W7WMY	W7WMY
West Allis Radio Amateur Club (Wis.)	129,261	5	WA9GAK	.....
Atlanta Society of Teenage Radio Operators (Ga.)	115,705	5	.....	.....
Columbia University Amateur Radio Club	112,384	5	.....	W8AXX/2
Motor City Radio Club (Mich.)	103,695	8	WA8OFJ	WA8CZH
Tri-County Radio Assn. (N. J.)	100,279	7	WA2ASM	.....
Louisville's Active Radio Operators (Ky.)	99,099	6	W4CVI	W4CVI
Drexel Electronics Society (Pa.)	97,824	6	K3PLJ	K3HYT
North Penn Amateur Radio Club	88,120	6	.....	W3EWE
Walton Radio Assn. (N. Y.)	85,013	7	W2TFL	.....
Radio Amateurs of Greater Syracuse (N. Y.)	83,279	7	K2KTK	WA2QKT
Chesapeake Amateur Radio Club (Md.)	76,257	8	W3CBP	K3KEE
Penn Wireless Assn.	75,232	5	K3HNP	.....
1200 Radio Club (Mass.)	64,301	4	.....	KIKNI
Morton West High School Amateur Radio Club (Ill.)	27,406	4	.....	WA9KWP
Lake Success Radio Club (N. Y.)	5,273	3	.....	.....
Blackhawk Amateur Radio Club (Wis.)	1,294	6	WA9MJG	WA9MJG

[1] K1ANV, opr.

MIDWAY BETWEEN POTOMAC VALLEY AND FRANKFORD TERRITORIES IS MURDER -- W3DPR"

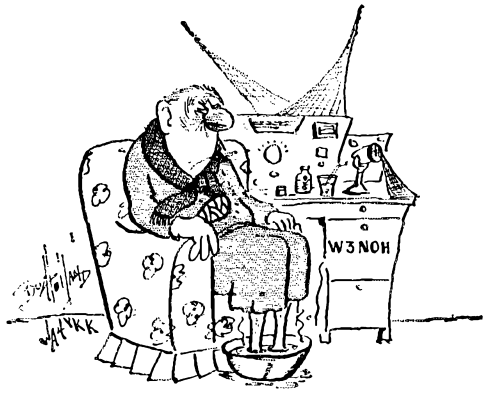


W9YT (keyed by **K9ZMS**) topped Wisconsin c.w. fans with close to 125-K. Glenn, who is also club prexy for the Badger AR Soc. (W9YT), hopes other college clubs will note their modest station. K9ZMS recalls K9ELT telling him 3 or 4 years ago that beating W9RQM in an SS would be a momentous occasion and Glenn claims all his on-the-air time has been devoted to improving his contest skills, ham friendships in rare sections etc. Fortunately he feels it paid off before he had a chance to flunk out of the Univ. of Wis.!

C.W. SOAPBOX

"Certainly a great c.w. contest. Glad to pass out a few WVAs." — *WA8POS*. "Is there a prize for making the least amount of contacts?" — *WA4NUO*. "Fun, fun, fun." — *WN9SRA*. "I would like to see this year's CHECK and DATE used in all future events, very useful information." — *W3QCB*. "Didn't work a soul that I worked in 1930 and, somehow, I didn't expect to. It was a very fine contest with many, many competitors, and well spread out over the bands." — *W1ADW*. "And some people seem to think this monkey business is fun." — *WA2UFI/4*. "Next year a keyer and a new receiver are in the works." — *W1DAL*. "The last station I worked, WA9ITB, took time out to warn me of my rough note even though the band was very active and he was in the contest. I stopped operating right then, but the League's Official Observers are so alert that two of them heard me and sent me notices. My hat is off to the OOs who spend their time helping us and to 1st-class operators like WA9ITB who take time out in a hot contest to warn of trouble." — *W8MKM*. "I remember that when I won the SS for S.F. in 1932 we had to send and receive a ten-word message. That would be something nowadays." — *WB6JQP*. "I was pretty worried about this c.w. contest. My horoscope for Saturday warned me about entering anything big, saying it might be disastrous." — *WA8MAM*.

"SPRAINED THUMB, THEN LARYNGITIS -- THE BEST PAIR OF EXCUSES A CLUB MEMBER EVER HAD."



"The gory statistics are as follows: I lived it up for 18 hours and 47 minutes, caused 356 other fellows to make log entries and ranged this contempt into 60 sections, failed to enter in my log a single one I heard and didn't work out of sheer cussedness." — *W3DVO*. "The c.w. section, more than the phone, brings out the OTs. It is nice to QSO the same old gang each year." — *W8ZJM*. "I like those beautiful log forms, don't ever change them." — *WA9JIS*. "Why not double points if you work someone with the same birthday, hi!" — *WN1GGN*. "I learned the value of Op. Aid #6 the hard way. After making 20 dupes in 300 QSOs I hereby request a lifetime supply." — *W9GJJ, opr. W9NGV*. "Some would say it just isn't possible to work all sections but VE1, but I did it." — *WA2OJD*. "Suggest a simulated precedence of M for married or S for single. It'll add additional flavor as well as getting the precedence to be used." — *W4ILE*. "As an old timer it was fun to try the SS again. It reminded me of the old days at W1AO in Mass. and N. H. Really hope to go at the contests in earnest next year." — *K4EN*. "A few people said 'why aren't you in Vt.?' I wish I had been!" — *K1YRB/2*. "Try taping your check sheets and a section list to the operating table to avoid losing them, and put your log sheets on a clip board for convenience in moving around during the test." — *K1THQ*. "After missing the last 4, I find the SS is better than ever, the best contest going." — *K9IICK*. "Even if one doesn't do too well, the SS is the most delightful aspect of ham radio." — *WØVRN*. "Very courteous and efficient operators with few repeats." — *K3EGE*. "Sixty of my 200 contacts were with operators licensed 25 years or more. Is the SS popular? You bet! My hat is off to the new crop, just licensed, who got in there and slugged it out." — *W6RCV*. "After 0300Z the silence was deafening." — *WA9PYJ*. "Everytime I'd get one equipment problem solved, another popped up. Although I was only on for 7 hours I sure learned a lot of lessons while using and repairing my Q-multiplier, monitor, TR switch and receiver." — *WØIBN*. "Why not a multiplier for low-low power rigs under 10 or 15 watts?" — *WØYSE*. "After missing the SS for several years, the short operating time and new format were pleasant surprises." — *K6CVX*. "Courtesy and patience were outstanding this year." — *K9SLK*. "My first SS and next year I plan to spend 2 months prior to the SS copying tube numbers on W1AW code practice." — *K7TVS*. "Looks like we need some expeditions to those western sections like W. Mass., W. Va., and W. Fla." — *VE3DDU*. "I'll QSL anyone needing Vernon County, Mo." — *WA9JNF*. "Due to a terrific lack of sleep before and during the SS, many times upon finding a new station I would think 'what am I supposed to do now?'" — *WA8MQE*. "I'm sure that the operator of W8FAW (WB2FIT) could add 100 QSOs if he gave up cigarettes and coffee." — *W8FAW*. "Glad to be back and the first time with time to spare. I just wish I knew the secret of those guys who can make 478 contacts with the contest only 7 hours and 35 minutes old." — *W5BUK*. "Competition is rough in L. A., especially with only a fair location." — *W6EJJ*. "The experience was more than helpful. Tnx." — *K9FZU*. "I wish to place a want ad for a schedule with a KP4 ten minutes prior to the 1967 c.w. SS." — *WA0HYI*. "Got the clean sweep this time, too bad it took both weekends to do it!" — *W4SQE*. "Surprised to work three Maine stations in 25 minutes." — *WA6KHK*. "Some of the times received suggests that some of the guys and gals need to check their sun dials with WWV before firing up for the SS, hi!" — *W8APC*. "Our 3-element beam was tuned for the phone portions of the bands, and our c.w. score shows it." — *K6LY*. "Even though I knew Kansas was a bit rare in the SS, I wasn't prepared for the onslaught! I did my darnedest to get Kansas out of the rare N.W.T.-Yuk. category." — *KØBHM*. "After getting 74 sections, it broke my heart not to get nr. 75, KP4, for a clean sweep." — *WA9ITB*. "Big thrill was in working the west coast on 80 in broad daylight." — *K9UIY*. "Your soapbox is the best reading in the SS report." — *WA8KCO*. "No prize winner here but I'd never miss an SS. I sure like the earlier starting time compared with a few years ago . . . it gets you off to a flying start while 15 and 20 are still open." — *K9DWG*. "The temperature was 20 degrees and we *had* to go multioperator so one could keep wood in the fireplace." — *WA9KAD*.

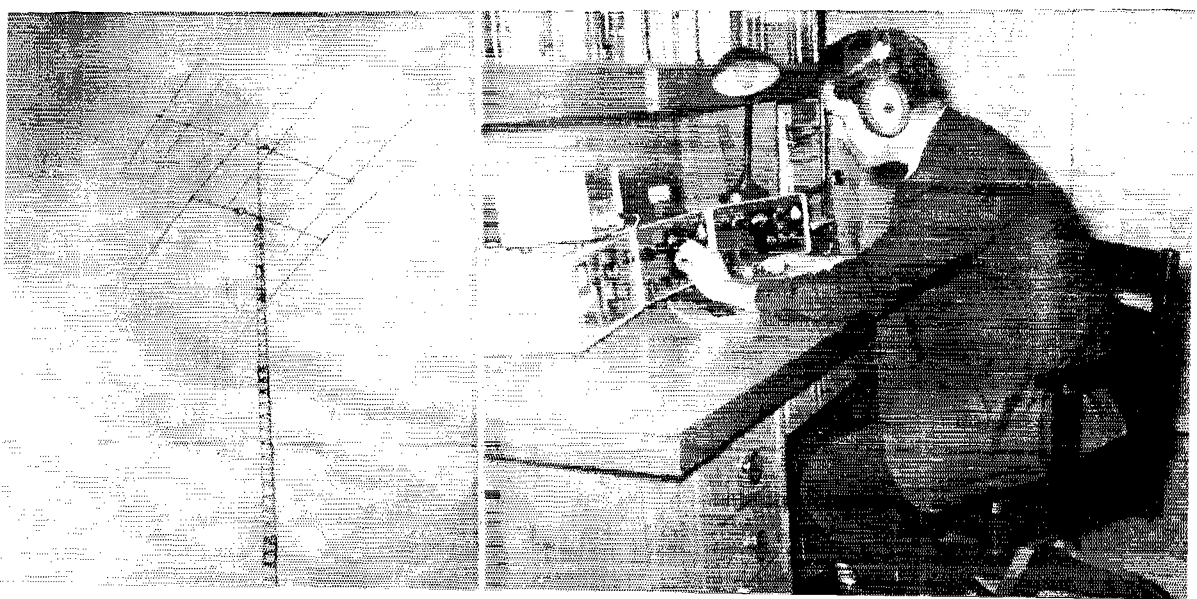
PHONE

"I had a great time in my 1st Phone SS Test. I had to borrow s.s.b. gear this year, but hope to have some of my own by next SS." — *WA3DCM*. "My congratulations to W3BES and K3JJG/3 for their outstanding scores. A beginner observing their techniques can't go wrong." — *K3DVS*. "I operated for 24 hours straight and my math teacher didn't appreciate it when I fell asleep in class the next day." — *WB2VPB (opr. W2GLQ/2)*. "Amateur radio is the height of 'lunacy'. I drove 385 miles home from college to spend the weekend in the basement working SS . . . but I'd do it all over again. Thanks for another enjoyable contest year." — *K7PGL*. "A homemade weeping-willow antenna for 20 was finished 15 minutes before the start and worked like a dream." — *WA9OFT*. "75 was in excellent condition, poor activity on 10, 40 a mess, and 20 and 15 active with 15 the better of the two for coverage." — *W6AMJ*. "My first SS and quite enjoyable. However, the dogone beam does as good to the rear as to the front." — *K9WKK*. "After my last QSO (with VE6AGV), I got ready to fly my trip (Western Airlines) and five hours later I was in Calgary having a personal visit with VE6AGV to compare comments about the phone SS. Acres of space on 10, with good skip, but where were the contestants? It could have relieved congestion 20." — *W0BWJ*. "Hoping for better S-meter activity in the *January* VHF SS!" — *WA8SSO*. "Hopefully this was the last time I'll have to operate from my college dorm room with antennas slung out the window. I'll graduate Colby in June and it is safe to say that this was my last contest from Maine." — *W1NJL/1*. "Operated the phone portion for the first time and found it very stimulating but I'll be more forceful next year." — *K9SLK*. "Had my usual bout with Murphy's Law; transmitter quit, kids knocked mike on floor, plagued with visitors." — *K8ZSZ*. "Our first sideband test and the operating was fun. However, keeping the exciter in business was a full-time job." — *WA3EPT*. "I wanted to see if a monoband station (20 meters) could make a good showing in the SS and I was very disappointed." — *K7STK* (507 two-ways in 67 sections, all on 20 meters — Ed.) "I knew the contest was almost over when W4KFC gave me number 600." — *W1EZD*. "I'm for using just one phonetic alphabet, the International, there are just too many variations in use. This would make for better transmissions in contests and in traffic work." — *W4ILE*. "Enjoy the SS more than any other contest." — *W8NBN*. "My biggest problem was in making people understand and accept the 55 check for W8UM. People must be made to realize that the check applies to the operator." — *W8FAW, opr. W8UM*. "Half of all the SJV hams moved to Missouri and the other half to E. Pa. The Wyoming hams went with them." — *WA4LSA*. "Enjoyed the good competition and didn't hear even one discourteous operator." — *W0PAN/KH6*. "I move this be renamed the 'Sleepstakes,' at least that is what one operator seemed to be saying about 0100 CST!" — *K5SGH*. "Ten open, but no contestants — why?" — *K5BVM*. "Operated just on 40 sideband with the beam aimed west, for 325 exchanges in 51 sections." — *W4MPF*. "Early in the contest a YL sent me all the necessary exchange, except the month and day of birth. I asked her twice for the birth date, then finally came the reply 1924. I was guilty, embarrassed, and finally explained but I'm afraid the cat was already out of the bag." — *W9GXR*. "A gallon of cider about midnight cut operating time down." — *WA9PIM*. "Each SS points up faulty equipment. This year has left quite an impression on me. The first thing I am going to do is to repad the seat of my operating chair." — *WA0KDJ*. "Didn't really plan to compete, but the demand for New Mexico was really something. Sure different from my WB2LRU (New Jersey) or my Virginia (WB4CNB) locations!" — *WA5QJQ*. "First time in 25 years that I turned in a higher phone SS score. Baby sitting with grandchildren on the c.w. weekend explains that. The new logs are f.b. and good signals and operating made this an outstanding SS." — *W9LNQ*.

Novice Certificate Winners

WN1GLS	WN6THT	WN8TOB
WN2YQH	WN6UHF	WN9SRA
WN3FLN	WN7GFT	WN0OVW
WN5QXD	WN8SOV	WN0PHA

It was clearly victory year for the west coast. W6CUF topped the S.C.V. c.w., as well as the Pacific Division and the entire field with 150-K. In general Jim found conditions somewhat improved over the 1965 SS and puts in a strong bid for the return of the RS(T) to the message preamble.



C.W. SCORES

Thirty-third Sweepstakes Contest

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is award winner for that Section unless otherwise indicated. . . . Likewise the "power factor" used in computing points in each score is indicated by the letter A or B. . . . A indicates d.c. power up to and including 150 watts (multiplier of 1.25 c.w., 1.5 phones), B over 150 watts (multiplier of 1). . . . The total operating time to the nearest hour, when given for each station, is the last figure following the score. . . . Example of listings: W3GAU 95,781-509-75-A-20 or final score 95,781, number of stations 509, number of multipliers 75, power factor of 1.25, total operating time 20 hours. . . . An asterisk denotes Headquarters Staff members, ineligible for awards. Superscript one denotes novice certificate winners. Multi-operator stations are grouped in order of score following single-operator station listings in each section tabulation.

ATLANTIC DIVISION

Delaware

W3GAU 95,781-509-75-A-20
W3IYE 68,220-379-72-A-24
W3TGF 45,199-355-51-A-21
K3COO 19,305-151-52-A-09
W3DRD 16,144-144-45-A- 8
W3HC 7390- 71-45-B- 8
K3TGM/3 6525- 90-29-A- 7
WA3DUM 5220- 73-29-A- 8
K3YBW 1758- 37-19-A-10
WN3GKI 394- 22- 9-A-15
WN3GQY 34- 5- 3-A- 4

Eastern Pennsylvania

W3BES 133,368-720-75-A-24
W3FLY 121,319-699-69-A-24
W3YUW 105,120-584-72-A-24
W3GHM 84,840-609-70-B-18
W3BIP 76,600-420-72-A-22
W3ISE 69,475-430-65-A-23
W3BGN 68,320-427-64-A-18
K3HTZ 59,880-368-64-A-20
K3LWR/3 54,773-327-67-A-24
K3MCO 52,800-321-66-A-20
WA3DSZ 50,750-350-58-A-17
W3QMZ 47,460-339-70-B-20
WA3DCM 45,813-324-57-A-23
K3EGE 45,000-300-60-A-16
W3BN (K3TEJ, opr.) 42,284-341-63-B-15
K3GNI 40,530-290-56-A-15
WA3AXZ 39,900-280-57-A- –
W3CNS 39,650-262-61-A-12
W3GHS 29,426-200-59-A-14
K3PLJ 29,260-209-56-A-18
K3FSV 29,120-208-56-A-13
K3JCJ 26,565-161-66-A-15
K3PTK 26,180-187-56-A-14
W3ARK 22,275-165-54-A-10
W3KDP 21,200-200-53-B- 9
K3FDQ 20,625-150-55-A-10
K3HNP 19,395-216-45-B- –
WA3DQR 19,000-200-38-A-17
W3NOH 17,220-168-41-A- 6
W3EVW 16,610-151-55-B-11
K3BNS 16,384-128-64-B- –
W3BUR 15,000-150-50-B- –
K3NJW 14,273-173-33-A-16
W3MPX 13,800-100-46-A-11
K3RFB 9322-111-38-B-14
W3EMH 9265-110-34-A-12
W3NNL 8540-104-29-A- 6
WA3BBB 8250-100-33-A-11
WA3DRC 7685-107-29-A-11
K3JLI 7400- 80-37-A- 5
WA3BFR 6728-118-23-A-11
W3MWC 6694- 73-35-A- 3
W3EQA 6064- 77-33-A- 3
WA3ENY 4615- 72-26-A-13
K3TGM 4320- 64-27-A- 5
W3CBF 4012- 59-34-B- 5
W3ADE 3900- 75-26-B- 6
WA3ERJ 3760- 48-23-A-11
K3VJA 3630- 61-24-A- 7
W3GSY 3438- 55-25-A- 8
W3JET 3281- 53-25-A- 4
WA3FUE 3163- 57-23-A-11
W3KT 2600- 40-26-A- 6
K3NUM 2325- 49-25-B- 3
W3PNL 1285- 29-18-A- 6
WA3CMD 1190- 10- 8-A- 6
WA3BSV 1023- 3- 3-A- 1
WN3FPK 1000- 32-16-A-11
WN3EVU 960- 25-16-A-18
WA3DNV 805- 23-14-A-10
K3PSW 3- 1- 1-A- 1
W3OK (W3IZI, WA3BME FGS) 55,684-434-63-B-24
K3LJZ (W2GIX, K3LJZ) 54,848-310-71-A-22
WA3CKG (WA3s CKG CNM) 25,028-219-47-A-20

Maryland-D. C.

K4GSU/3 118,260-661-72-A-24
W3EIS 106,120-585-72-A-24
W3MSR 93,736-645-72-B-24
W3AEL 77,375-470-65-A-17
W3AZD (K3OAE, opr.) 73,350-517-70-B-24
K3JYZ 67,248-363-73-A-20
W3MFJ 64,236-385-67-A-20
W3MCG 62,975-335-74-A-20
W3VAN 59,463-335-71-A-15
W3FYS 57,520-314-72-A-16
W3CSZ 55,145-319-68-A-16
W3GRF 52,650-407-65-B-12
WA3BNT 45,300-302-75-B-20
W3DVO 42,720-356-60-B-19
W3HVM 42,205-246-67-A-19
W3EPZ 40,714-261-63-A-13
WA3GTX 39,848-233-69-A-20
W3DPR 38,039-227-67-A- 9
K3ANA 37,990-262-58-A-19
W3AYS 37,375-230-65-A-12
WA3EEQ 32,415-206-61-A-17
W3RNY 29,228-217-54-A-12
W3ZA 29,160-177-64-A-19
WA3AMH 13,860-129-44-A-19
W3TN 12,500-100-46-A-14

An interesting desirable multiplier, active in both modes, good operator, hides out on 15 often to avoid the 20-meter QRM—can you guess who? Check the very end of the score listing to see if you guessed right!

W3DPJ 11,244-130-35-A- 9
W3AXW 10,353-100-47-B- 5
W3EIV 10,120- 92-44-A- 5
WA3EVY 7275- 98-30-A-10
W3JXS 7210-103-28-A- 6
W3CRP 5428- 84-26-A- 7
WA3DSD 5280- 64-33-A- –
W3FBE (W4TFX, opr.) 4148- 80-21-A- 6
K3GZK 4048- 53-23-A- 4
W3GBB 2178- 50-22-B- 5
K3OAE 1193- 11- 7-A- –
WA3EEE 1000- 25-16-A- 7
WA3ENM 750- 20-15-A- 5
WA3AZI 660- 22-12-A- 2
K3UID 300- 12-10-A- 1
W3QCB 240- 16- 6-A- 3
WA3EPT (6 oprs.) 97,900-649-75-B-24
K3TQM (K3TQM, WA3DXT) 19,268-186-42-A-24

Southern New Jersey

W2HDW 77,245-444-69-A-19
WB2TEN 69,000-500-69-B-22
K2CPR 56,800-310-72-A-17
WB2MOQ 49,024-386-51-A-24
K2ERC 44,968-288-63-A-22
W2QUY 36,448-272-67-B-20
W2EEB 32,595-615-53-B- –
K2AGU 26,326-236-54-B-23
W2ZHN 23,719-138-69-A-14
K2AA/2 (W2FYS, opr.) 20,488-149-55-A-10
WB2ALX 20,349-185-57-B-19
K2BG 14,700-137-50-A-10
WB2YCI 7700-140-22-A- 9
W2DAJ 7394- 85-35-A- 5
W2HAZ 4510- 82-22-A- 5
WB2RVX 4169- 55-29-A- 7
WB2UZB 3570- 84-17-A-13
W2ZVW 3366- 51-33-B- 2
W2BLV 1628- 31-21-A- 7
W2PJC 978- 23-17-A- 3
K2PI 625- 25-10-A- 4
WB2SXF 300- 12-10-A- 5
WA2ABF 260- 13- 8-A- 2
W2OQN 165- 11- 6-A- 2
WB2QNL 120- 8- 6-A- 1
WA2HSP (WA2s EMB HSP) 81,295-458-71-A-23
W2PAU (W2s ESX PAU) 66,385-391-68-A-23
K2ZOM (K2ZOM, K3NQV) 885- 30-15-B- 5

Western New York

WB2CON 113,000-612-70-A-24
W2MTA 75,638-428-70-A-24
K2KTK 65,640-404-64-A-12
WA2BEX 48,913-301-65-A-15
W2SSC 46,384-295-63-A- 8
K2KNV 38,500-220-70-B- 9
W2TFL 34,220-232-59-A-17
WA2KNZ 32,934-217-59-A-16
WB2FWG 28,488-215-53-A-23
WA2PCW 26,301-200-53-A-14
K2LMX 24,990-204-49-A-15
WA2SEY 21,400-180-52-A- 9
WB2PGM 20,385-151-54-A-13
K2EZK 15,683-123-51-A-14
WB2SZY 12,819-148-35-A-24
WB2VZY 12,160-128-38-A-15
W2GB 8370- 93-36-A-11
WB2TSZ 7676-134-23-A-13
K2YCO 7508- 91-33-A-11
W2SEI 7336- 66-48-B- 5
WB2PCP 7000-102-35-B-12
WB2HZH 6458- 63-40-A- 8
WB2SMD 4725- 70-27-A-13
WN2YQH 4480- 56-32-A- 8
WB2AGX 4080-120-34-B-10
WB2NSD 3348- 62-27-B- 7
WB2RXN 2760- 48-23-A- 9
K2UAN 2268- 41-18-A- 9
K2KKH 2138- 45-19-A- 3
WB2SRV 1788- 32-22-A- 2
K2KBI 1600- 32-25-B- 3
WB2HZG 634- 20-13-A- 4
W2OSL 8- 2- 2-A- 3
K2ZWI (K1USD, K2IMK) 117,000-650-72-A-23

K9DWG 54,700-310-68-A-19
W9GXR 53,768-321-67-A-24
W9VBV 50,500-300-66-A-17
WA9JIS 49,594-288-69-A-23
K9SLK 42,625-275-62-A-19
K9DSV 41,913-240-70-A-24
K9MFD 40,260-246-66-A-18
WA9SEO 39,990-258-62-A-18
K9DJQ 38,935-300-65-B- –
WA9FBC/9 32,770-227-58-A-22
K9DMW 32,130-252-51-A-23
W9LNQ 30,500-200-61-A- 8
WA9INK 28,471-204-71-B-23
K9DGC 26,263-191-55-A-11
WA9QXT 23,055-159-58-A-20
WA9BMG 22,000-200-44-A-18
WA9HS8 21,970-170-52-A-13
WA9NWK 21,600-160-54-A-17
W9REC 14,643-107-51-A-13
K9BSH 11,985-102-47-A-11
W9KDH 11,610-165-43-A-24
WA9QGQ 11,300-115-50-B-13
W9WR 9200-100-46-B- –
WA9JBN 8968-107-34-A-10
K9RVF 7800- 80-39-A-14
K9UCR 6396-120-43-A-13
W9YYG 4298- 77-32-B- 3
WA9RAT 3843- 54-31-A- 8
K9UQN 3373- 73-19-A- 5
W9ZEN 2990- 52-23-A- 6
W9JNQ 2475- 50-20-A- 9
WN9RJL 2258- 43-21-A-16
WA9OBP 1488- 36-17-A- 5
WA9SQG 1488- 36-17-A- 7
K9EWC 578- 17-14-A- 8
WA9KLU 5- 2- 1-A- 2
WA9QMB 3- 1- 1-A- 1
WA9LUD (WA9s LUD NQU) 69,530-409-68-A-24
WA9KAD (K9LGU, WA9RSC) 50,735-345-58-A-23
WA9NNA (WA9s NNA OVB) 36,642-298-62-B-23
WA9RXX (WA9s KVA RXX) 21,823-203-43-A-24

Indiana

W9IOP 134,325-900-75-B-24
WA9ITB 116,920-632-74-A-22
WA9MQI 41,000-250-64-A-15
W9CNG 32,825-202-65-A-15
W9JOO 32,325-216-60-A-21
W9DWK 31,949-213-61-A-14
W9JPX (WA9CYC, opr.) 23,228-163-57-A-19
WA9AUM 22,140-218-41-A- 6
WA9KOH (WA9MXG, opr.) 16,800-160-42-A-12
W9LKI 16,390-151-55-B-11
K9UKM/9 13,072-152-43-B- 5
W9DGA 12,275-111-41-A- 7
K9FZU 6950-140-25-B-12
WA9NXY 6311- 80-33-A-14
W9GGK 6035- 71-34-A- –
K9HCK 3162- 51- 8-B- 8
W9QLW 1460- 37-20-B- 2
WN9SWR 1190- 28-17-A- 6
K9FIC 40- 5- 4-B- 1

Wisconsin

W9YT (K9ZMS, opr.) 124,858-671-74-A-24
W9RQM 118,198-634-74-A-24
W9QQQ 102,653-557-73-A-22
W9HQT 95,375-545-70-A-24
K9GDF 87,365-513-68-A-20
W9NYJ 68,088-419-65-A-22
WA9NPB 47,900-270-70-A-16
WA9GAK 45,225-270-67-A-22
W9NGV (W9GJJ, opr.) 42,300-282-60-A-22
W9FRC 40,165-277-58-A-19
WA9IAT 36,829-242-61-A-22
WA9NYY 34,480-253-54-A-22
K9YBC 30,271-199-61-A-10
WA9HCZ 21,600-160-54-A-18
W9GIL 18,013-131-55-A- –
WA9NDV 10,028- 97-42-A- –
WA9HRS 9605-113-34-A-12
WA9IQN 9379- 93-41-A- 7
WA9QMO 8093- 85-38-A-12
WA9RUE 5480- 70-27-A-19
WA9RAK 5070- 81-26-A- 9
WA9FGL 3051- 50-27-B- 5
WN9SRA 2340- 44-24-A-11
K9JPS 1958- 46-18-A- 6
K9HFR 1510- 17-12-A- 2
W9BCC 1013- 27-15-A- 3
WN9RAM 326- 15- 9-A- 2
WN9MRV 210- 16- 6-A- 7
WA9MJG 4- 2- 1-A- 1
WA9NLT 3- 1- 1-A- 1
WA9SZC 3- 1- 1-A- 1
W9HHX (6 oprs.) 70,290-498-71-B-22
WA9PTG (WA9s PTG PTX) WN9SWX) 9759-106-37-A-24

CENTRAL DIVISION

Illinois

W9LKJ 109,200-630-70-A-23
W9RCJ 100,068-536-74-A-23
W9DOB/9 93,013-534-70-A-24
WA9NFS 87,938-503-70-A-24
K9UIY 72,000-401-72-A-24
K2CC (W1TWX, K2BFF, WA2RJZ) 53,130-381-70-B-24
WB2OYE (WB2s OYE RAN) 14,175-190-30-A- –
WB2QEW (WB2s QEW QEW) 11,676-139-42-B-16
W2QYV (4 oprs.) 3770- 52-29-A-18

Western Pennsylvania

K3KMO 85,046-474-71-A-24
WA3BJE 77,656-442-71-A-22
WA3BGE 57,700-362-63-A-20
K3HKK (W2KAT, opr.) 52,818-329-63-A- –
W8OTI/3 46,545-325-58-A-20
W3NEM 32,780-227-56-A-16
K3EXE 30,444-261-59-B-20
K3VCH 23,713-197-46-A-14
W3KQD 12,600-120-42-A- –
WA3AWH 12,120-101-48-A-14
WN3FLN 11,310-108-42-A-24
K3AKR 8728- 81-48-B-22
K3CFA 3470- 39-26-A-11
K3HZE 2730- 42-26-A- 4
WA3BDI/3 2231- 43-21-A-13
W3SMX 1840- 32-23-A- 7
K3LVA 400- 16-10-A- 5
K3UGM 350- 14-10-A- 2

DAKOTA DIVISION

Minnesota

W0I8J 88,550-517-68-A-24
W0YCR 66,300-408-65-A-17
K0ZXE 60,760-377-64-A-20
W0TKX 60,128-353-67-A-16
WA0IKP 58,460-338-68-A-23

KØLJL	50,418-303-67-A-13
WAØJHB	47,025-333-57-A-24
WAØLKL	37,433-244-62-A-20
WØKMH	21,625-173-50-A-21
WAØQCC	9379- 93-41-A-15
WAØMKF	5100- 63-34-A- 7
WAØKNP	5040- 64-32-A- 9
WAØHVR	3375- 50-27-A- 4
KØMPH/Ø	3048- 58-23-A- 5
WØKUT	2968- 53-28-B-11
WNØPRT	1069- 30-15-A-20
WNØPR8	455- 17-13-A-16
WAØDKA (WAØs BWM DKA)	84,318-485-69-A-24
WØYC (KØs OTH UXQ, WAØBPU)	81,428-517-63-A-24

North Dakota

WAØHY1	97,891-563-71-A-24
WAØOAT	15,986-134-49-A-19
WNØOVW[1]	6651- 73-33-A-22
WØKON	3500- 50-28-A- 2

South Dakota

WØSMV	83,417-569-73-B-24
WØCUC	73,576-506-72-B-20
KØZTV	5220- 72-29-A- 4
WNØOML	1105- 30-17-A-21

DELTA DIVISION

Arkansas

K5TYW	51,268-355-71-B-13
WA5KUD	34,375-255-55-A-17
W5DTR	30,200-183-64-A-14
W5RIT	4520- 57-32-A- 4

Louisiana

W5BUK	74,054-424-69-A-24
W5ABD (W5EKF, opr.)	44,104-313-57-A-17
WA5GVB	41,930-301-56-A-19
WA5PWX	35,860-257-56-A-18
W5ERR	24,060-203-48-A-15
WA5MMD	6614- 73-37-A-14
WA5NJX	5795- 69-28-A-14

Mississippi

K5IIN	65,340-498-66-B-24
WA5OYU	1188- 28-19-A-12
WA8LHH/5 (WA1DWF, WA8LHH)	11,408-125-45-B-11

Tennessee

K4RIN	95,174-525-73-A-24
W4WZC	76,320-427-72-A-24
W4SQE	71,000-400-70-A-24
K4UWH	64,423-353-73-A-20
W4ZJA (K4LRL, opr.)	39,353-297-53-A-17
W4DRT	31,928-243-54-A-22
W4OGG	3375- 50-27-A- 3
WB4AFE	200- 10- 8-A- 3
WN4CRU (WN4s CRU EHD)	1300- 29-20-A-21

GREAT LAKES DIVISION

Kentucky

W4CVI	64,800-360-72-A-21
WA4TWB	50,600-320-62-A-22
WB4BEO	11,475-103-45-A-16
K4GEZ	9800- 70-70-B-20
W4BCV	1628- 31-21-A- 1
WA4ZIR	840- 25-14-A- 4
WN4CJM	94- 9- 5-A-24

Michigan

W8UM (W8CQN, opr.)	132,813-703-75-A-24
W8FAW (WB2FIT, opr.)	105,188-561-75-A-24
W8VPC	95,809-520-73-A-22
W8DQL	86,713-501-70-A-24
W8OQH	73,219-413-71-A-23
W8CRD	72,420-408-71-A-23
WA8GUF	70,438-403-70-A-20
W8DUS	63,963-374-70-A-22
WA8MAM	57,348-343-66-A-24
W8GAI	55,605-340-66-A-16
K8ZQE	55,028-320-69-A-24
K8CGD	44,100-294-60-A-22
WA8MMV	41,791-251-67-A-16
K8RDE	33,473-210-62-A- 9
WA8FKY	31,500-216-60-A-14
W8PVI	28,620-216-53-A-15
WA8TQN	27,300-301-42-A-24
WA8ORJ	24,111-212-57-B-18
WA8RSD	22,147-185-57-B-22
W8KZM	20,300-140-58-A-16
K8HKM	17,868-173-39-A-21
K8QKT	17,550-135-52-A- –
WA8FLK	15,000-141-40-A-12
WA8MCQ	14,806-120-47-A-10
W8MKM	14,681-132-45-A-13
WA8LBH	12,300-127-40-A-18
W8DM	7800- 80-39-A- 7
WN8TOB[1]	7200- 87-36-A-22
WA8QAF	5225- 66-26-A- 5
K8UDJ	5100- 60-34-A- 5
W8JUP/8	4573- 59-31-A- 8
W8VWY	4075- 41-30-A- 4
WN8SOP	3188- 57-25-A-17
WA8PVR	2375- 50-19-A-10
WA8IML	683- 21-13-A- 4
WN8UMC	260- 13- 8-A- 6
W8S8	120- 8- 6-A- 1
W8REN (WA8s NKA RVE)	40,290-316-51-A-24
WA8BBB (W8HFM, WA8QAF)	22,381-160-55-A-14
WA8CQR (8 oprs.)	12,425-180-28-A-24

Ohio

W8NBK	106,575-609-70-A-24
W8AEB	90,503-549-66-A-23
W8QDH	85,775-470-73-A- –
K8YSO	81,030-447-73-A-23
W8ETU	80,450-454-70-A-20
W8OYI	78,894-539-73-B-23
W8CJN	76,920-416-73-A-23
WA8OCG	74,755-450-66-A-23
W8LQA	68,873-442-58-A-17
W8QXQ	66,255-424-62-A-23
WA8PJA	63,653-369-69-A-24
W8DQG	60,635-362-67-A-22
WA8MQE	60,550-347-70-A-17
K8CFH	59,138-415-57-A-21
WA8NTA	56,970-422-54-A-24
WA8PZA	54,248-361-59-A-24
WA8GYT	53,388-320-66-A-16
W8ZJM	50,781-267-75-A-17
W8AJW	50,563-307-65-A-16
WA8KUW	48,275-312-61-A-12
WA8CWU	48,034-333-73-B-21
W8ELE	46,725-297-62-A-23
K8EKG	44,100-296-60-A-11
WA8ADJ	42,776-281-61-A-16
K8BQY	42,504-392-56-B-17
WA8RWU	41,695-289-62-A-21
W8UPH	40,398-369-51-A-15
W9FTK/8	40,185-282-57-A-24
K8CQA	40,010-256-61-A-23
K8EHU/8	39,611-252-63-A-24
WA8NSL	38,475-286-54-A-22
K8ANA	38,273-205-63-A-18
W8EXI	36,013-215-67-A-17
K8ZBZ	35,400-236-60-A-16
K8NEB	35,368-329-43-A-17
WA8SHL	34,583-261-53-A-18
W8GFH	33,163-190-70-A-16
W8VQI	33,138-263-63-B-20
W8DWP	32,465-205-62-A-16
W8YPT	31,964-263-61-B-12
W8OQV	30,495-214-57-A-15
W8SUZ	30,324-266-57-B-14
W8APC	29,280-241-61-B-15
W8YCP	25,408-200-64-B- 8
WA8MCR	25,050-186-65-B-12
W8LUZ	22,113-145-61-A- 9
K8CEA	21,315-174-49-A- 8
K8IKO	18,360-136-54-A-13
W8IDM	17,425-147-45-A-11
W8GOE	17,349-160-41-A-10
WA8SLW	16,320-136-48-A-22
WW8SK	15,120-126-48-A- 7
WA8RCN	14,570-124-47-A-16
W8EFW	14,145-123-46-A-10
K8BSM	13,668-134-51-B-11
WA8RYC	12,850-130-40-A-14
WA8FDL	12,690-135-47-B-11
WA8NAZ	12,535-111-46-A- 9
WA8MGD	12,100-110-44-A-16
WA8QGK	11,780-155-38-B-13
WA8TYF	10,891- 97-41-A-16
K8EHE	10,512-116-41-B-11
W8AL	9555- 78-49-A-11
WA8SKV	9300-123-31-A-17
W8NPF	9138-108-34-A-14
WA8SCZ	8993-109-33-A-10
K8GHG	8740- 92-38-A- 5
WA8REN	8663-106-33-A-15
K8BPX	8048- 87-37-A- 4
K8DZR	7500-100-30-A- 8

K7CTI (W6BZZ) topped both Montana and the Northwestern Division on c.w. with an impressive 112-plus K. Tom was first licensed when 11 years of age (back in 1958) and holds Amateur Extra as well as Commercial First Phone. His main concern at this time is attending the University of Montana as a Junior majoring in Philosophy.

W8DZG	6825- 70-39-A-17
W8CHT	5843- 75-26-A- –
W8KMF	5785- 58-33-A- –
WA8RLW/8	5624- 68-34-B- 9
WA8QPT	5290- 52-33-A- 9
WN8SOV[1]	5120- 67-32-A-14
WA8FKD	3730- 42-26-A- 3
WA8IXI (K8QOJ, opr.)	3291- 40-29-B- 7
K8KEG	3000- 50-20-A-11
W8VZE	2594- 42-25-A- 6
WA8SXK	2563- 43-25-A-11
WA8TCW	2408- 57-18-A-11
WA8UAV	2075- 47-20-A-11
W8ZIP	1875- 50-15-A- 8
W4SON/8	1780- 26-12-A-14
W8VDF	1466- 34-17-A- 6
W8RO	1430- 44-13-A- 5
WA8SLL	1410- 24-14-A-10
WA8EYA	1274- 47-14-B- 9
K8MLV	1149- 9- 7-A- 1
WN8UIA	1045- 5- 4-A- 9
W8SZF	796- 25-13-A- 3
WA8JXM	495- 18-11-A- 1
WA8RHN	427- 31- 7-B-12
WA8TKW	358- 14-11-A- 2
WA8SFM	341- 21-13-A- 5
WN8SWH	150- 11- 5-A- 6
W8WPC	40- 4- 4-A- 1
K8WUD	5- 2- 1-A- 2
WA8NVW	5- 2- 1-A- 2
W8EDU (4 oprs.)	51,156-409-63-B-24
WA8LWH (WA8s LVT LWH)	50,065-323-62-A-24
W8LT (WA8s AJZ KKN)	11,063-150-37-B- –

HUDSON DIVISION

Eastern New York

K2AJA	105,213-596-70-A-24
W2MEL	92,565-548-68-A-24
WA2OJD	64,528-436-74-B-23
WB2DXL	55,645-360-62-A-20
WB2UHZ	41,238-279-58-A-24
WB2JYV	40,480-253-64-A-19
W2TER	30,813-226-53-A-18
WB2KOY	16,875-150-45-A- 6
WB2SOA	16,373-177-37-A-17
K2SSX/2	10,360-156-24-A- 5
WB2HZY	7695- 81-38-A- 5
DJ1ZN/W2	1728- 36-24-B- 5
W2FSL	1575- 42-15-A- –
W2SZ (6 oprs.)	67,620-490-69-B-23

N. Y. C. — L. I.

W2GGE	84,600-589-72-B-24
K2ZYR	75,970-535-71-B-22
W2AJR (WA2UWA, opr.)	66,960-388-68-A- 9
K2UQT	60,289-350-69-A-22
WB2PTS	50,220-324-62-A-19
W2GKZ	47,240-340-68-B-17
K1YRB/2	46,903-301-61-A-21
K2KD	37,781-235-65-A-21
W2DSC (WA2APT, opr.)	26,228-269-39-A-10
WB2RBA	21,930-172-51-A-16
WB2FON	21,838-180-61-B-10
K2QMF	21,450-220-39-A-13
W2LNK	18,300-125-75-B-22
W2DUS	14,175-135-42-A-10
WB2QNF	13,640-124-44-A-12
WA2VDA	13,340-116-46-A-17
WB2WMJ	13,225-115-46-A-15
WB2PHO	13,125-125-42-A-17

DIVISION LEADERS

C.W.			Phone	
Single Operator	*Multioperator*		*Single Operator*	*Multioperator*
W3BES	K2ZWI	Atlantic	W3GRF	WA2HSP
W9IOP	W9HHX	Central	W9RQM	W9HHX
WAØHYI	WAØDKA	Dakota	WA5CPX	WØHSC
K4RIN	WA8LHH/5	Delta	K5IIN	WA5JWU
W8UM	W8EDU	Great Lakes	K8DOC	WA8GUF
W2VJN	W2SZ	Hudson	W2RLM	W2SZ
WØTDR	WØEEE	Midwest	WAØMOB	WAØCHH
W1BGD	W1AW	New England	K1LPL	WA1FEH
K7CTI	KL7AIZ	Northwestern	W7ESK	WA7BKW
W6CUF	K6LY	Pacific	WA6IVN	K6LY
W4KFC	W4BVV	Roanoke	W4KFC	K4WJV/4
K7RAJ	WØANA	Rocky Mt.	WA5CVS	WA7EHB/7
K4VFY	WA4UBH	Southeastern	W4PZV	K4YSB
WA6SBO	WA6WOY	Southwestern	W6EIF	K6BPC
K6OCX	K5LZO	West Gul	K5LZO	K5VTA
VE5US	VE2DCW	Canadian	VE5US	VE3VX

"THE CLEAN SWEEP"

Worked All 75 Multipliers

W1BGD
W2LXK
W2VJN
W3BES
WA3BNT
WA3EPT[1]
W3GAU
W3ZKH[2]
W4KFC
W4KFC[2]
K4WJT
K5IIN[2]
K5LZO[1]

K5LZO[2]
W6RW
WA6URY
W7DK
W7DK[2]
W7ESK[2]
W8FAW
W8LXU[1,2]
W8UM
W8ZJM
W9IOP
WAØCHH[1,2]
KØGJD/6[2]

A classic multioperator photo of the Johns Hopkins University Radio Club crew, **WA3EPT,** and their obvious joy at the c.w. "clean sweep" aiding that hefty 97-K c.w. They had an additional f.b. phone tally of 65-K.

[1] Multi-operator

[2] Phone

W2UAL 8325-111-30-A-11
WA2URD 6105- 94-33-B- 7
WA2WUT 5619- 78-29-A- 8
WB2HIR 4858- 67-29-A-16
W2HAE 4573- 59-31-A- 5
W2TNI 3938- 45-35-A- 8
WB2UGP 3415- 69-14-A- 8
W2UNS 3105- 69-18-A- –
WA2YQW 2340- 41-23-A- 6
W2MZB 2250- 50-18-A- 3
WB2VFK 2153- 42-21-A- 8
W2NCG 1350- 27-20-A- –
WB2WXR 1170- 36-13-A-20
WB2UQP 1008- 2- 2-A- 1
WA2APT/2 725- 17-17-A- 1
W2IHE 384- 16-12-B- 2
WN2VFF 330- 12-11-A- 6
WA2TCD 180- 10- 9-B- 5
WB2ZGG 120- 10- 6-B- 3
WB2RZF 112- 8- 7-B- 3
W2NBI 75- 6- 5-A- 4
WB2CKS (WB2s CKS VBT) 64,101-465-69-B-24
WB2MJD (WB2s EJB) MJD) 2200- 44-20-A- 4

Northern New Jersey

W2VJN 127,656-677-75-A-24
W2NNL 94,253-532-71-A-24
W2DMJ 80,989-469-69-A-20
WB2NZU 74,175-431-69-A-22
WB2RKK 72,033-451-63-A-24
WB2RJJ 65,760-411-64-A-23
W2IWP 64,925-373-71-A-23
WB2TFK 63,750-425-60-A-24
WA2ASM 59,480-368-64-A-22
WB2OHK 55,929-467-59-B-20
W2GBY 44,250-300-59-A-22
K2BMI 42,458-316-54-A-17
WB2JYM 40,800-255-64-A-18
W2NEP 30,000-200-60-A-10
WB2YEW 27,900-279-40-A-22
WB2UFV 27,403-181-59-A-20
W2LYO 23,010-156-59-A-13
W2ECO 22,100-170-52-A-18
W2IPJ 20,605-159-52-A-13
WB2UEK 16,810-167-41-A-14
W2QNL 16,539-201-31-A-14
WB2UIR 14,800-160-37-A-13
W2BWW 13,043-111-47-A-15
WB2GGO 11,875- 95-50-A-13
W2IRZ 11,390-135-34-A- 9
WB2KNN 11,165-154-29-A-24
W2LRO 10,800-140-30-A-10
WB2UJK 10,500-168-25-A-21
WA2QHK 9345- 89-42-A-23
W2EWZ 7313-101-25-A- 9
K2AFQ 6045- 78-31-A- 6
WB2NHT 5250- 70-30-A-10
WB2QZE 4688- 75-25-A- 9
K2SBW 3915- 68-29-B- 9
W2MPP 1913- 45-17-A- –
W2JDH 1575- 30-21-A- 2
W2HDT 640- 16-16-A- 3
WN2YOJ 160- 10- 8-A- 3
WB2SSZ (WB2s SSZ TUP UCC) 54,900-368-61-A-24
W2GLQ/2 (WB2s RSS UJV) 17,940-138-52-A-16

MIDWEST DIVISION

Iowa

KØGXR 91,088-525-70-A-24
WØHZC 85,000-500-68-A-23
KØAZJ 72,940-436-66-A-17
WØCXN 58,793-351-67-A- –
WAØKXJ 47,503-355-67-B-22
WAØKST 41,600-284-58-A-19
WØDRE 41,170-316-65-B-19
WØATA 35,280-226-63-A-17
WØBSY 27,560-208-53-A-14
WAØJSD 20,538-156-53-A-18
WØQVA 14,022-171-41-B- 8
WAØOTE 9398- 92-42-A-15
KØCQA 4914- 95-26-B- –
WAØLUD 3953- 51-31-A-11
WØIBN 3120- 46-26-A- 7
WAØNMA 3038- 45-27-A- 7
WØYSE 2125- 35-25-A- 6
WNØNYK 3- 1- 1-A- 1

Kansas

KØBHM 83,985-512-66-A-22
WØINH 33,863-281-59-B- 8
KØBWI 18,956-174-45-A-10
WAØEMQ 18,506-164-47-A-20
WAØMLE 12,032-129-47-B- 7
WØYRN 10,496-130-41-A-13
WNØPHA[1] 9690-124-38-A-23
WØRBO 1420- 18-12-B- 7
WAØLWC (K3ZMI, WAØLWC) 13,283-118-46-A- –
WØQQQ (W5OXP, KØDJC, WAØHLO) 12,300-124-50-B-17

Missouri

WØTDR 104,500-575-72-A-22
KØDEQ 56,520-344-66-A-19
WØQWS 55,877-396-71-B-24
WAØPYJ 45,385-313-58-A-18
KØYIP 42,435-246-69-A-14
WAØJNF 30,038-226-54-A-24
WAØELM 28,325-206-55-A- 7
KØYGR 18,545-160-44-A-18
KØGSV 16,425-146-45-A- 8
WØKCG 9600- 96-40-A-10
WAØPAN 9555- 91-42-A-20
KØAEM 9240-118-40-B- 7
WØVVU 3405- 37-26-A- 4
KØJPL 3270- 55-30-B- 3
KØLGZ 1500- 30-20-A- 1
WAØNLN 1430- 37-22-B-10
WAØICX 488- 15-13-A- 2
WAØKBZ 270- 12- 9-A- 1
WØTNI 40- 4- 4-A- 1
WØEEE (5 oprs.) 79,242-553-71-B-24

Nebraska

WAØHGY 75,878-453-67-A-23
WAØGVJ 17,750-100-67-A- 4

NEW ENGLAND DIVISION

Connecticut

W1BGD* 130,188-689-75-A-24
K1ZND 98,470-542-72-A-24
W1ECH 91,132-610-74-B-23
W1CSM 83,530-462-72-A-24
W1BIH 76,816-527-72-B- –
W4JTA/1 61,975-407-60-A-24
W1TCJ 53,038-413-63-B-20
K1HTV 51,490-306-66-A-14
K1MOT 39,305-326-47-A-24
W1CNY* 35,880-299-60-B-22
W1BDI* 33,863-215-63-A-15
W1TX 33,562-243-67-B-15
W1JMY* 29,728-229-63-B- –
K1FSI/1 29,480-178-64-A-22
W1FTX 23,788-173-55-A- 9
W1DIT 23,700-198-60-B-15
WA1FCB 22,950-425-54-B-12
W1ZJJ 22,275-186-46-A-20
WA1FGN 21,625,188-44-A-16
K1DPB 21,293-168-51-A-18
W1RZG 20,688-214-46-B-14
W1DDJ 20,150-155-52-A-14
K1THQ 17,625-150-47-A- 9
W1NJM* 5438- 87-25-A- 4
W1ADW 5940- 72-33-A- 5
W1DJI 4151- 83-27-A- 8
W1EFW 3508- 61-23-A- 4
WN1GLS[1] 3393- 48-22-A-17
WN1GOO 1818- 35-15-A-14
WA1DDG 1125- 30-15-A- 5
WN1GGN 413- 18-10-A- 5
WN1GUD 350- 17-10-A- 6
WN1GZH 170- 12- 8-Q- 5
W1AW (W1WPR, W9NWX) 18,833-357-67-B-12
W1LXV (K1MJC, WA2YTJ) 27,376-232-59-B-24

Eastern Massachusetts

W1WLZ 71,750-410-70-A-24
W1DAL 52,015-359-57-A-23
K1CUD 42,075-250-68-A-18
W1AQE 26,078-171-61-A-14
WA1FHU 22,275-166-54-A-20
K1UCA 18,681-154-49-A-15
W1NTY 18,024-134-54-A-11
WA1BYA 17,220-170-41-A-14
WA1EOT 15,064-121-50-A-14
W1MRQ 6642- 81-41-B- 8
W1PLJ 6080- 80-38-B-11
K1IEM 5154- 68-31-A- 7
WA1GRP 4650- 78-30-B-19
K2GLQ/1 4600- 80-23-A- 6
WA1BMR/1 2933- 69-17-A-18
W1PH 1715- 49-14-A- 4
K1WJD 1501- 44-19-B- 1
W1JYH (W1s EOB JYH) 18,200-140-65-B- –

Maine

K1GAX 55,563-319-70-A-23
W1GKJ 8200-100-41-B- 6
W1NJL/1 4880- 61-32-A- –

New Hampshire

W1DYE/1 72,730-401-72-A-18
K1WKP 40,200-335-60-B-23
K2EPP/1 28,250-228-50-A-21
W1BUT/1 18,508-165-45-A-13
W1PEG 13,024-152-44-B-20
WA1FON 12,793-121-43-A-20
K1AC 1000- 20-20-A- 2

Rhode Island

K1LPL 123,188-675-73-A-24
W1KMV (K1JYN, opr.) 109,710-636-69-A-24
W1CJH 37,332-306-61-B-17
WA1FNK 25,000-200-50-A-22
WA1BLC 22,848-189-49-A-21
WA1FEL 11,645-142-34-A-14
WA1FRW 6433- 83-31-A- 5
W1SXX 4928- 73-27-A-10
WA1FQG 1350- 27-20-A- 3

Vermont

K1UZG 29,340-218-52-A-12
W1AYK 9900-110-36-A- 4

Western Massachusetts

W1EZD 59,498-419-71-B-21
K1SSH 53,228-453-47-A-24
W1CKD 39,726-261-61-A-19
W1WF 17,640-147-49-A- 9
WA8DOM/1 2106- 39-27-B-14

NORTHWESTERN DIVISION

Alaska

KL7AIZ (4 oprs.) 54,605-408-67-B-22

Idaho

K7CPC 58,338-363-65-A-24
W7UO 24,264-214-47-A-20
K7YFF 12,673-102-46-A-16

Montana

K7CTI 112,680-628-72-A-23
W7FLB 63,360-402-64-A-23
K7GAH 25,786-211-49-A-12
K7QCO 24,119-190-61-B-22
WAØATY/7 17,902-165-54-B-23
WA7DMA 12,320-177-56-A-24
WA7AQZ 4720- 60-32-A-22
W7FO/7 (K7s QCO TTZ, WA7FYW) 1008- 28-18-B- 4

Oregon

K7BPR 66,406-407-65-A-24
K7ZNE 61,240-392-64-A-24
K7ZMR 4725- 54-35-A- 9
WA7DGF 200- 11- 8-A- 4
WA7AXK (WA7s AXK GTL) 9095-111-34-A-24

Washington

K7UKC 83,970-481-72-A-24
W7DK (W7BSW, opr.) 60,000-320-75-A-21
K7EXT 57,369-343-67-A-20
K7VPF 55,019-324-67-A-24
K7VCX 49,120-310-64-A-21
W7WMY 48,631-300-65-A-19
K7ONB 42,630-297-57-A-23
K7BOY 39,530-300-67-B-24
WA7CXD 34,703-221-61-A-13
WA7DLO 22,475-200-58-A-24
W7GYP 20,875-150-53-A- 7
W7RGL 19,522-189-49-B-19
K7ONF 19,279-144-53-A- 9
WA7CCD 14,700-120-49-A-15
WA7BYF 12,126-141-43-B-22
W7AEA 8400- 80-37-A- 5
K7RSB 1238- 28-18-A- 5
W7EVT 250- 10-10-A- 2
W7OS 2- 2- 1-B- 1
W7AZI 1- 1- 1-B- 1

PACIFIC DIVISION

East Bay

WA6IVN 94,973-658-73-B-23
WB6ETY 56,920-238-64-A-24
K6AUD 43,400-280-62-A-19
WB6TOJ (WB6HDH, opr.) 23,618-201-47-A-18
W6NBL/6 18,800-160-47-A-18
W6TYM 12,814-149-43-B- 4
K6LRN 12,250-100-45-A- 6
W6YKS 12,038-107-45-A- –
WA7FLR/6 11,110-101-44-A-15
WB6BBC 9068- 97-39-A-19
K6BXI (K6s BXD BXI) 16,180-167-46-B-24

Hawaii

KH6IJ 70,361-496-71-B-20

Nevada

K7KHA 61,530-443-70-B-24
WAØEAC/7 15,525-136-46-A-13
K8RQO/7 10,051- 94-43-A-10

Sacramento Valley

W6ZGM 48,240-288-67-A-20
K6ORT 43,240-256-66-A-16
W6EGIX 42,750-285-60-A-19
W6NKR 32,473-210-62-A- –
WA6JDT 26,444-173-59-A-16
W6VUZ 2185- 38-23-A- –
K6RFT 1688- 38-18-A- 9

San Francisco

W6BIP 47,080-320-72-B-19
WA6RXM 43,063-265-65-A-19
W6WLV 18,243-122-57-A-14
WB6JQP 8453- 74-46-A-10

San Joaquin Valley

K6DNY 52,765-306-68-A-19
K6RTK 30,495-214-57-A- 9
W6BYH 17,110-118-58-A-11
WB6RSS 7703- 79-39-A-12
WA6VML 32- 4- 4-B- 1

Santa Clara Valley

W6QUF 150,468-822-73-A-24
K6QEX (WA6AMW, opr.) 72,154-310-71-A-24
WB6RCC 44,000-275-64-A-18
K6CQF 27,428-160-69-A- –
W6OKK 20,803-162-53-A-20
WB6SSN 18,772-183-52-B-21
WB6AIG 15,065-132-46-A-16

W6KHS 7912- 93-43-B- 6
WN6THT[1] 6753- 73-37-A-17
W6CLM 6510- 78-62-B-10
WB6ITM 5610- 66-34-A- 6
WA6VAS 5184- 72-29-A-14
K6LY (6 oprs.) 56,520-400-72-B-24

ROANOKE DIVISION

North Carolina

K4EOF 65,655-386-67-A-23
W0YFT/4 46,632-348-67-B-16
WA4PFW 46,521-310-61-A-21
W4OMW 34,999-230-61-A-13
WA4ZQM 32,700-273-48-A-21
K4QWQ 10,696-102-43-A- 7
WB4BGL 7311- 94-27-A- 5
WA4VVT 5670- 81-35-B-11
WA4WSU 4638- 55-35-A-13
WA4WML 3030- 60-24-A-16
K4KLC/4 2700- 50-27-B- 8
WA4NUO 135- 9- 6-A- 2

South Carolina

K4WJT 94,313-503-75-A-24
W4YDD 68,985-438-63-A-24
WA4VZK 43,605-258-68-A-22
W4PED 35,000-200-68-A-15
W4YSJ 14,375-115-50-A-18

Virginia

W4KFC 133,469-708-75-A-19
K3EST/4 109,964-750-71-B-21
W4YGY 107,005-573-74-A-24
W4PTH 94,275-533-70-A-23
K1ANV/4 93,240-632-74-B-23
K4CG (K3WUW, opr.) 87,095-514-67-A-24
W4YZC 84,780-472-71-A-22
W4DVT 84,713-453-74-A-24
W4ZM 73,540-403-72-A-18
W4NH 72,243-407-71-A-19
W4DKU 72,191-419-69-A-22
K4AEV 48,650-281-70-A- 9
W4GF 37,249-231-63-A-13
K4FJW 28,875-231-50-A-18
W4KXV 28,200-188-60-A-12
WA4WRW 26,535-183-58-A-15
K4UYY 26,163-184-55-A-19
K4ASU 21,200-160-53-A- 8
WB4CRL 21,165-172-51-A-21
K4MXF 19,000-150-48-A- 8
W4JAT 18,720-144-52-A-11
W4MOJ 16,611-170-49-B- –
K4QIY/4 16,170-154-45-A- 9
WA0IDK/4 15,216-165-37-A-16
K4ORQ 10,448-100-42-A- 5
WB4EGR 10,400-118-32-A-13
W4NHX 6708- 86-39-B- 6
WA2UFI/4 4234- 74-22-B- 2
WB4DHT 3885- 57-28-A- 9
W4JXD 3498- 37-27-A- –
W4WBC 2145- 39-22-A- 3
W4JUJ 1765- 18-17-A- 2
WB4CWN 975- 33-13-A-10
WA1GUP/4 699- 22-13-A- 3
WN4DVD 638- 17-15-A- 7
WA4VXR 313- 13-10-A- 3
W4BVV (W3TMZ, W4BVV) 27,000-200-54-A- 8

West Virginia

WA8KCO 38,976-267-57-A-16
W3EYF/8 26,860-158-68-A-18
WA8POS 21,640-192-43-A-16
W8OKX 14,263-163-35-A- 7
W8JWX 5490- 61-36-A-10
WN8TWR 413- 19-10-A-15

ROCKY MOUNTAIN DIVISION

Colorado

W0CDP 96,660-537-72-A-22
WA0CVS 83,800-482-69-A-19
K0VFN 61,458-408-61-A-24
WA0IZS 39,513-284-58-A-19
K0RTI 37,075-245-60-A-17
W0KFX 13,223-129-41-A- 9
WA0NJU 12,852-167-43-B- –
W0KAU 12,138-119-51-B- 7
W0KPZ 8150- 81-40-A- 6
W0HEP 7380- 82-36-A- 9
WA0COG 6956- 95-37-B- –
W0ANA (K0PYB, WA0GST) 43,200-360-60-B-20

Utah

K7RAJ 113,785-625-73-A-24
W7QDM 98,153-579-69-A-24
WA7EBR/7 42,265-262-63-A-20
K7CLS 41,023-270-61-A-19
WA7AUW 30,400-198-64-A-13
WA7BSG 25,034-195-51-A-18

New Mexico

W0JPH/5 102,288-586-70-A-24
W5BZY/5 63,630-406-63-A-23
W5DQV 8628-102-34-A- 3
K5MAT 1313- 25-21-A- 6
W5ODJ 2685- 41-26-A- 2
WA5IFX 1040- 26-16-A- 7

Wyoming

W7TSM 57,152-456-64-B-21
WA7EWC 28,860-225-52-A-24
K7IVJ 24,453-178-53-A-16
WA7CLF 20,699-156-51-A-14
W7HRM 2184- 42-26-B- 3
WA7DNZ 1030- 4- 3-A- 1

SOUTHEASTERN DIVISION

Alabama

W4U8M 103,675-556-74-A-24
K4BQP 35,573-277-54-A-24
WB4AKE 10,810-116-47-B-19
K4YUP 8500- 85-40-A-10
W4CBG 5133- 57-37-A-12
WA4SBD 825- 22-15-A- 3

Canal Zone

KZ5FX 75,880-546-70-B-20

Eastern Florida

W4BRB 71,400-444-64-A-23
W4KET 64,328-350-73-A-15
W4UQZ 58,511-374-63-A-22
WA4PXP 52,560-329-64-A-15
W4WYJ 51,538-312-65-A-14
W4ILE 48,486-304-63-A-16
WA4LCO 32,470-194-68-A-22
WA4HDH 32,450-220-59-A-20

"CHECK THOSE ACCURATE TIME PIECES AGAINST WWV BEFORE THE SS--W8APC"

WA4UFW 27,875-226-50-A-24
WA4OAB 27,270-210-54-A-15
W4HOS 19,765-134-59-A-14
W4ZOK 11,000-100-55-B-20
W4IAZ 6175- 66-38-A-10
WA4NCY 5513-105-42-A-21
W4BSW 3900- 40-29-A- 4
WB4AMY 2250- 45-20-A-17
W4UGD 1575- 41-21-B-13
W4JQU 1120- 8- 8-B- 1
K4EN 638- 17-15-A- 2
WA4YNP 510- 20-12-A- 2

Georgia

K4BAI 111,445-597-74-A-24
W4YWX 80,916-613-66-B-24
W4YE 61,685-475-65-B-17
K4HAV 52,615-312-68-A-19
W4BEY 29,916-217-69-B-17
WB4AYP 23,453-178-53-A-18
WA4YPB 15,510-132-47-A-13
K4AHO 13,079-130-47-B-12
WB4CPV 8740-115-38-B-22
W4HYW 2530- 36-17-A- 5
W4FQX 2125- 43-25-B- 2
WN4EMF 81- 8- 5-A-12
WA4UBH (WA4UBH, WB4AJR) 44,370-261-68-A-22
K4NFP (K4NFP, WA4GAY) 35,148-236-58-A-19
K4YSB (K4s NVN YSB) 13,278-117-47-A-14

Western Florida

K4VFY 112,780-621-72-A-24
K4CL 30,238-205-59-A-20
W4MLE 26,880-221-60-B- –

SOUTHWESTERN DIVISION

Arizona

W7CAL 86,838-449-70-A-24
K7TNW 67,900-400-70-A-16
WA7BNA 51,848-341-62-A-24
K7RQI 48,620-293-68-A- –
K7NTG 41,625-279-60-A-24
W7CCQ/7 31,270-213-59-A- –
W7FCD 28,073-200-57-A-15
WA7ETQ 25,436-181-57-A-24
K7TVS 24,581-173-57-A-24
W7ATV 19,110-159-49-A-12
WN7GFT[1] 6458- 74-41-A-19
W7KRW 3680- 47-32-A- 5
K7HQN 2130- 37-24-A- 7
WA7BKG (WA7s BKG FDJ) 63,456-398-65-A-24
WA7DAZ/7 (WA7s DAZ FCV) 20,410-157-52-A-24

Los Angeles

W6RW (K9ELT, opr.) 139,469-740-75-A-24
WA6URY (WA6WSO, opr.) 118,275-807-75-B-24
K6AEH 103,595-600-71-A-24
W6OEO 60,714-359-67-A-24
W6EJJ 60,063-338-70-A-24
W6BAB 58,114-370-63-A-19
K6VNX 53,034-402-66-B-20
WB6KPN 44,703-300-60-A-20
WB6IQI 44,103-300-59-A-14
WB6OUD 29,435-203-58-A-16
WB6PCV 20,020-154-52-A-20
K6BPC (K6QPH, opr.) 17,034-167-51-B- 6
WB6GRH 12,900-108-48-A-20
WB6TMC 9610- 82-42-A-14
WB6AHY 8955-103-38-A-11
WA1GTE/6 3713- 50-30-A-14
W6TMP 5280- 66-32-A- –
WN6UHF[1] 4568- 67-29-A-24
W6RCV 2400-200-60-B-13
W6MHI 1705- 32-22-A- 8
WN6SMP 998- 34-14-A-16
K6YFZ 135- 9- 6-A- 5
WN6TYK 56- 8- 3-A- 1
WB6KVA 3- 1- 1-A- 1
WA6WOY (WA6s WOY WZD) 65,274-499-66-B-24
WB6CPE (4 oprs.) 42,108-327-66-B-16
WB6NPR/6 (WB6s NPR ROR) 8610-168-41-A-23

Orange

W6EIF 79,725-481-67-A-24
K6CYX 60,936-447-69-B-23
W6QFU 36,480-285-64-B-21
K6DLY/6 2460- 42-24-A- –
WA6RND 1913- 51-15-A- 5
WB6TFP 1900- 40-19-A- 4
WA6YW8 225- 14- 9-B-10

San Diego

WA6SBO (W6EGP/W1YNP, opr.) 142,201-796-71-A-24
WB6IEX 50,050-286-70-A-23
WB6OHZ 28,668-179-62-A-15
W6YZD 3366- 51-33-B- 7

Santa Barbara

W6GEB 76,600-433-70-A-24
W6JTA 38,696-304-62-B-14
K6LBV 32,900-235-56-A-16
WB6LIV 10,500-101-42-A- 9
WB6SLT 7760- 97-32-A-15
WB6LJL 7556- 99-31-A-17
WB6DPV/6 (WB6s OCP DPV) 8405-104-41-B- 9

WEST GULF DIVISION

Northern Texas

K5RHZ 121,545-657-74-A-24
K2EIU/5 120,081-654-73-A-24
WA5JMK 51,188-325-63-A-20
K5PXV 10,868- 95-46-A-13
WN5QXD[1] 3156- 60-25-A-15
W5OPV 3004- 48-27-A- 8
WA5MZI 220- 13- 8-A- 3

Oklahoma

K5OCX 122,638-666-74-A-24
W5NML 76,653-460-66-A-23
WA5NOM 46,895-274-67-A-23
WA5NTI 330- 12-11-A- 2

Southern Texas

K5LWL 76,500-452-68-A-22
WA2ZJF/5 59,730-362-66-A-18
K5ABV 49,440-310-64-A-12
WA5AXS 21,724-180-57-A- 9
WA5CXT 20,865-161-52-A- 8
W5AR 3240- 67-27-B-12
K6RLX/5 2310- 45-21-A- 5
W7WAH/5 1800- 20-16-A- 3
WA5MUF 166- 10- 7-A-10
K5LZO (K5LZO, WA5LES) 157,800-1058-75-B-24

W9DOB/9, top Illinois phone with over 100-K, claims all his friends say he should get a special award because of his antenna system. Spence claims that his dipoles hold his mast up!

CANADIAN DIVISION

Maritime

VE1AE 11,310-116-39-A-12
VO1GF (4 oprs.) 16,900-162-40-A-24

Quebec

VE2BUW 47,598-328-57-A-21
VE2AYU 46,500-375-62-B-24
VE2DCW (VE2s BOW DCW) 40,973-304-54-A-24

Ontario

VE3EEW 56,420-364-62-A-19
VE3AWE 46,375-303-60-A-13
VE3EZM 45,820-325-58-A-20
VE3ON 45,150-302-60-A-19
VE3DDU 43,218-293-58-A-17
VE3GCE 28,050-204-55-A-18
VE3BQL 23,850-214-45-A-20
VE3DH 21,930-150-56-A- 9
VE3ES 19,825-163-61-B-11
VE3EFV 14,065-148-41-A-23
VE3FIN 3750- 60-25-A- 9
VE3BLY 3533- 81-18-A- 6
VE3CNA 2875- 52-23-A- 6
VE3DGB 2100- 53-16-A- 4
VE3VX (5 oprs.) 17,637-199-36-A-24
VE3UOT (VE3s AED EOL FBY) 13,200-163-33-A-16

Manitoba

VE4SC 31,968-279-56-B-22

Saskatchewan

VE5US (VE5UF, opr.) 100,725-603-68-A-23
VE5VP 30,281-218-57-A-14

Alberta

VE6MA 30,785-259-46-A-20

British Columbia

VE7ANP 43,865-283-62-A-14
VE7AGN 14,159-123-47-A-23
VE7BRV 1153- 77-22-A-15
VE7TV 3875- 50-31-A- 9

Yukon-N.W.T.

VE8BB 32,700-220-60-A-14

PHONE SCORES

ATLANTIC DIVISION

Delaware

W3GAU 50,530-256-65-A- 9
WA3DUM 11,215-115-36-A-11
W3IYE 6816- 71-32-A- –
W3DRD 6660- 60-37-A- 8
W3HC 5690- 68-35-B- 6

Eastern Pennsylvania

K3JJG/3 158,118-730-73-A-24
W3BES 155,224-719-72-A-24
W3LUW/3 (K3DVS, opr.) 117,504-550-72-A-24
WA3COJ 99,756-489-68-A-22
W3GHM 83,020-598-70-B-18
WA3CQW/3 79,002-420-63-A-24
WA3DCM 69,948-406-58-A-24
WA3CEJ 53,244-307-58-A-21
K3TGM 50,634-291-58-A-21
WA3AXZ 49,572-324-51-A- –
K3DPQ 48,192-251-64-A-21
W3EWE 38,877-223-57-A-22
K3PSW 35,910-201-60-A-19
W3QMZ 32,981-280-59-B-18
K3LJZ 30,677-201-51-A-13
W3KDF 29,376-192-51-A-10
W3NOH 29,025-225-43-A- 8
K3EGE 27,352-216-61-B-17
W3MWC 25,946-179-49-A- 6
K3BNS 25,650-285-45-B-14
W3DHM 24,840-138-60-B- –
K3HYT 20,625-125-55-A-13
K3QGQ 18,768-136-46-A- –
W3SF 15,750-125-42-A-11
K3GNI 12,870-110-39-A- 9
WA3CDZ 12,402-163-39-B-16
WA3DQR 9135-105-29-A-17
WA3FUE 4703-106-15-A-10
K3MCO 4248- 59-24-A- 4
W3STA 3363- 59-19-A- 6
WA3ERJ 2836- 36-17-A- 4
K3JLI 2160- 36-20-A- 4
WA3DHV 1890- 46-14-A-16
W3BUR 1584- 36-22-B- –
W3BN (K3TEJ, opr.) 1224- 36-17-B- 2
W3EQA 1200- 30-20-B- 2
W3KT 1152- 24-16-A- 3
WA3GGH 1020- 34-10-A-17
WA3CMD 759- 23-11-A-10
W3EMH 702- 20-12-A- 6
K3YWJ/3 495- 15-11-A- 1
K2VPV/3 396- 44- 3-A-13
W3PNL 360- 13-10-A- 3
K3FSV 336- 16- 7-A- 1
K3PLJ 288- 12- 8-A- 1
WA3DNV 24- 4- 2-A- 1
K3HNP 3- 1- 1-A- 1
W3OK (6 oprs.) 55,060-340-53-A-22

Maryland-D. C.

W3GRF (K1ANV, opr.) 164,141-753-73-A-23
W3AZD 123,475-575-71-A-24
W3ZKH 105,525-705-75-B-23
K3EST 102,934-700-74-B-23
W3TOO 93,827-441-71-A-24
W3MVB 86,560-460-62-A-18
W3EIS 66,228-335-65-A-24
K3JYZ 54,392-376-71-B-19
W3MCG 43,024-206-68-A-19
W3KMV 40,000-313-64-B-15
WA2DHF/3 36,816-236-52-A-24
K3FKU 31,992-250-43-A-24
W3JPT 27,448-152-58-A-23
W3NPZ 26,130-201-65-B- –
W3ZA 23,320-124-60-A-16
W3AYS 21,285-129-55-A- 9
WA3AMH 19,467-170-42-A-19
WA3BNT 13,200-100-66-B- –
W3AXW 10,812-106-51-B- 7
K3KEE 10,611-197-27-B-11
W3ZNH 9234- 86-36-A- 4
W3HRE 8358- 99-28-A-13
W3MFJ 8100- 75-36-A-11
K3ANA 6603- 71-31-A-12
WA3AFY 1536- 48-16-B- 6
W3CSZ 1224- 26-16-A- 3
K3UID 990- 30-11-A- 4
W3ONP 432- 16- 9-A- –
WA3ENM 153- 9- 6-A- 3
K3GIJ 147- 11- 7-B- 4
W3CBP 120- 8- 5-A- 3
WA3EPT (7 oprs.) 64,668-478-68-B-24

Southern New Jersey

W2ORA 65,178-307-71-A-24
K2PZF 40,788-309-66-B-22
W2QDY 38,200-300-62-B-20
K2CPR 29,728-152-63-A-19
K2AA/2 (W2FYS, opr.) 28,800-150-64-A-19
WB2BYF 22,624-205-56-B-12
K2AGU 18,473-190-49-B-12
WB2FOC 13,200-100-44-A-11
WA2DVU 7378-109-34-B-10
W2DAJ 5082- 61-28-A- 4
WB2WXA 3916- 54-27-B- 7
WB2QEV (WB2s QAC QEV QEW) 18,447-143-43-A-16
WA2WVF/2 (WB2s NUC PBX) 4088- 74-28-B-19

Western Pennsylvania

K3KMO 112,573-540-69-A-24
K3FNW 54,809-300-61-A-22
K3NIQ 34,572-258-67-B-17
WA3BGE/3330 34,754-175-57-A-18
K3UGM 9300-100-31-A-19
WA3AWH 1368- 52-24-A- 9
WA3BDI/3 4248- 59-24-A-13
K3HKK (W2KAT, opr.) 4000- 50-20-A- 6
W3WLF 3750- 50-25-A- 6
W3KQD 1275- 25-17-A- –
K3SRB 891- 27-11-A- 4
W3SMX 360- 12-10-A- 5
K3LVA 78- 13- 2-A- 6

"I WISH TO PLACE A WANT AD FOR A SCHEDULE WITH A KP4 TEN MINUTES PRIOR TO THE 1967 C.W. SS."

WA9HYI

W2HDW 3864- 43-23-A- 4
W2HLV 3075- 41-25-A- 3
WB2MNM 2835- 45-21-A- –
W2OWA 2250- 27-20-A- 8
W2VX 1305- 29-15-A- 3
WB2QAL 1238- 29-15-A- 4
W2PZD 1144- 16- 3-A-17
WB2ALX 1122- 34-17-B- 9
K2IEO 243- 9- 9-A- 2
W2ZYW 98- 7- 7-B- 1
WA2HSP (WA2s EMB HSP) 77,527-385-66-A-23
WB2RVX (W2PJC, WB2RVX, WN2UVB) 31,311-213-49-A-20
K2ZOM (K2ZOM, K3NQV) 9741- 67-34-A-14

Western New York

WA2UJM 109,038-537-68-A-23
W2VDX 77,106-362-71-A-22
WA2BEX 35,757-205-58-A-15
W3TBF/2 35,108-263-67-B-21
W2PDB 34,776-168-69-A-14
WB2RJT 33,549-211-53-A-18
WB2VHT 24,668-150-55-A-19
WB2RCB 23,310-222-35-A-13
W2SSC 21,945-200-55-B- 6
WB2PCP 18,240-152-40-A-15
WA2AQW 12,702- 73-58-A- 4
WB2SNS 11,264-128-44-B- –
WA2QKT 8694- 81-36-A-13
WB2SRV 4995- 57-30-A-14
W2CZT 3844- 62-31-B- 6
WB2RMM 2070- 45-23-B- 3
WB2HZG 1368- 29-16-A- 2
WA2SEY 945- 21-15-A- 1
WB2AGX 396- 33-12-B- 2
WA2KMI 260- 13-10-B- 2
WB2SMD 27- 3- 3-A- 1
K2KTK 3- 1- 1-A- 1
W2SEI 3- 1- 1-A- 1
W2ARV 3- 1- 1-A- 1
K2ZWI (4 oprs.) 64,608-339-64-A-22
WB2HEX (4 oprs.) 46,965-253-62-A-23
WB2NJN (WB2s NJN SXJ) 40,948-356-58-B-20
K2CC (11 oprs.) 40,260-337-60-B-23
W2OFQ/2 (8 oprs.) 31,050-313-50-B-24
W3KJM 9- 3- 1-A- 1
WA3BLE (WA3s BHT BLE) 31,464-185-57-A-21
WA3AOQ (WA3s AOQ AYC) 26,838-216-63-B-21

CENTRAL DIVISION

Illinois

W9DOB/9 104,580-504-70-A-22
W9LNQ 65,700-300-73-A-18
WA9HVQ 61,386-324-63-A-23
W9QXO 55,787-272-69-A-20
W9GXR 51,255-255-67-A-22
K9MFD 46,058-224-69-A-18
W9GEG 43,400-316-70-B-18
W9YRU 40,656-308-66-B-22
K9QPJ 31,902-206-52-A-19
W9RHV 29,406-169-58-A-16
K9DMW 27,666-174-53-A-22
WA9FBC/9 26,856-189-48-A-21
W9JJT 25,740-156-55-A-15
W9HBJ 23,814-163-49-A-15
W9YWX 17,613-155-57-B- 8
W9CRN 17,010-105-54-A-13
W9YDX 14,835-115-43-A- 9
K9SLK 14,523-103-47-A-13
WA9QFT 10,887- 96-38-A-18
WA9NFS 8190- 91-30-A- 7
WA9INK 6160- 90-33-B-13
WA9KWP 4352- 64-34-B- 6
WA9RRB 2052- 36-19-A- 3
WA9QXT 1666- 19-12-A- 5
WA9NWK 1488- 31-16-A- 7
WA9JIS 810- 27-10-A- 6
WA9QGO 690- 24-15-B- 3
WA9KLU 72- 6- 4-A- 4
WN9TFY 50- 6- 3-A-14
WA9QMB 48- 4- 4-A- 1
WN9RJL 6- 2- 1-A- 1
WA9LUD (WA9s LUD NQI) 81,774-413-66-A-24
K9AVE (7 oprs.) 56,826-432-66-B-18
WA9NXV (WA9s NXV OZC PPD) 35,393-217-55-A-20
W9BXU (5 oprs.) 22,976-145-53-A-17
WA9KVA (WA9s KVA RXX) 22,491-230-49-B-23
WA9RJU/9 (WA9s LED RJU) 20,922-159-44-A- –

K4RIN, top c.w. for Tennessee and the Delta Division, claims the sick expression was due to trying to eat, sleep and operate simultaneously plus hearing W9IOP's number 846 to his 501!

WA9PIM (WA9s JDV PIM) 18,603-117-53-A-14
WA9BRE (6 oprs.) 6438- 74-29-A-18

Indiana

K9KLR 97,485-485-67-A-21
WA9AUM 54,091-348-51-A-13
W9LKI 53,723-266-65-A-18
K9DVZ 45,927-288-54-A-24
K9WKK 41,986-256-54-A-19
WA9BRD 33,825-206-55-A-16
K9FIC 31,320-174-60-A-17
WA9FHF 26,145-125- 7-A-10
WA9AQZ 25,510-206-40-A-18
W9BF (K9ULF, opr.) 22,176-168-44-A-10
W9JOO 14,000-140-50-B-11
WA9MQI 11,824- 90-41-A-11
WA9QMX 11,439-124-31-A-11
W1DRN/9 11,400-100-38-A- –
W9JPX (WA9CYG, opr.) 3510- 60-20-A- 9
W9DGA 1084- 7- 4-A- 1
K9MMH (K9MMH, WA9AMZ) 68,160-356-64-A-24
WA9KOH (WA8ETV, WA9MXG 8658- 78-37-A-14

Wisconsin

W9RQM 132,400-601-73-A-24
W9YT (K9LBQ, opr.) 126,540-580-74-A-24
WA9AIB/9 42,850-225-62-A-13
W9QQQ 37,758-217-58-A- 9
W9GMV 32,080-222-70-B-16
WA9NPB 28,450-154-60-A- 8
WA9IQN 18,300-127-50-A-19
W9FBC 13,500-125-36-A-11
WA9HCZ 12,474- 96-44-A-19
WA9NVY 11,692-109-33-A-10
K9HFR 10,320-120-43-B-11
W9GIL 10,296- 66-52-A- –
K9EBL 10,200-100-34-A- –
WA9FGL 8505-124-35-B-11
K9LGU 7088- 87-27-A- 5
W9KXK 5680- 71-40-B- 5
WA9NDV 3240- 55-20-A- 6
K9GDF 1326- 26-17-A- 2
WA9MJG 1272- 27-16-A- 7
WA9IAT 1035- 23-15-A- 2
K9BCB 627- 19-11-A- 3
K9JPS 468- 27- 6-A- –
WA9OMO 252- 14- 6-A-11
W9GJJ/9 9- 3- 1-A- 1
WA9NLT 6- 2- 1-A- 1
WA9SZO 6- 2- 1-A- 1
W9HHX (5 oprs.) 85,555-614-71-B-24
K9YBC (K9s LWV YBC) 79,295-398-67-A-22

DAKOTA DIVISION

Minnesota

KØIUZ 76,600-360-70-A-21
WAØKEQ 54,371-274-67-A-17
WAØHVR 50,700-390-65-B- –
WAØBWM 43,719-247-59-A- –
WØYC (WAØCVW, opr.) 43,148-264-55-A-20
WAØGYQ 40,920-220-62-A- 9
WAØJKT 37,376-293-64-B-23
KØZXE 35,457-202-57-A-20
WAØIKP 17,848-117-48-A-10
WØSZW 9024- 95-32-A- 9
KØMPH/Ø 7527- 97-26-A- 3
WAØKWO 4450- 53-23-A-10
WAØJHB 777- 20-10-A- 3
WØKUI 28- 4- B- 9

North Dakota

WØKON 73,926-335-74-A-10
WAØFWC 53,010-291-62-A-18
WØKZZ 26,901-228-59-B- 9
WAØHYI 450- 15-10-A- 1
WØHSC (multiopr.) 104,142-549-68-A- –
WAØLJN (WA0s LJM LJN) 20,360-140-49-A-17

South Dakota

WAØCPX 80,380-379-70-A-19
WØCUC 79,991-542-74-B-19
WAØCJI 47,778-284-55-A-15
WAØMWN 25,758-159-54-A-21
KØZTV 3366- 51-22-A- 2

DELTA DIVISION

Arkansas

WA5NCJ 41,194-322-63-B-20
WA5MUD 39,162-214-61-A-23
WA5BQI 6831- 70-33-A-11

Louisiana

W5ZBC 85,600-470-60-A-19
K5AGI 48,992-281-57-A-18
WA5LGO 46,332-234-66-A-19
WA5EAM 31,200-300-52-B- 9
W5ERR 23,616-165-48-A-15
K7YUC/5 18,998-161-59-B-20
W5QPS 10,965- 85-43-A-10
WA5LJB 5040- 53-32-A- 8
K5YMM 2988- 42-24-A- 6
WA5JWU (WA5s JWU NWB) 39,480-238-56-A-17
WA5NLJ (WA5s GVB NLJ) 32,157-204-54-A-22
W5ABD (9 oprs.) 31,941-257-63-B-17

Mississippi

K5IIN 89,625-600-75-B-24
K5SVC 48,972-371-66-B-23
W5NCR 16,368-124-44-A-15

Tennessee

W4SQE 44,485-223-65-A-18
WA4WTO 42,030-236-60-A-18
W4IGW 25,522-134-61-A-18
WB4BOV 14,664-156-47-B- –
K4UWH 7854- 78-34-A- 6
W4OGG 3970- 45-22-A- 3
WN4CRU 11- 5- 1-A- 5

GREAT LAKES DIVISION

Kentucky

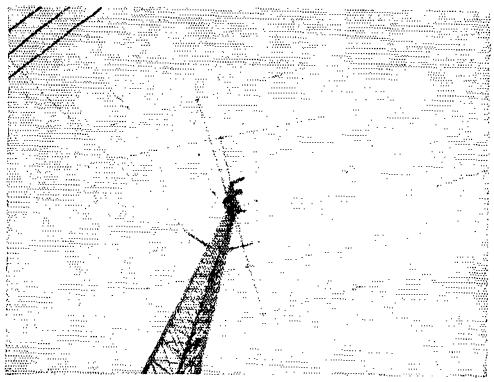
W4WYX 48,735-285-57-A-24
WA4UAZ 36,000-200-60-A- 8
W4CVI 29,968-142-68-A-13
K4RZK 27,136-212-64-B-11
WA4TWB 25,758-159-54-A-24
K4VZI 5005- 46-30-A- 9
WA4ZIR 1860- 31-20-A- 4
W4BCV 3- 1- 1-A- 5

Michigan

W8UM (W8FAW, opr.) 146,197-665-73-A-24
WA8CZH 71,073-370-65-A-13
W8VPC 55,270-270-67-A-19
WA8RYT 47,345-252-63-A-15
W8QQL 46,512-272-57-A-20
K8BGZ 37,352-284-64-B-20
W8GAI 33,852-184-62-A-10
WA8SQN 27,052-170-52-A-11
WA8RSL 22,632-164-69-B-14
WA8OSL 14,280-119-40-A-13
W8DQV, 8037- 71-38-A- 6
WA8OEE 3896- 56-22-A- 9
W8GS 2726- 47-20-B- 3
W8CQB 1768- 24-16-B- 2
W8NBN 1504- 47-16-B- –
W8VWY 1230- 41-10-A- 2
WA8MAM 1024- 4- 2-A- 1
K8ZJU 630- 21-10-A- 2
WA8SGV 585- 15-13-A- 9
WA8GUF (WA8s GUF HHO RGT) 120,225-575-70-A-24
K8TFO (K8s AXV TFO, WA8MOA) 15,078-342-66-B-23
WA8CQR (9 oprs.) 26,785-247-55-B-24
W8MF (WA8s FLK MCI) 22,956-180-41-A-24
WA8LAY (W8CRP, WA8 LAY QCW) 19,252-117-52-A-11
W8RVD (K8CGD, W8s HXZ RVD) 18,814-205-46-B-21

Ohio

K8DOC (K8TAH, opr.) 165,165-796-70-A-24
WA8MCR 133,273-621-71-B-22
W8AEB 92,400-440-70-A-23
WA8FKD 86,200-403-71-A-22
W8HDB 80,640-567-72-B-24
WA8LEO 74,800-551-68-B-22
WA8CWU 64,908-301-72-A-22
K8JOR 62,920-484-65-B-24
W8WPC 51,285-264-65-A-22
WA8KTI 50,244-318-53-A-22
W8CEA 47,532-233-68-A-14
WA8PZA 47,254-297-52-A-23
K8BSM 46,944-326-72-B-16
WA8NAZ 43,461-220-66-A-13
W8NBK 42,780-345-62-B-17
W8HSK 40,436-311-65-B-17
WA8RLW/8 37,000-201-60-A-24
WA8EDL 36,018-207-58-A-17
W8QXQ 34,231-213-53-A-17
W8UFH 31,771-263-39-A-12
W8SUS 31,755-183-58-A-15
WA8OCG 29,905-208-47-A-20
W8OQV 27,693-181-51-A-13
W8CHX 26,870-200-65-A-19
W8VQI 26,536-214-62-B-21
W8AJW 25,251-160-51-A-13
W9FTK/8 24,804-157-53-A-24
K8BPX/8 21,060-156-45-A- 7
WA8CPT 20,320-115-56-A-11
W8ZJM 20,236-115-56-A- –
WA8TWC 19,508-130-51-A-18
K8ANA 19,202-126-51-A-12
W8YCP 19,110-137-70-B- 8
W8WUO 16,686-103-54-A-12
K8ZSZ 16,497-117-47-A-10
W8VZE 14,378-107-45-A-14
W8ICS 13,590-151-36-A-11
K8CQA 10,578- 82-43-A-19
W8IDM 10,379- 94-37-A-11
W8GPE 10,101-130-26-A-11
WA8SHP 9824- 89-37-A- 5
W8IJZ 9594- 78-41-A-15
WA8DHG 8400-100-42-B-18
WA8PVS 8290- 81-45-B-10
W8OYI 7956- 78-34-A- 4
W8QDH 7524- 66-38-A- –



Leading E. Pa. takes some doing with one of the FRC crew managing to do so. Once again this year this was the case as **K3JJG/3** posted 158-K during the phone weekend. Ed is shown atop a 70-ft. tower with that 2-L 40 and the tribander at 80 and 70 feet respectively.

W8POR 7020- 65-36-A- 8
WA8GYT 6930- 66-35-A- 5
WA8SKV 6782- 69-33-A- 6
K8EKG 5037- 73-23-A- 3
W8IDWP 4774- 37-34-A- –
W8HYV 4036- 73-22-B- 9
W8EPP 3978- 51-26-A- 9
WA8SLL 3690- 43-30-A-10
WA8EYA 3113- 42-25-A-14
WA8LVT 2907- 51-19-A- 8
W8SZF 2310- 35-22-A- 3
W8SDV 2268- 42-18-A- 7
K8VJG 1896- 40-24-B- 3
WA8PFG 1824- 32-19-A- 7
K8EHE 1485- 33-15-A- 8
WA8QNJ 1260- 31-14-A- 3
K8GVK/8 1036- 12- 1-A- 7
WA8SVW 1020- 7- 1-A- 3
W8YPT 1018- 3- 2-A- 1
WA8FZS 960- 20-16-A- 3
W8BIM 796- 19-14-A- 3
WA8SLW 612- 17- 1-A- 6
WA8REN 360- 15- 8-A- 6
W8PJN 234- 13- 6-A- 1
K8VVB 180- 10- 6-A- 2
K8SLF 84- 7- 4-A- 2
WA8RCN 63- 5- 5-A- 1
WA8MGD 60- 5- 5-A- 2
K8DZR 36- 4- 3-A- 1
WA8SBG 18- 6- 1-A- 2
WA8NYW 15- 5- 1-A- 2
WA8SFM 15- 5- 1-A- –
WA8SSQ 14- 7- 1-A-11
K8WTD 12- 4- 1-A- 6
WA8RZD 11- 6- 1-A- 3

K8YSO 3- 1- 1-A- 1
WA8PJA 3- 1- 1-A- 1
W8LXU (multiopr.) 66,925-293-75-A-23
W8JND/8 (W8JND, WA8NTA) 48,348-286-59-A-24
W8LT (WA8s AJZ KKN) 9600-100-32-A- 6

HUDSON DIVISION

Eastern New York

W2BJU 133,408-614-72-A-24
K2AJA 125,712-588-71-A-24
WA2TIF 64,072-330-64-A-22
WB2MBI 30,000-200-50-A-20
WB2EXZ 15,840-180-44-B-24
WA2DTE 14,500-147-50-B-11
WB2PPK 11,730-115-34-A- 8
WB2HZY 11,700-100-39-A- 6
WB2PUH 9161-100-31-A-13
WB2UUD 5400-100-18-A- 9
W2BYI 2500- 50-25-B-13
WB2RBG 300- 20- 5-A- 3
W2BZ (5 oprs.) 87,016-600-73-B-23
WB2GMN (WB2s DXL GMN JYV) 35,160-293-60-B-14

N. Y. C.-L. I.

W2RLM 166,780-785-72-A-24
WA2QEB 84,456-406-69-A-23
WA2AXX/2 56,210-391-73-B-20
K2UQT 53,448-264-68-A-19

WØISJ, top c.w. for Minnesota utilizes dipoles just 2.5 feet up on 80, 40 and 20.

WB2FON 43,974-350-63-B-18
WB6NIK/2 42,215-273-53-A- -
W2GKZ 38,740-278-68-B-17
WB2VBT 25,776-179-48-A-19
W2AJR (WA2UWA, opr.)
24,865-185-43-A-18
K2RAR 20,784-220-48-B- 8
W2LEJ 17,278-163-53-B-16
WA2YJN 15,876-129-42-A-10
WB2RSW 12,087- 80-51-A- 9
WB2PJH 12,084-106-38-A-16
W2MGV 10,584- 84-42-A-14
W2ZV 6318- 54-39-A-13
WA2TCD 5376- 84-32-B- 7
WB2ZGG 5162- 89-29-B-12
WB4APN/2 4500- 70-25-B- 6
WA2BNK/2 4416- 66-23-A- 9
WB2VIO 4275- 57-25-A- 6
WB2UQP 4090- 52-20-A- 5
W2OQI 2880- 80-18-B- 9
W2HAF 2680- 28-20-A- 4
WB2RZF 2092- 26-21-B- 5
W2INT 1800- 80-15-A- 6
WB2UPV 1536- 48-16-B- 4
W2NBI 1260- 30-14-A- 4
WB2VZU 1095- 38-10-A- 4
WB2QIL 1092- 26-14-A- 7
WB2EMJ 1003- 1- 1-A- 3
W2DID 839- 22-13-A- 3
W2AEE (WA2ZZF, opr.)
468- 26- 6-A- -
WB2PHO 225- 15- 5-A- 7
W2UNS 180- 10- 6-A- 1
WA2YQW 15- 3- 2-A- 1
W2DSC (5 oprs.)
66,402-357-62-A-24
WB2MVA (WB2s MVA VYM)
54,069-272-67-A-24
WB2UPB (4 oprs.)
44,768-318-47-A-24
WB2MDH (WB2s MDH QZD)
43,960-314-70-B- -
WB2COL (WB2s COL LBJ)
33,936-202-56-A-22
WB2MJD (WB2s MJD PLE)
31,200-200-52-A-21
WA2PXB (WB2s RKB WNJ WXP) 23,079-243-49-B-22
WA2LEN/2 (multioprs.)
8775-117-25-A-19
WB2UGP (WB2s EMJ UG)
1405- 15- 9-A- 2

Northern New Jersey

K2OMP 53,064-401-67-A-19
WB2SSZ 49,870-282-60-A-19
WB2OHK 47,817-380-63-B- -
W2DMJ 33,096-197-56-A-11
WB2PAR 14,700-140-35-A-14
W2ECO 11,211-101-37-A-12
WB2RKK 10,200-100-34-A-13
WB2UCC 4636- 52-24-A- 6
WB2JYM 3922- 49-26-A- 3
WB2TSY 3808- 68-28-B- 8
WB2NHT 2430- 45-18-A- 5
W2IHA 2400- 40-20-A- 4
WB2UOQ 1368- 38-18-B- 6
WA2ASM 1104- 23-16-A- 5
WB2KNN 567- 21- 9-A- 4
WB2JHQ (WB2s JHQ PIA RTF) 55,052-379-49-A-24
W2GLQ/2 (W2TJD, WB2s RSS VPB)
37,179-244-51-A-19
WB2FBO (4 oprs.)
31,773-312-51-B-23
WB2KQC (WB2, KQC VFT)
11,876-102-39-A-11

MIDWEST DIVISION

Iowa

WØTYK 89,556-439-68-A-20

WAØJOA 87,720-430-68-A-22
WØBVR 47,265-347-69-B-21
WAØKXJ 26,136-244-54-B-22
WØATA 21,303-132-54-A-12
WB2FCA/Ø 14,112-112-42-A- 6
WAØJSD 10,268- 91-37-A-14
WØGHZ/Ø (WAØs JEG MTZ)
66,924-506-66-B-23
WØCRG (5 oprs.)
61,650-360-60-A-21

Kansas

KØBHM 97,500-500-65-A-18
WØLXA 58,504-412-71-B-21
WAØLWC 33,300-187-60-A-15
WAØKDJ 20,881-141-47-A-15

Missouri

KØLGZ 113,200-551-68-A-21
WAØAPC 99,774-482-69-A-24
KØREV 96,000-503-64-A-23
KØBXI (WAØEMS, opr.)
72,400-341-70-A-24
WØTDR 55,378-318-57-A-16
WØPEM 42,958-222-63-A-24
WØQWS 42,432-314-68-B- -
WAØKBZ 41,145-211-65-A- 2
WAØAHL 39,498-343-58-B-16
WA5EFN/Ø 37,500-314-60-B-18
KØGSV 34,056-172-66-A-12
KØYIP 24,960-130-64-A- 9
WAØKXZ 20,160-253-40-B-13
WAØICK 9102- 82-37-A- 7
KØJPL 8436-112-38-B- 7
WAØPYJ 8400-100-28-A- 9
KØJPG 5290- 55-26-A- 4
WAØEWZ 2592- 36-24-A- 5
KØUCG 288- 12- 8-A- 2
WAØCBH (4 oprs.)
138,937-620-75-A-24
WØEEE (6 oprs.)
100,764-469-72-A-24
WAØFAE (KØIOG, WAØFAE)
30,444-258-59-B-23

Nebraska

WAØMOB 144,504-674-72-A-24
WAØHSX 109,603-555-66-A-24
WAØJZY 85,800-451-65-A-20
WØGVM 27,280-221-62-B- 3
KØLFA 16,684-194-43-B-10
WAØHGY 7905- 85-31-A- 4

NEW ENGLAND DIVISION

Connecticut

W1BGD* 103,200-700-73-B-23
K1THQ 94,370-471-67-A-23
WA1AWX 73,030-511-70-B-22
K1ZND 63,063-319-66-A-21
K8BSH/1 54,545-355-51-A-21
W1CNY* 52,008-394-66-B-24
W1CSM 50,991-267-63-A-24
W1BIH 43,920-290-74-B-13
W1ECH 42,548-234-61-A-14
K1HTV 37,800-200-63-A-12
W1ILV 30,784-206-52-B-12
WA1CNB 21,150-150-47-A-11
W1JMY* 17,120-156-52-B- -
WA1GHW 12,400-124-50-B-22
WA1FIR 14,400-150-32-A-14
K1DPB 12,137-132-31-A-15
W1BDI* 12,126- 94-43-A-13
W1TCJ 5992- 78-32-B- 5
W1AW* (W1QIS, opr.)
5427-102-27-B- -
WA1DJG 495- 13-11-A- 1
W1LXV (WA1BGX, WA2YTJ)
39,136-341-56-B-20

Eastern Massachusetts

K1KNI 51,504-297-58-A-24
WA1FZK 25,864-216-53-B-20
WA1GRP 22,842-163-47-A-21
K1ZQV 18,040-207-44-B-24
WA1BYA 14,553-117-42-A-10
W1JYH 13,200-100-66-B- -
WA1EIH 11,325- 76- 50-A- 9
K1YRG 10,692-100-36-A- 7
W1TKG 7248- 76-32-A-13
W1MRQ 7128- 99-36-B- -
WA1BIQ 7115- 79-31-A- 5
W1LHY 7095-108-33-B- 5
WA1BFD 6150- 75-41-A- 5
W1PLJ 5112- 71-33-B-10
W1ETQ 1364- 31-22-B- 7
K1WJD 390- 13-10-A- -
K1WIM 288- 16- 6-A- 2
WA1FEK 108- 6- 6-A- 1

Maine

K1ACT 57,173-304-63-A-22
K1GAX 51,188-263-65-A-19
W1DIS 22,597-192-59-B-10
W1NJL/1 14,490-138-35-A- -
W1GKJ 12,900-100-43-A-10

New Hampshire

W1DYE/1 70,894-357-66-A-16
W1PZ 18,920-160-56-B-11

Rhode Island

K1LPL 142,560-651-73-A-24
W1HQV 97,696-697-71-B- -
W1BFB 62,424-306-68-A-19
W1KMV (K1JYN, opr.)
45,720-254-60-A-18
K1HMO 37,632-295-64-B-22
WA1FNK 27,768-178-52-A-22
WA1EEJ 19,000- 50-12-A- 6
K1NQG (WN1GGD, opr.)
2008- 38-22-A-13

Vermont

W1UOP/1 47,120-381-62-B-18
K1UDP/1 4608- 77-32-B- 8

Western Massachusetts

K1NWE 90,072-417-72-A-24
K1KNQ 49,295-282-59-A-22
W1EZD 35,072-274-64-B-15
K1DGQ/1 18,954-162-39-A-19
W1EOB 18,252-119-54-B- -
W1WF 14,016-146-48-B- 9
WA1FEH (K1DFC, WA1FEH)
51,100-365-70-B-24

NORTHWESTERN DIVISION

Alaska

KL7AIZ (K1ZYW, K2LRE, K6OZL) 45,184-353-64-B-17

Idaho

K7SWW 49,400-366-65-B-22
K7YWM 8505- 81-35-A- 6

Montana

K7PGL 48,573-257-63-A-24
WA7BQS 33,835-199-55-A-14
WAØATY/7 19,963-150-43-A-24
W7FLB 4913- 69-25-A- 5
WA7BKW (4 oprs.)
90,984-451-68-A-24
W7FO/7 (7 oprs.)
14,352-349-64-B-24

Oregon

K7STK 67,804-507-67-B-14
W7CMC 14,098-133-53-B-16
KØYSU/7 1080- 32-20-A- 8
K7WWR 1026- 29-12-A- 4
WA7EFP (WA7s EFP GLY)
23,680-165-48-A-24

Washington

W7ESK 202,050-906-75-A-24
W7DK (W7BSW, opr.)
152,425-673-75-A-23
W7BUN 114,400-540-70-A-23
WA7FFU 51,942-401-66-B-23
K7VCX 14,730-250-60-A-17
K7ONF 36,462-210-59-A-18
W7EVU 34,431-196-57-A-16
W7WMY 32,277-205-53-A-13
W7UZE 30,420-234-65-B-18
W7EYD 27,318-236-58-B-14
WA7EGJ 25,536-280-58-B-15
K7YDZ 17,316-111-52-A-11
K7VPF 16,642-123-44-A-23
WA7BHH 14,352-130-52-B-10
K7NWS 14,025-133-53-B- 8
WA7BYF 12,864-134-48-A-24
WA7ACQ 11,400-100-38-A-10
W7RJW 5534- 65-31-A-16
W7EVT 5265- 65-27-A-14
W7CJL 4425- 59-25-A- 8
K7RSB 4050- 50-27-A- 7
K7TTS 3600- 50-24-A- 7
W7AEA 3139- 31-33-A- 2
WA7BDB 320- 16-10-B- 3
W7CBE 18- 3- 3-B- 1
W7AZI 2- 1- 1-B- 1

PACIFIC DIVISION

East Bay

WA6IVN 95,400-666-72-B-24
W6VNH 72,030-345-70-A-21
WB6FPP 38,208-200-64-A-21
WB6BID 33,129-205-54-A-22
WB6LRV 28,236-181-52-A-24

Hawaii

KH6IJ 57,270-415-69-B-19
WØPAN/KH6
20,097-160-63-B- 9

Nevada

WA7EJZ 30,225-156-65-A-19
K8RQO/7 8436- 76-37-A- 5
WA7DIA 2805- 43-22-A- 9

Sacramento Valley

WB6LTY 48,945-252-65-A-17
WA6JDT 29,449-164-58-A-14
W6VUZ 28,260-157-60-A-13
WB6UNP 22,842-141-54-A-15
WB6ONU 16,500-110-50-A- 9
WB6MZX 15,382-154-47-B- -

San Francisco

W6BIP 48,580-244-65-A-21
WA6AUD 39,902-281-71-B-20
WA6RXM 13,530-110-41-A-13
WB6OGF 11,448-106-36-A- 9

San Joaquin Valley

WB6NCJ 20,732-136-51-A-16

Santa Clara Valley

WB6ITM 20,904-134-52-A-16
W6TPL 18,700-173-55-B-17
WB6GRX 1584- 33-16-A- 6
K6CQF 450- 15-10-A- -
K6LY (5 oprs.)
77,420-567-70-B-23
WB6GFJ (4 oprs.)
71,060-514-70-B-24
WB6AAZ (WB6s IQL LWO)
37,364-222-57-A-23
WB6JOD (W6KHS, WB6FFB)
24,949-211-61-B-18

ROANOKE DIVISION

North Carolina

WØYFT/4 44,200-341-65-B-14
WA4LSA 37,058-204-60-A-16
W4MPF 32,895-325-51-B-19
WA4IWE 26,568-186-48-A-19
WA4FFW 16,296-201-42-B-12
WA4KWC 10,240- 77-40-A- 9
WA4NUO 1050- 54-25-A-11

South Carolina

K4WJT 86,478-406-71-A-19
W4YSJ 24,400-200-61-B-17
WA4VZK 17,250-126-46-A-18
W4ULY 14,700-100-49-A-12
K4WJV/4 (8 oprs.)
85,145-522-63-A-24

Virginia

W4KFC 138,250-611-75-A-21
W4BVV 127,161-601-71-A-24
K4CG (K3WUW, opr.)
118,810-581-70-A-24
W4PTR 32,310-410-67-A-23
W4ZM 41,950-210-65-A-11
W4YGY 31,716-231-58-A-20
WAØIDK/4 31,824-221-48-A-23
WA4JGA 17,200-100-54-A-15
W4JVN 14,108-105-45-A- -
WB4BIZ 14,040-117-40-A- 7
K4ORQ 13,739-107-43-A-11
W4WBC 11,160-124-45-B- 8
W4MOJ 8424-117-36-B- -
W4GF 4770- 53-30-A- 6
W4DKU 3312- 48-23-A- 3
W4YZC 2565- 45-19-A- 3
WB4CRL 1305- 29-15-A- 6
W4JXD 1144- 8- 6-A- 2
K4LMB 819- 20-14-A- -
WB4BLJ 684- 19-12-A- 6

West Virginia

WA8QND 49,006-256-63-A-21
K8QYG 210- 10- 7-A- 1
WA8FMA (WA8s FMA KQX)
72,175-367-65-A-20

ROCKY MOUNTAIN DIVISION

Colorado

WAØCVS 128,694-610-71-A-24
KØOER 69,795-358-66-A-18
KØSUB 44,321-241-63-A-14
WØBWJ 26,326-134-63-A-17
WAØDDW 22,550-205-55-B-15
WØHEP 14,635-101-45-A-12
WØKFX 5624- 89-23-A- 6
W9HRB/Ø (W4CHQ, K7VRT)
9348- 76-41-A- 6

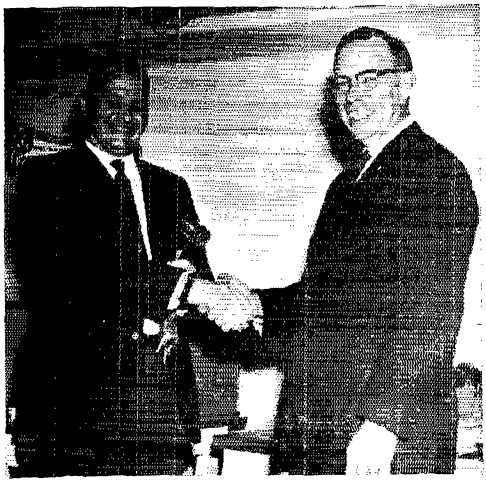
New Mexico

K5FPO 94,806-460-69-A-24
W5DQV 86,824-449-64-A-15
WA5QJQ 32,588-199-55-A-16
W8BZY/5 9660-116-42-A-10

(Continued on page 166)

Top E. Mass. c.w. **W1WLZ** and his neat station featuring an SB-301 and 401—final score 72-K.

Strays



The award of the first gavel during the HamQuest '67 campaign went to the Arapahoe Radio Club of Littleton, Colorado, Sparked by WAØNQL, the Arapahoe Radio Club was the first to sign up twenty-five new members for ARRL. The award was presented by Rocky Mountain Division Director WØBWJ (r.) on January 9, to "Hank" Hankinson, WAØNQL (l.) (WØHNC photo)

The Dutch World Broadcasting System announces that Radio Nederland will conduct a radio propagation course in the English language commencing Thursday, April 6, 1967. Among topics to be dealt with are: Ground and sky wave propagation, the various ionospheric layers, single and multi-hop trajectories, signal strength in relation to radio noise, influence of distance, season, and time of day, the sunspot cycle, solar flares and storms, absorption, fading, and v.h.f. propagation. Printed text material and diagrams will be made available, free of charge, to anyone who plans to actively participate in the course. Full details of the frequencies of the broadcasts and their times, will be sent to those who enroll in the course. Enrollment may be accomplished by writing: Propagation Course, % Mr. H. van Gelder, Radio Nederland, English Section, P.O. Box 222, Hilversum, NETHERLANDS.

—•••—

Join the Amateur Radio Club of Newfoundland in celebrating Canada's 100th Birthday by participating in the Canadian Centennial Year Contest. *Prize:* white mounted seal; runners up receive commemoration certificates each country. *Time:* March 1, 0001 GMT to March 31, 2359 GMT. *Object:* work maximum VO1, VO2 stations including portable and special centennial year calls 3B1 and 3B2 stations. *Scoring:* 1 point each QSO, each mode, each band (i.e. 20 meters, 3 points maximum each VO station, 1 c.w., 1 RTTY, and 1 phone). *Rules:* all countries as per Canadian DOT regulations outside Newfoundland and Labrador; final entry date May 31, 1967; send list of contacts with times in GMT to VO1AT Amateur Radio Club of Newfoundland, P.O. 266, Gander, Newfoundland, Canada.

B.A.R.T.G. SPRING RTTY DX CONTEST

The British Amateur Radio Teletype Group is sponsoring a spring RTTY contest that will run from 0200 GMT on the 4th of March to 0200 GMT on the 6th of March. Stations may not be contacted more than once on any one band (80 through 10 meters), although additional contacts may be made with the same station if a different band is used. Use the ARRL Country list for country status. However, KL7, KH6, and VO will be considered as separate countries. The message exchange will consist of message number, report (RST), time in GMT, and country. All two-way RTTY contacts with stations in one's own country will earn two points, with stations outside one's own country earning ten points. All stations will receive a bonus of 200 points per country, including their own. Scoring will be done as follows: (A) Two-way exchange points times total countries worked. (B) Total country points, times number of Continents worked. Add A and B for total score. Single and multiple operator stations will compete separately. The transmission of RTTY on more than one frequency at one time will be disallowed. Logs and score sheets should be sent to B.A.R.T.G. Contest Manager, Alan Walmsley, G2HIO, The Firs, 3 Trinity Close, Ashby-de-la-Zeuch, Leicestershire, England, not later than May 1, 1967.

Feedback

There is an error on the top of page 49 in the "Hints and Kinks" section of February *QST*. The eighth line in the second column should read, "the 4700-ohm resistor with a 47,000-ohm unit."

Pictured at the right is WØTCK's home made tower. Herman constructed the tower from used windmill towers which he obtained from farmers. It stands 112 ft. high, with the base of the ground plane on top at 127 ft. The tower at the left is a windmill tower with a platform added.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

The Party Line

YEARS ago, down on the farm, our telephone was on the same line with eleven others. It jangled away all the time. Each party on the line had his own ring, and there was seldom a time you would lift the receiver that someone wasn't talking. On every such party line (and there were many of them, in those days) there was always at least one person who monopolized it a great deal of the time with idle chatter. As often as not, if you wanted to make a call, you had to let your desire be known if you wanted to get the line. The party line was no place for backward, shy personalities.

But a system like that has to have quite a large element of courtesy in order to work. Courtesy we had. It was considered perfectly ethical to listen, but not to horn into a conversation. If you wanted to make an important call, or if your time was limited, persons engaged in casual conversation on the line would gladly relinquish the line so you could do so. In such a case, it was expected you would make your call brief and to the point, and get off the line. You didn't ask someone to relinquish the line from chatter so *you* could chatter.

It seems to us that we amateurs could use a little party line courtesy in our daily public service operation — because after all, this is what the amateur bands are, a huge party line. No one has any prior or exclusive right to any frequency or channel (expect in FCC-declared emergencies), QRM is bound to occur, and yet every day we hear squabbles on the air about someone QRMing someone else, accusations that it is deliberate, arguments about whose activity is the more important, refusals of amateurs to respect the rights of others, or of nets.

Not too long ago in the same mail we received a letter saying one of our blankety-blank nets had started up right on the frequency on which the writer and a friend were having a QSO; another from a net manager was indignant that a QSO party crawled all over his net and kept it from operating; and still another from a net manager asked if there wasn't something that could be done about rag-chewers camping on top of nets. The first amateur felt he had a prior right to the frequency on which he was chatting with his friend. Not so. The net managers above felt that QSO parties and rag chewers, much less important than nets, should stay off of net frequencies. But the net-QRM'd amateur is prone to argue that what he is saying to his friend is just as important as a "wish you were here" message to Aunt Susie which, he says, probably won't get to Aunt Susie anyway.

It all depends on how you look at it. Arguments about importance are not progressive, since importance is pretty much a matter of opinion. Talk about "rights" is pointless, because all amateurs have equal rights to the frequencies on which they operate. Howling about malicious QRM only creates strife and makes a bad impression; it is next to impossible to prove.

What is most needed is not laws, or rules, but plain old-fashioned courtesy. This will not prevent QRM; we can't do this, there are too many amateurs and too few frequency channels. But it *will* make for friendlier feeling and a better impression on the listening public. Before starting up your net on its scheduled frequency, try to contact anyone ragchewing there and ask them if they would just as soon move a little. Don't demand it. You may think your net is more important than their conversation, but they probably don't think so, and they have as much right to the frequency as you do. On the other hand, you have as much right as they do. It's an impasse, a draw, a stand-off. Resolve the problem with courtesy, not with bitter words, invective, and accusations. Let's try to operate harmoniously on our amateur radio party line.— *W1NJM.*

WAØEYG, Lowell Mathison, was one of many amateurs who provided emergency communication during the tornado that struck Belmond, Iowa, on Oct. 15. (*Photo by* Ames Iowa Tribune.)

* Communications Manager.

National Traffic System

As we pass year-end, we start gathering statistics for annual reports. It's an annual chore, like spring housecleaning. The members want to know how we stack up, compared to our status of a year ago and previous years. It has been the custom since 1951 to make a statistical analysis of NTS Region nets on a somewhat competitive basis and, about this time each year, to present a "statistical champ" among our twelve NTS Region nets.

Last year we presented a summary of the "champs" since we started keeping these records (Apr. '66 *QST*, p. 45), and noted that RN6 was the winner for 1965, just nosing out RN5. The 1966 analysis shows RN6 again to be the statistical champion, this time with 9RN in second place, RN5 dropping to fourth. The ratings are based on number of sessions, total traffic handlings, rate, average traffic per session, and percentage representation of Section nets. RN6 was tops in two of these categories, second in two others, and third in representation, which averaged out well above the other Region nets. Congrats to the RN6 gang for the second straight year, and congrats also to 9RN in coming from fifth place in 1965 to second in 1966. Here is the table, showing the relative standings of the Region nets in all five categories:

Net	Sessions	Traffic	Rate	Average	Rep.	Final Standings
RN6	2	1	2	1	3	1 (1)
9RN	9	6	1	1	1	2 (5)
3RN	2	4	6	6	1	3 (4)
RN5	2	2	7	3	7	4 (2)
TEN	5	3	4	5	10	5 (8)
8RN	1	7	10	9	5	6 (10)
2RN	7	8	3	11	4	7 (3)
4RN	8	5	8	7	6	8 (6)
RN7	10	10	5	4	11	9 (7)
1RN	6	9	11	10	8	10 (9)
TWN	12	11	9	8	12	11 (11)
ECN	11	12	12	12	9	12 (12)

In order to stay up in these standings, Region nets can't just repeat previous years' performances. The general trend of NTS affairs is *up*, and in order to stay up with other NTS nets, each NTS net has to show progress from year to year. If they stay the same, they get left behind by those who are maintaining the pace.

Nearly all NTS statistics seem to be up from all previous years. We'll have more about this in later literature, especially the annual ARPSC Bulletin. We're doing fine. Let's keep it up, there is still a long way to go. — *W1NJM*.

December report:

Net	Sessions	Traffic	Rate	Average	Representation (%)
1RN	62	792	.378	12.8	88.4
2RN	58	744	.851	12.9	98.9
3RN	62	1176	.659	19.0	99.5
4RN	58	1092	.646	18.8	91.3
RN5	62	1730	.641	27.9	96.2
RN6	62	2231	.950	35.9	100
RN7	31	1003	.755	30.8	79.8[1]
8RN	62	987	.486	15.9	97.9
9RN	31	773	.850	24.9	98.4[1]
TEN	62	1573	.814	25.8	85.1
ECN	31	201	.284	6.5	86.0[1]
TWN	31	557	.486	17.9	85.2[1]
EAN	31	3154	1.872	101.7	98.4
CAN	31	2840	1.603	91.6	99.9
PAN	31	2934	1.376	94.7	97.8
Sections[2]	2053	19,754		8.9	
TCC Eastern	119[3]	1506			
TCC Central	131[3]	1571			
TCC Pacific	140[3]	2267			
Summary	2758	46,885	EAN	14.6	94.2
Records	2811	44,109	1.643	23.5	

[1] Representation based on one or less sessions per day.

[2] Section/Local nets reporting (65): NCSSB NCNE NCNL (N.C.); N.Y.C.-L.I. PN· MOSSB MOTTN PHD (Mo.) OZK (Ark.); EMNN (E. Mass.); GSN (Ga.); SCSN SCN/NCN (Cal.); NTTN (Tex.); PTN (Maine); BN OSSBN (Ohio); Alta. SSB; WPA PTTN EPA (Pa.); LAN (La.) OSN BSN (Ore.) VN VSBNE VSBNL (Va.); Iowa 75; AENB AEND AENH AENM AENO AENR AENT (Ala.); QMN(s) QMN(f) Wolverine Mich 6 (Mich.); GN FMTN QFN WFPN (Fla.); SCNE SCNL (S.C.); MDDS (Md.-D.C.-Del.); BUN (Utah); BEN WSBN (Wis.); RISPN (R.I.); CPN (Conn.); MSN MJN (Minn.); WSN (Wash.); TSSBN ETPN TN TPN (Tenn.); NJN NJPTN (N.J.); MEPN MTN (Man.); WVN (W. Va.); ILN (Ill.).

[3] TCC functions not counted as net sessions.

Amateurs in Philadelphia, Pa., set up a message-handling service for the public a few weeks before Christmas. Needless to say, the response was excellent and large numbers of messages were handled. Pictured here are a few of the participating amateurs: City representative; W3PST, W3ELI, W3INW, K3WEU, K3JKT, WA3ATQ (seated).

1966 concluded on a good note, records broken during December. We can't help but take special note of the almost unbelievable traffic total EAN reported this month. Along with it, K1WJD shows an equally fantastic rate and average for the month. Good show, boys.

The way our figures are adding up, it appears that 1966 was a record breaking year for NTS in all departments. Not being satisfied here, we are looking to bigger and better things in the years to come. There are little things that need to be worked on: improved representation at all levels of NTS; better coverage on the part of Section and Local nets; the submission of more reports each month and their being sent in on time.

W1EFW notes the record traffic total and average that 1RN produced this month. WA2GQZ sends a silent key report on long time traffic handler W2RG. K3MVO sez this month's traffic total is the highest 3RN has had since he took over as manager. W4SHJ issued a 4RN certificate to W4HJS. "For the first time in a long time," comments K5IBZ, "Texas was represented 100% of the time." K7JHA issued RN7 certificates to *W7s* ZIW HMA JEY. *W7s* DXI BYP, KL7AIZ and *VEs* 6XA 6ITH 7ASY. K7IWD was named the top NCS for 1966. W9QLW informs us that 9RN is now operating at 0145z and by April, there may be a second session at 0330z going. WØLGG issued a TEN certificate to WAØPYJ and comments on the fine showing her gang made this month. 3C3BZB remarks that Dec. was a good month but now we are in the January slump. All's well, but there is little traffic. K7NHL received all net reports this month and notes a good crew of new ops coming along.

Transcontinental Corps: "December saw the boys putting on a great show with the regulars doing a beautiful job with the deluge of traffic," comments W3EML. "With the exception of the spotty work on function D, December's performance exceeded any since I have been the director." W9JUK is starting the ball rolling towards the formation of a Central Area Staff (CAS), paralleling PAS and EAS. W7DZX begins the new year with all skeds set up once again so reports should show improvement.

December report:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	119	90.8	4240	1506
Central	131	87.7	3349	1571
Pacific	140	85.7	4534	2267
Summary	390	87.0	12,124	5344

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 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.

TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EFW NJM, *K1s* ESG TMK WJD, *W2s* GVH SEI, *K2s* RYH SSX, *W4Qs* BLV UFI/4 WBA/5 UPC, WB2OHK, *W8s* EEB EML NEM, *K3s* HKK MVO, WA3EEQ, *W4s* DVT HJS ZM, *W8s* CHT HQL RYP, K8KMQ, WA8CFJ. Central Area (W9JUK, Dir.) — W4OGG, K4DZM, WA4WWT, *W5s* GHP KRX, WA5JOL, *W9s* CXY DYG HRY JUK QLW VAY ZYK, *WA9s* NFS OYI, *W0s* LCX TDR YC, KØAEM, *WA0s* IAW M E. Pacific Area (W7DZX, Dir.) — *W6s* VNQ EOT IDY BGF HC IPW EMS TYM, *K6s* AJU LRN, WA6ROF, WB6HVA, *W7s* DZX ZIW HMA, VE7BDJ.

—•••—

Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
7290	44	1556	960
Mike Farad	58	661	1024
HBN	31	486	997
North American SSB	31	919	1708
1SSB (20)	21	401	2454
1SSB (75)	31	1333	1062

—•••—

Diary of the AREC

At approximately 2030z, Oct. 10, a tornado touched down at the southwest corner of Belmond, Iowa. The tornado ripped across the town, taking most of the buildings with it. By 2100z, WØNGS was on the air and activated the Iowa 75 Meter Phone Net. Contact with *WA0s* GZF NEH and WØHWA was quickly established, and all three volunteered to go to Belmond and operate mobile, make a survey of the situation, determine the needs for communication and help in whatever way they could. It was soon determined that there was absolutely no commercial communications possible and no commercial power available. This information was relayed to WØNGS, who in turn relayed the information to the other volunteers on the frequency who handled the traffic directly to the proper destinations.

During this time, KØHFU volunteered his services and equipment to be set up as a permanent portable station within the town for the duration of the emergency. KØHFU traveled about 100 miles and set up a station by 0100z. Inter-town communication was also needed and a number of the 6 meter operators from Ames, Iowa, were recruited and stations were set up. One at the hospital, which was relatively untouched by the storm, one at the junior high school building which was used as the Red Cross Headquarters and refugee center, and one at the fire station where KØHFY was set up. Later on, the national guard unit requested additional communication and they were brought into the 6-meter net that was operating.

All out-going traffic was handled on the Iowa 75 Meter Net, and for the most part, the out-of-state traffic was relayed to KØTYK who had organized an emergency net on 20 meters to handle such traffic. Incoming traffic was either handled directly on the 75 meter net or, when the volume grew too great to handle without interfering with the out-going traffic, on another frequency where it was held until KØHFU could collect it.

W8RYP alerted 8RN at 0230z, Oct. 15, then went to the Iowa Emergency Net frequency for the evening. W8CHT, 8RN manager, informs us that there were no extra sessions held and a few stations were assigned to monitor the NCEF just in case. Apparently, all the traffic handling was being done on phone and none on c.w.

From Wisconsin, we find that W9GPI checked into the Iowa net and was asked to check with a radio station in Minneapolis, Minn., for the location of their mobile unit which was enroute to the Belmond area. K9KJT, Milwaukee Co. EC, was contacted by a local radio station and asked to take health and welfare traffic for the disaster area. This traffic was relayed to the Iowa net the next day.

By evening, Oct. 15, two telephone trunk lines had been connected to Belmond, but these lines terminated at what was left of the telephone office. By late in the afternoon of Oct. 16, the town had eight working trunk lines and houses were rapidly being re-connected to the phone circuits. Commercial power was also restored that afternoon.

As work crews began the clean-up operation, and the need for communication lessened, the amateurs slowly packed up their gear and left the area.

—•••—

VE5BO, Prince Albert, Sask., EC, received a telephone call from the manager of a local radio station on Nov. 12. Inquiry was made as to any amateurs who might be in the Candle Lake area where some men had gone fishing and who were overdue as of the night before. VE5BO got a description of the two men and boy, then called the local RCMP headquarters. They didn't feel the situation was serious enough as yet, but would be on the alert. It should be pointed out here that weather conditions were something less than good. A heavy snow storm was in progress and the temperature was approximately 20 below! As time progressed, the men were still not located and no word was received from them; VE5BO continued making arrangements for amateurs to participate in the search, should one be started.

Later that day, preparations were made to send out the communications team, *VE5s* FW IT GM, to Candle Lake. Information received indicated that the missing persons might be in their truck if they couldn't find any other shelter. As the communication teams began their trip, VE5BO was informed that the truck has been found by a conservation officer, and the occupants were safe. Evidently, the driver had lost control of the truck and had gone off the road. Since it was snowing so badly, they were unable to get the truck back on the road, so they sat and waited for help.

VE5BO then went through the process of informing all concerned that the men had been found and that all was well. Those amateurs known to have participated were: *VE5s* DR IR JD PA VW ZM. — *VE5BO, EC Prince Albert, Sask.*

—•••—

On Nov. 12 and 13, Yakima, Wash., EC, K7MGA, headed a party of eleven amateurs while they provided communication for the sheriff's office and the Indian agency. Those amateurs known to have participated were: *W7s* PHG UVI WCW GIP, *K7s* RRR SRC USG LWZ, WA7BMW, WAØDFM. — *K7MGA, EC Yakima Co., Wash.*

—•••—

A severe blizzard on the night of Nov. 27 left roads blocked and telephone lines down between all major cities in Michigan's Upper Peninsula. Nearly 400 motorists, mostly college students returning from their Thanksgiving vacation, were marooned at Engadine, Manistique and Marquette. Intermittent power failures throughout the Peninsula further complicated the situation.

The Upper Peninsula Evening Net began operating at 2230Z, Nov. 28, with WA8SLP as NCS. Health and welfare traffic was handled in great quantity through W8PVU, located at the Engadine Town Hall where over 200 students were sheltered; WA8LHC at Manistique, where 100 students and motorists were housed in the National Guard Armory, WA8CQR at Houghton; K8TNZ and WA8TVQ, both at Marquette. K1DEU/8, at Sault Ste. Marie, handled communication between the Manistique power company and the Edison Sault Electric Company who were having trouble with their generators. W8LSZ in Escanaba handled traffic for that area while W8OQH did the same for St. Ignace.

In Detroit, WA8PII handled the bulk of traffic to and from the Peninsula to Detroit. She also acted as liaison between the amateur circuits and the local news media, giving them the latest information as it became available.

By Nov. 29, traffic had slowed, and the various nets that had been operating, discontinued the extra sessions. Those stations known to have participated were: *W8s* CQU FYL HAU HAV NBJ, ZDF *K8s* CBK IFH JED MHS RNN SRO TNS, *WA8s* AXF GBN LHC MZY PWF. — *W8OQH, Manager UPN.*

— • • • —

On Dec. 24, at 2150Z, during a snow storm in Falls Church, Va., an elderly person suffered a severe head injury from a fall. A local ambulance took the injured person to the hospital and WA4FMC tried to get through in a car. K4AVD responded to a call on 20 meters and relayed information ahead to the hospital emergency room as to the nature of the case and stood by for traffic relay until the hospital was reached. The patient is still in critical condition, but expedient treatment was facilitated by K4AVD's help. — *WA4FMC.*

— • • • —

On Dec. 25, a man in Panama City, Fla., died of a heart attack. The family of the deceased tried to telephone a message to Cleveland, Ohio, but were unable to because the phone lines were jammed with holiday callers. WA4IMC, a friend of the family, was contacted and asked to relay the message. Attempts on 40 and 75 meters proved unsuccessful, so W4IKB was called and asked to help. After about 20 minutes, K8UVK was contacted and with the help of WA5JMK, the message was relayed. — *WA4IMC, Asst. EC, Bay Co., Fla.*

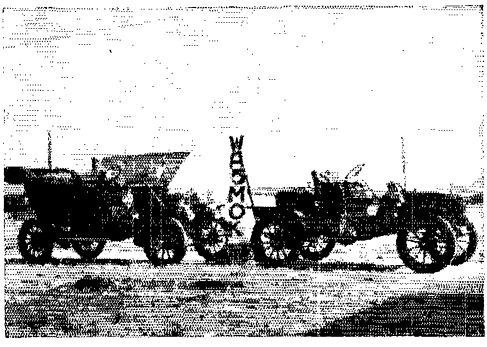
At their annual banquet, held on December 4, the Northern Virginia AREC presented a special plaque to Hal Richman, W4CIZ, in recognition of his "Outstanding service to radio amateurs." Hal, an FCC Assistant Engineer in Charge, has, for many years, helped many an amateur and would-be amateur feel more at ease while taking the examination. He has also been the guiding hand in the Washington TVI Committee since 1952.

— • • • —

Forty-three SEC reports were received for November, representing 17,134 AREC members. This is the same number of SEC reports as we received last year, but shows a loss of 3,492 AREC members. Common fellows, lets get those reports in, please! Those Sections heard from this month are: Conn., E. Mass. N.H., N.N.J., S.N.J., E. Pa., W. Pa., Del., Ala., E. Fla., Ga., Ky., N.C., Tenn., Va., W. Fla., Ark., Miss., N. Tex., Okla., S. Tex., Los A. Orange, S.C.V., S.F., Mont., Nev., Ore., Utah, Wash., Mich., Ohio, W. Va., Ill., Colo., Kans., Mo., Nebr., S. Dak. Que., Ont., Sask., Alta., B.C. QST

Strays

The Hawaiian Phone Activities Manager, Larry, WØPAM/KH6 lives In Hoomalimali Street. Hoomalimali is Hawaiian for "hot air that is spent in a bull session." (*From KH6BZF*)



This is WA5MOK mobile. Both vehicles, a 1908 Playboy Speedster Reo and a 1909 Jackson Touring car, were restored by Dale McMurry, son of WA5MOK.

Visitors to the IEEE convention who are accustomed to including the Single Sideband Show in their activities will be glad to know that it is being continued this year under W2AVA's sponsorship and will be held Tuesday, March 21, from 11:00 A.M. to 9:00 P.M. in the Penn Top Room, Statler-Hilton Hotel, Seventh Ave. at 33rd Street in N. Y. C.

— • • • —

WA1FGN suggests that if you or your club need an emergency generator for field day or other use you contact a local rental store. Most of these stores have generators for rent and the rates vary from 12 dollars a day for a 1500-watt unit to 15 dollars a day for a 3000-watt unit. Look in the Yellow Pages under "Rental Service Stores."

— • • • —

W3LEZ reports that in the early thirties a group of transcontinental traffic handlers included W8YA, W9KJY, W9HPG, W9LEZ, and W6KFC. Now look what has happened to them: W8YA (operator George), now W1NJM, ARRL Communications Manager; W9KJY, now W1LVQ, ARRL General Manager; W9HPG, still W9HPG, Director, Central Division; W9LEZ, now W3LEZ, Asst. Director, Atlantic Division; and W6KFC, now W4KFC, Director, Roanoke Division.

The 1966 Simulated Emergency Test

An Analysis of the 20th Annual Granddaddy of Emergency Tests

BY PETE CHAMALIAN,* W1BGD

On October 8-9, most parts of the United States and Canada were struck by simulated tornadoes, hurricanes, wind storms, floods, blizzards, atomic bombs and just about any other type of natural or man-made disaster that could be imagined. This was the weekend of the annual ARRL Simulated Emergency Test. For the first time, RACES groups participated along with AREC crews in either joint or parallel tests, the object being closer coordination between the two at the local level. On the Traffic side, the National Traffic System went into full swing to outperform their 1965 operation.

For those of you who aren't familiar with the SET and its purpose, let's take a look at what's behind this annual drill. Back in 1946, the first SET was held. There were no big *QST* announcements or big mailings of instructions to ECs; this SET was quite modest. Through the years, the scope of this important affair has widened, participation increased by leaps and bounds and its importance brought to the full light of what it is today. The SET is not a contest in the same sense as the Sweepstakes or DX competition. Points are tallied only on a group basis as a means of comparison with their efforts of previous years.

Of course, when a disaster strikes, it is highly unlikely that it will cover the exact area covered by a local SET exercise. Picking one part of the country and declaring this a disaster zone would be more realistic, but quite impractical since most ARPSC groups wouldn't get the practice they do now.

AREC Participation

As SCMs continue to eliminate deadwood from their EC ranks, non-active AREC members are dropped from the rosters, many AREC groups are reorganizing, AREC participation appears to be lower than in the 1965 test. Statistics, however, don't tell the whole story, so we must dig deeper into the reports to get the true picture of AREC strength. Actually, the *quality* of participating crews has improved greatly over previous years, forming a hard nucleus around which we can continue to build. There is still a great need for more ECs and AREC members, especially in areas where the general amateur population is relatively small and scattered. In some areas, highly efficient groups are slowly falling apart, not because the EC isn't doing his job, but just because there isn't any new blood coming in with new and fresh ideas.

NTS Participation

Taking a cue from the 1965 SET, the NTS operating schedule was completely revised to fulfill two major objectives. The first was to aid liaison between the Local (AREC) nets and the rest of the system. This was accomplished by moving the starting time for NTS to the middle of the afternoon, rather than early in the evening. This meant that Local nets and the rest of the system would be operating at the same time as they would and should during a real emergency.

The second objective was designed to rectify a situation that popped up in the '65 SET. A serious bottleneck in some of the higher levels of NTS slowed traffic flow to a crawl, leaving many liaison stations and nets loaded with traffic and nowhere to put it. This time, Section and Region nets were scheduled to hold half-hour sessions, while the Area nets would meet for a full hour, thus permitting less traffic to flow into the Area net during any one session, but giving them ample time to clear it, resulting in a *greater* traffic capacity and improved efficiency.

In the statistical department, 67 NTS nets sent reports indicating 12,265 message handlings in just under 530 net hours. Individual station participation increased to 2081, and the total score of 52,092 almost doubles the '65 effort. In '66 the number of different liaison stations was added to the point total and reports indicate that 431 stations were used. To make a fair comparison with the '65 score, these should be subtracted.

Interested in a break down of how the nets made out? The columns below are numbered to indicate (1) Name of the net, (2) total traffic, (3) total time (in minutes) the net was in session, (4) number of different NCSs, (5) number of different participating stations, (6) number of different liaison stations and (7) total score.

* ARRL Communications Dept.

In Randolph and Jay Cos., Ind., (l. to r.) WA9QOF, WA9PAP and K9SGB manned the 2-meter mobile station.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
EAN	914	706	6	96	6	1922
CAN	650	802	12	62	15	1711
PAN	616	682	11	24	15	1476
1RN	339	800	6	36	11	1296
2RN	257	780	7	36	14	1214
3RN	311	694	12	53	17	1256
4RN	372	862	9	54	20	1487
RN5	477	975	12	75	16	1742
RN6	433	1780	6	22	11	2342
RN7	242	750	5	28	7	1108
8RN	298	870	11	52	21	1432
9RN	151	870	13	32	5	1175
ECN	53	360	8	22	8	537
TWN	163	397	4	13	8	646
TCC Eastern	1030					1030
TCC Central	638					638
TCC Pacific	894					894
NYS (N.Y.)	222	665	9	40	11	1067
OLZ (Okla.)	136	960	6	19	7	1199
NCSSB (N.C.)	129	840	4	38	5	1090
AENM (Ala.)	152	243	4	124	5	678
SoCal16 (Cal.)	209	960	5	30	7	1289
NJN (N.J.)	69	481	6	22	4	644
LAN (La.)	128	835	11	8	24	1106
QIN (Ind.)	69	794	7	13	6	954
AENR (Ala.)	53	180	2	29	1	306
GASSB (Ga.)	259	910	15	294	28	1972
VSBN (Va.)	158	990	6	59	7	1331
ILN (Ill.)	66	755	4	14	4	889
SCN (Cal.)	284	988	5	44	11	1440
TPTN (Fla.)	36	75	1	25	1	171
GSN (Ga.)	246	897	11	32	10	1312
CSN (Ariz.)	70	701	3	60	3	921
BUN (Utah.)	6	118	2	22	1	183
AEND (Ala.)	12	145	3	9	3	205
NCN (N.C.)	296	826	9	33	9	1278
SDSN (Cal.)	23	120	1	9	2	176
OZK (Ark.)	41	318	6	20	3	444
AENT (Ala.)	24	148	4	15	2	232
QFN (Fla.)	156	544	4	28	12	836
AENH (Ala.)	15	80	1	26	3	167
MOTTN (Mo.)	2	12	1	9	1	42
WVN (W. Va.)	12	187	5	9	5	267
TN (Tenn.)	63	420	8	22	8	607
VN (Va.)	239	786	11	46	17	1257
OQN (Ont.-Que.)	53	140	4	25	6	293
KYN (Ky.)	86	445	2	24	3	604
QKS (Kans.)	21	137	3	8	4	209
Alta. SSB	169	495	3	37	4	773
CN (Conn.)	167	975	7	21	7	1254
TPN (Tenn.)	135	342	4	74	2	675
Columbus AREC (Ga.)	22	137	2	8	2	195
Navasink AREC (N.J.)	69	182	6	31	2	353
Bristol Area (Va.)	61	142	2	12	3	252
Weakley Co. 2 Mtr. (Tenn.)	5	120	3	3	1	151
Indian River Co. (Fla.)	53	480	2	12	2	577
PHD (Mo.)	4	75	2	5	1	104
Washington Co. (Ohio)	20	300	1	18	1	366
NJAREC (N.J.)	15	80	4	15	2	155
Oak Ridge Emergency (Tenn.)	16	60	1	17	1	120
Chautauqua Co. (N.Y.)	75	180	2	20	3	320
Billings Emergency (Mont.)	8	120	2	16	2	180
Missoula Area (Mont.)	28	45	1	24	1	131
SPECS (Cal.)	98	295	3	12	3	447
Newport Co. Emerg. (Va.)	28	150	2	10	3	223
Weber Co. (Utah)	11	105	2	11	1	153
Racine Emerg. (Wis.)	8	120	2	8	2	164
Pinellas Co. (Fla.)	24	90	7	14	2	187
Kans. Zone 13	40	30	4	15	1	125
Totals	12,265	31,780	346	2081	431	52,092
1965	9710	24,775	273	1486	—	38,859

RACES Participation

For the first time, RACES groups participated in the SET same as other ARPSC members. While the number of RO reports is small, we have a good beginning and look for increased participation from this quarter in future years. In some areas of the country, AREC and RACES groups joined forces for a combined effort, using each other's facilities and maintaining communication links between the two groups. In other areas, radio officers held drills separate from the AREC, permitting them to test their own facilities and operating plans.

Red Cross Participation

Mr. Robert E. Myers, K4IAG, Chief of Radio Communications for the National Disaster Services, American Red Cross, sends his usual detailed report from which we quote:

"Total received and sent traffic is estimated at close to one thousand messages, handled by Red

Felton Jenkins, KØZZR, Hennepin Co., Minn., EC, is shown at his elaborate station. He and the AREC crew turned in an impressive report of their activities.

Cross affiliated amateur stations at the four principal Red Cross collection points. W4PAY represented the Eastern Area Office in Alexandria, Va., and National Headquarters in Washington; W4DOC represented the Southeastern Area Office, Atlanta, Ga.; KØLIR represented the Midwestern Area Office, St. Louis, Mo.; and W6CXO represented the Western Area Office, San Francisco, Cal. These stations were in turn assisted by other amateur stations in the areas named. The traffic totals for this year exceed the 1965 total by approximately 200 messages.

"It is the opinion of the staff of National Headquarters and the Area Offices that the 1966 SET indicated once again that the members of the ARPSC are maintaining a high degree of emergency communications readiness and fully capable of providing an effective and efficient service in time of disaster or emergency. The National Headquarters, ANRC, wishes to express its deepest appreciation to the club members of the stations mentioned above, to their supporting stations, our chapter-affiliated amateurs and to the ARPSC in general."

Headquarters Traffic

A total of 425 messages were received at Hq., 153 from ECs and 272 from AREC members, local and state officials, Red Cross chapters, NTS officials and the like. Of all messages received, W1BGD handled 148, W1AW 112, W1BDI 38, W1LVQ 29, WA1FNJ 15, K1LMS 11, W1EFW 10, W2EW 9, WA1ELA 9, W1PRT 7, K1RQO 7, WA1DEM 6, K1SYF 6, K1LFW 5, W1NJM 5, W1JMY 4, K1NAX 2, W1YBH 2, K1ILQ 1, W1YBI 1. Many thanks to all who helped.

The Set and Emergencies

Each year, at least one AREC group has its SET plans pre-empted by a real emergency that just happened to come along at the wrong time. The 1966 SET was no exception. In southern Texas and elsewhere along the Gulf of Mexico coast, amateurs scrapped their plans and kept their eyes on Hurricane Inez. Details of this operation appear in the February ARPSC column.

—•••—

We are pleased to see some new Sections near the top of the statistical list and others showing activity that previously hadn't sent reports. Ohio succeeded in maintaining its hold on first place, this time exclusively. N.Y.C.-L.I. inched forward a bit from third to second place, E. Fla. remained in third place while E. Penna. jumped from the tenth to fourth. Other Sections showing excellent improvement include Georgia, moving from 41 to 6, Kansas 12 to 8, Kentucky 11 to 9, Michigan 18 to 11, Ontario 15 to 13, S.C.V. 19 to 14, Montana 19 to 16, Connecticut 28 to 19, Oklahoma 38 to 22, Orange 53 to 22, Illinois 58 to 24, W. Penna. 33 to 26, Colorado 46 to 31, Nevada 59 to 36, Delaware 55 to 43, Manitoba 52 to 45, Southern N.J. 55 to 47, La. 59 to 49, S. Dak. 59 to 50, Maritime 59 to 52. Sixty Sections were heard from in 1966, one of the best showings we've had in a long time.

The statistics below speak for themselves. You'll notice that this year we've included RACES totals in a few departments, so these figures are no longer comparable with 1965 totals.

Figures in parentheses are 1965 scores for comparison.

Total Reports Received: 283 (281)
By Mail: 218 (221)
By Radio: 137 (135)
By Hearsay: 16 (26)
Total Reported AREC/RACES Membership: 7251
Total Known Participation: 3454 (3546)
Mobiles and Portables: 1272 (1030)
Fixed Stations on Emergency Power: 241 (233)
AREC/RACES Messages Sent to SEC/State RO: 1958
EC/RO Radio Reports to ARRL: 136 (165)
Percent Received by Radio: 67.3 (60.0)
AREC Groups Also Heard From in 1965: 141 (118)

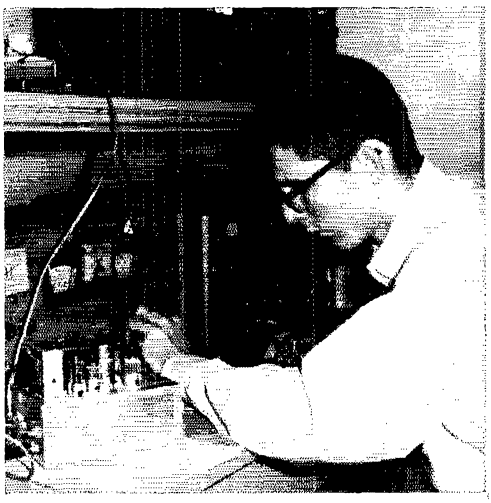
W7GPN, Weber Co., Utah, EC is shown operating at the outdoor emergency powered 2-meter NCS set-up. *(Photo by John R. Shnpe)*

Emergency power was the order of the day for the Needham, Mass., AREC crew where (l. to r.) WA1FEP, WA1ABU, Paul Johnson (Red Cross), and K1ZSA are shown starting their generator. *(Photo by Jack Nowland)*

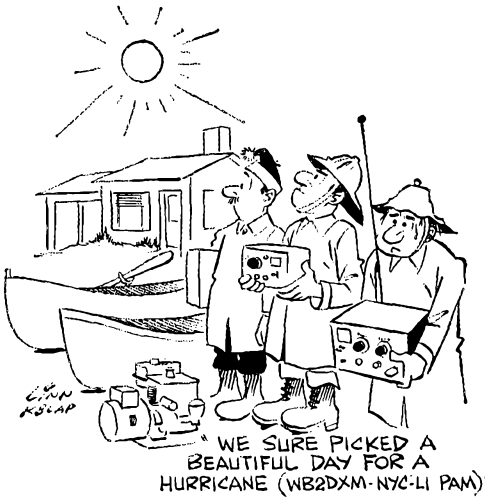
AREC Groups Bettering 1966 Score: 66 (52)
Total Score: 30,685 (29,732)

Area of Jurisdiction	*Reported by*	*Points*
1. OHIO (18 reports)		2616 (1)
Belmont Co.[1]	W8DJD	61
Cuyahoga Co.[1]	WA8PQL	128
Franklin Co.[1,2]	W8ETU	364
Hamilton Co.[1,2]	W8OUV	147
Harrison Co.[6]	K8LGB	...
Licking Co.[6]	WA8CSJ	...
Lorain Co.[1,2]	K8DNS	223
Lucas Co.[1]	W8UEL	325
Marion Co.[1,3]	W8TV	140
Montgomery, Greene, Preble Cos.[1,3]	W8ILC	437
Scioto Co.[1,3]	K8BNL	87
Seneca Co.[1]	WA8BUL	80
Stark Co.[1,3]	K8DHJ	181
Summit Co.[1]	K8OYQ	57
Trumbull[4]	...	...
Van Wert Co.[1,2]	K8PFD	133
Washington Co.[1]	W8VZ	140
Wyandot Co.[1,2,3]	WA8HFI	113
2. NEW YORK CITY-LONG ISLAND (11 reports)		2995 (3)
Area 6 Nassau[1,3,7]	W2ELK	...
Area 7 Nassau[1,7]	W2UAL	...
Kings Co.[1,3]	WA2UCP	373
Kings Co.[3]	WA2GAB	...
Kings Co. 6 meter[3]	WA2TKS	...
Nassau Co.[1,2,3]	W2FI/K2DHC	1299
Queens Co.[1,3]	WB2RXB	1139
10 Meter Kings Co.[1]	WB2AWX	54
10 meter Queens[1,2]	W2IAG	130
Valley Stream RACES[3]	WA2EXP/2	...
W. Central Nassau[1,7]	W2ELK	...
3. EASTERN FLORIDA (13 reports)		2040 (3)
Brevard Co.[1]	K4LTQ	209
Broward Co.[1,2,3,8]	K4EVY	255
Clay Co.[1,3]	W4WHN	6
Dade Co.[4]	WA4RRB	240
Duval Co.[1]	W4GUJ	279
Hillsborough Co.[1,2,3]	W4KRC	205
Indian River Co.[1,2]	WA4SCK	125
Lee Co.[1,3]	W4SMK	168
Manatee Co.[1,2,9]	K4ILB	107
Okeechobee Co.[1,3]	W4GM	38
Osceola Co.[4]	K4YAZ	46
Pinellas Co.[1]	W4FPC	148
Polk Co.[1,3]	W4FP	214

[1] Mail report received. [2] Bettered last year's score. [3] Radio report received. [4] Hearsay report. [5] Mail report received, no pointsummary. [6] Mail report received, no test held. [7] Points included in W2FI's report. [8] Sept. 12, 19, 26; Oct. 3, 10. [9] Oct. 7. [10] Oct. 9–10. [11] Oct. 13. [12] Oct. 15. [13] Oct. 30. [14] Oct. 9. [15] Oct. 10. [16] Oct. 31. [17] Oct. 5, 7. [18] Oct. 16. [19] Oct. 3. [20] Oct. 11. [21] Oct. 28–31. [22] Oct. 29–31. [23] Oct. 29. [24] Oct. 4. [25] Oct. 9, 12. [26] Oct. 7–8. [27] Sept. 25. [28] State less Kent Co. [29] Oct. 2. [30] Sept. 28.



In Montgomery Co., Ohio, W8RXM/8, the Red Cross station was activated by K8GDQ during the SET. The station was operated from emergency power sources.



4. EASTERN PENNSYLVANIA (11 reports)		1324 (10)
Adams Co.[1,3]	WA3FWT	51
Carbon Co.[1]	W3PVY	107
Lackawanna Co.[1,3]	W3QDW	146
Lower Merion[3]	K3EZJ	...
Montgomery Co.[1,3,9]	K3HLN	334
Philadelphia[3]	K3KTY	...
Philadelphia Co.[1,2,3]	K3FYS	411
Schuykill Co.[1,2,10]	W3ZRQ	71
Union Co.[1,3]	WA3BBI	109
Whitehall Twsp[3]	WA3BYH	...
5. ALABAMA (9 reports)		1220 (1)
Etowah Co.[1,2]	K5RSI/4	52
Jefferson Co.[1,2,3,11]	W4GET	186
Lawrence Co.[1,12]	WA4FYO	55
Limestone Co.[1,3,13]	WA4WLD	64
Macon Co.[1,2]	...	109
Madison Co.[1,2,3]	W4YFN	264
Montgomery Co.[1,2,3]	WA4MTG	334
Morgan Co.[1,2,3]	K4WHW	156
St. Clair Co.[3]	K4NUW	...
6. GEORGIA (14 reports)		572 (41)
Americus[3]	K4QWX	...
Bibb Co.[1,3]	WA4HYW	63
Chatham Co.[4]	...	...
Chattahochee, Marion, Muscogee Cos.[1,3]	K4BAI	101
Cobble Co.[1]	K4YZE	85
Cochran[3]	W4BOL	...
Conets/Fayette[1]	...	47
Doraville[3]	WA4AJY	...
East Point[3]	WA4YPB	...
Hampton[3]	W4BBQ	...
Newnon[3]	K4IKV	...
Richmond Co.[1,3]	W4DDY	224
Sumter Co.[1]	...	42
Town and Union Co.[1,3]	K4NFP	10
7. TENNESSEE (8 reports)		884 (7)
Davidson Co.[1,2,14]	W4KAT	103
Gibson Co.[1,2,3]	W4IGW	100
Memphis Co.[3]	W4DWT	...
Rutherford Co.[1,3]	W4SZE	41
Shelby Co.[1,2]	K4FZJ	423
Sullivan Co.[1,2,14]	W4TYV	110
Washington Co.[1,14]	W4UVP	51
Weakley Co.[1,2,15]	W4FLW	56
8. KANSAS (10 reports)		861 (12)
Beloit[3,5]	WAØCCW	...
Johnson Co.[4]	WØAIB	...
Zone 3[1]	KØJMF	77
Zone 5[1]	WØZGK	105
Zone 8[1]	KØVQC	91
Zone 10[1,2]	KØEMB	144
Zone 11[1]	KØJDD	112
Zone 13[1,2]	KØLPE	90
Zone 14[1]	KØMZZ	133
Zone 15[1,3]	KØUVH	109
9. KENTUCKY (10 reports)		790 (11)
Dist. 1[1,2]	WA4GMA	78
Dist. 2[1]	W4CSN	67
Dist. 4[1,3]	WA4MXD	209
Dist. 6[1]	W4BEJ	32
Dist. 7[1]	K4MIQ	23
Dist. 8[1,2,3]	W4NOA	302
Dist. 10[4]	K4HOE	39
Dist. 11[1]	WA4BZS	23

K3FYS, Philadelphia Co., Pa., EC, had everyone out for the SET, from the oldest to the youngest. Operating her station, K3FYS had (l. to r.) WA3EHN, WA3DZU and WA3FBK holding down the fort while others participated in different phases of this large test.

Dist. 12[1]	W4SZB	35
Harlan[1]	K4CC	21
10. NORTHERN NEW JERSEY (9 reports)		650 (8)
Bergen[3]	W2WBY	...
Demarest[3]	WB2VUJ	...
Englewood[1,3,16]	WA2CCF	140
Monmouth Co.[4]	.....	...
Morris[1,3]	K2ZFI	174
Navesink[1]	WB2BCS	175
Passaic[1,2,3]	K2KDQ	161
Passaic RACES[3]	K2YWA	...
Wood Ridge[3]	W2DMJ	...
11. MICHIGAN (6 reports)		877 (18)
Calhoun Co.[1,2,3]	WA8LRB	114
Monroe Co.[1,2,3]	W8NDM	215
Oakland Co.[1]	W8CQB	266
Washtenaw Co.[1,17]	WA8IAQ	61
Wayne Co.[1,3]	W8MPD	117
Wayne Co. RACES[1]	W8SS	44
11. VIRGINIA (8 reports)		546 (6)
Alexandria[1,3]	W4JED	146
Area 3[6]	.....	...
Area 4[3]	K4LMB	...
Area 7[3]	K4MKO	...
Area 10[1]	W4NLC	56
Arlington Co.[1,9]	WA4TDQ	161
Loudoun Co.[1,2]	WA4NKM	78
Washington Co./Bristol[1,3]	K4ITV	90
13. ONTARIO (7 reports)		484 (15)
Huron Co.[1,2,3]	VE3BWM	49
Metro Toronto 75 Meter[1,3]	VE3CO	123
Middlesex[1,3]	VE3CCB	78
Norfolk Co.[1]	VE3GCE	6
Ontario Co.[1,3]	VE3ATI	54
Welland/Lincoln Cos.[1,3]	VE3FOI	81
Wentworth Co.[1]	VE3EUM	93
14. SANTA CLARA VALLEY (7 reports)		776 (19)
Burlingame[1,3]	W6VZE	96
Del Notre Co.[4]	WB6MXD	...
Nevada Co.[4]	K6RHW.	...
Palo Alta/Los Altos/ Mt. Vie[1]	W6ASH	151
Redwood City[1,2,3]	W6DEF	446
S. Monterey Co.[1,3]	WB6IZF	83
Yolo Co.[4]	WA6TQJ	...
15. SOUTHERN TEXAS (6 reports)		2412 (16)
Bexar Co./San Antonio[1,2,3]	K5HZR	244
Harris Co.[1,2]	K5HXR	1069
Houston[1]	W5OBC	774
Jefferson Co.[1]	W5TFW	110
Nueces Co.[1]	W5AQK	188
San Patricio Co.[1]	W5BRZ	27
16. MONTANA (6 reports)		481 (19)
Billings[1,3]	K7UPH	104
Bozeman[1,3]	WA7DCF	110
Deer Lodge[1,2,18]	W7VNE	68
Harlowton[1,2,3]	K7CHA	61
Missoula[1,3]	W7COH	318
Silver Bow Co.[3]	K7MRZ	...
16. EASTERN MASSACHUSETTS (7 reports)		534 (12)
Acton[1,3,19]	W1QMN	74
Hinsdale[3]	W1DWA	...
Needham[1,2,19]	W1STX	98
Newton[1,2]	W1RM	140
Townsend[3]	K1PNB	...
Wayland[1,19]	W1EHT	78
Winthrop[1,19]	W1BB	144
18. MARYLAND-D.C. (5 reports)		630 (17)
Calvert Co.[1,2,3]	W3ZNW	57
Montgomery Co.[1,2,3]	W3WTW	102
Pikesville[1,20]	W3NPL	158
Prince Georges Co.[1,2]	W3YBV	160
Prince Georges Co.[1,3]	WA3EKS	153
19. CONNECTICUT (8 reports)		365 (28)
Bloomfield[1,2]	K1QPM	101
Danbury[3,5]	W1ADW	...
Fairfield[1]	W1WX	78
Hamden[1,21]	W1NFG	113
Ledyard[3]	K1SRF	...
Meriden[3]	W1FYG	...
Southington[1,3]	W1WHR	73
Wallingford[3]	K1QAH	...
20. IOWA (7 reports)		384 (4)
Blackhawk Co.[1]	WAØINC	83
Clinton Co.[1,22]	WAØEFN	155
Hardin Co.[3]	WAØNRS	...
Humbolt Co.[3]	WØFDM	...
Kossuth Co.[1,2,15]	WØOSC	22
Marion[3]	WØHBX	...
Story Co.[1]	WØJIG	124
21. WESTERN NEW YORK (4 reports)		622 (21)
Chautauqua[1,3]	W2SB	185
Chemung Co.[1,3]	K2DNN	139
Delaware Co.[1]	W2TFL	117
Glens Falls[1,2,3]	K2AYQ	181
22. OKLAHOMA (4 reports)		541 (38)
Comanche Co.[1,3]	K5BYF	262
Craig Co.[1,3]	K5BPV	82
Garfield Co.[1]	WA5FVK	131
Pawnee Co.[1]	WA5KZA	66
22. ORANGE (4 reports)		817 (53)
Desert Area[1,2,15]	WA6TAG	151
Riverside Co.[1]	K6CID	208
San Bernardino Co.[1]	K6GCS	328
75 Meter Net[1,3]	WB6QAK	130
24. ILLINOIS (4 reports)		652 (58)
Chicago[1]	W9SPB/ K9HBZ	331
Cook Co.[1]	W9HPG	193
Sangamon Co.[3]	K9IDQ	...
Whiteside Co.[1,3,23]	W8IAD	128
25. NORTH CAROLINA (5 reports) Ashe/Allegheney/		371 (29)
Surry Cos.[1,2]	WA4LWE	59
Durham/Orange Cos.[1,2,3]	W4LEN	117
Forsyth Co.[1,24]	W4IRE	58
Kingham Co.[1]	W4NAP	54
Wake Co.[1,2]	K4FMW	83
26. WESTERN PENNSYLVANIA (5 reports)		199 (33)
Alleghney Co.[3]	W3LHN	...
Centre Co.[3]	K3CXZ	...
McKean Co.[1,2,25]	W3OCR	82
Venango Co.[1,3]	W3LOD	76
Westmoreland Co.[1,3]	W3WBH	41
26. WEST VIRGINIA (3 reports)		555 (23)
Kanawha Co.[1,2,3]	W8IRN	314
Monogalia Co.[1,2]	W8GUL	131
Randolph Co.[1,2,3]	K8TPF	110

"COULD YOU REMIND US TO LAY IN A HUSKY STOCK OF ASPIRIN AND PEPTO DISMAL COME 1967 SET TIME? — WA2UFI/4"

28. INDIANA (3 reports)		502 (14)
Madison Co.[1,2]	W9FWH	295
Morgan Co.[1,2,3,26]	W9ZSK	103
Randolph Co.[1,2]	WA9GKF	104
29. LOS ANGELES (5 reports)		192 (22)
East San Gabriel[3]	K6QGI	...
Long Beach[3]	WA6TYR	...
Pasadena[3]	WA6NLZ	...
West L.A.[1,3]	WA6WJT	109
Whittier[1,3]	W6LVQ	83
30. EASTERN NEW YORK (3 reports)		334 (24)
Dutchess Co.[1,3,9]	W2HZZ/K2GCH	140
Ulster/Orange Co.[1,26]	WA2UKR	41
Westchester Co.[1,2]	K2SJN	153
31. COLORADO (4 reports)		70 (46)
Otheroe Co.[3]	KNØPGX	...
Pueblo Co.[1,2]	.....	70
Pueblo Co. RACES[3]	KØMVT	...
Weld Co.[3]	WØDZI	...
31. MINNESOTA (3 reports)		420 (27)
Hennepin Co.[1,2,27]	KØZZR	228
Minneapolis[6]	KØLIR	...
Ramsey Co.[1,2,3]	WAØFUR	192
33. MISSOURI (11 reports)		125 (4)
Cass, Johnson Co.[4]	KØFPC	...
Clay Co.[1]	WAØFLL	50
Iron, Madison Cos.[4]	KØWKC	...
Jackson Co.[4]	KØTCB	...
Kirksville[4]	WAØCHH	...
Macon/Adair Cos.[1]	WAØELM	75
McDonald, Jasper, Newton, Barton Cos.[4]	WØAIM	...
Saline Co.[4]	KØONK	...
St. Joseph[3]	WØOGC	...
St. Louis[4]	KØJPL	...
Trenton[4]	WØGQR	...
34. WISCONSIN (4 reports)		260 (35)
Buffalo Co.[1]	W9SQM	18
Dodge Co.[1]	K9FHI	17
Marathon Co.[1,2]	W9VZA	126
Racine[1]	W9SZL	99
35. SASKATCHEWAN (3 reports)		354 (32)
Prince Albert[1]	VE5BO	163
Regina[1,18]	VE5HP	57
Saskatoon[1]	VE5LG	134
36. NEVADA (3 reports)		237 (59)
Boulder City[1]	W7BIF	81
Las Vegas[1]	K7RKH	112
North Las Vegas[1]	K7NYU	44
37. UTAH (3 reports)		230 (30)
Davis Co.[1,2]	K7ERR	63
Utah Co.[1]	K7SAI	49
Weber Co.[1,2]	W7GPN	118
38. RHODE ISLAND (3 reports)		88 (24)
Cranston[3]	W1BTV	...
Johnston[1,3]	W1POP	40
Newport[1]	W1JFF	48
39. ALBERTA (2 reports)		311 (40)
Clagary[1,3]	VE6SA	233
S. Alberta[1]	.....	78
40. MAINE (2 reports)		134 (31)
Aroostook Co.[1,2,3]	K1CLF	90
Waldo Co.[1,2,3]	K1TZH	44

Part of the Morgan Co., Ind., SET involved the "discovery" of a simulated radioactive container. A test message regarding the discovery was sent to the Atomic Energy Commission. Part of the participating crew was (l. to r.) K9JKJ, W9SWC, WA9LLE, K9OLE. (Second row): call unknown, W9ZSK (EC), WA9QQH, WA9LTI, K9PYI and WA9PUZ.

"I CALLED A CQ A LITTLE TOO CLOSE TO THE NET AND THEY PASSED ME THREE PIECES OF TRAFFIC BEFORE I COULD QSY!"

41. ARKANSAS (3 reports)		190 (34)
Fort Smith[4]	.....	...
Sebastian Co.[1,2]	K5YMU	139
Washington Co.[1,2]	WA5CSJ	51
41. EAST BAY (1 report)		327 (44)
Napa/Solano Cos.[1,2]	K6TFT	327
43. DELAWARE (3 reports)		180 (55)
Kent Co.[1]	K3NYG	53
State[1,28]	K3NYG	127
Sussex[4]	W3PM	...
43. SACRAMENTO VALLEY (1 report)		294 (43)
Sacramento Co.[1,3]	W6SMU	294
45. MANITOBA (2 reports)		0 (52)
Flin Flon[3,6,29]	VE4NW	...
Winnipeg[6]	VE4LG	...
45. NEBRASKA (1 report)		183 (26)
Lincoln/Lancaster Co.[1,2,3]	WAØEUM	183
47. SOUTHERN NEW JERSEY (1 report)		95 (55)
Gloucester Co.[1,2,3,9]	W2LVW	95
48. SAN DIEGO (1 report)		212 (45)
San Diego Co.[1]	W6VNM	212
49. LOUISIANA (2 reports)		173 (59)
Calcasieu Parish[1]	W5SKW/W5IIF	173
New Orleans[4]	.....	...
50. SOUTH DAKOTA (1 report)		45 (59)
Lawrence Co.[1,3]	WØDVB	45
51. OREGON (1 report)		177 (50)
Josephine Co.[1,2]	W7DEM	177
52. MARITIME (1 report)		162 (59)
Halifax/Dartmouth Area[1]	VE1AI	162
53. NEW MEXICO (1 report)		78 (38)
Los Alamos[1,2,30]	K5MFD	78
54. NEW HAMPSHIRE (1 report)		58 (54)
Merrimack Co.[1,19]	K1DWK	58
55. VERMONT (1 report)		56 (59)
Bennington Co.[1,11]	W1MEP	56
56. ARIZONA (1 report)		0 (59)
Gila Co.[3]	W7DXX	...
57. BRITISH COLUMBIA (1 report)		0 (44)
Vancouver[4]	.....	...
57. SANTA BARBARA (1 report)		0 (59)
Santa Barbara[4]	.....	...
57. WASHINGTON (1 report)		0 (37)
Kitsap Co.[4]	.....	...
60. ALL OTHERS		zilch

Soapbox

Overall, I feel that the SET was a very successful one with improvements shown over previous years. — *W7DZX, TCC Dir. Pacific Area.* The chief gripe was apathy on the part of local officials. Looks like some kind of a shot in the arm is needed for these folks. — *K8GOU, SEC Mich.* The results this year were very encouraging to me. — *W9JUK, TCC Dir. Central Area.* One comment from the boys was universal, they don't like having the SET on our Thanksgiving weekend, and neither do I. — *VE3BZB, Mgr. ECN.* According to all reports received, the AREC groups and nets which participated thoroughly enjoyed the exercise and more important, took due note of their weak areas with the

(*Continued on page 158*)

Happenings of the Month

NO SUPERPOWER

The following letter was written by W4GF of the FCC staff in answer to one he received from a DX club which speculated that FCC would "look the other way" on powers above one kilowatt. It merits the careful attention of all amateurs.

"Thank you for your letter inviting me to present the Federal Communications Commission's attitude toward high power . . .

"As you know, funds for authorized travel are quite limited, and it is therefore rather unlikely that I will be able to attend your meeting. However, it will be easy to give you the Commission's attitude in writing and, although this letter is not an official expression, since it is over my personal signature, you may quote me. In fact I request that you read it to the convention.

"The Rule is plain. One kilowatt is the limit. Observe it!

"Contrary to some rumors, there is no 'understanding' that high power operation is to be ignored. The instructions to the field offices are explicitly to the contrary. The only reason more of you are not on the list of those who have been caught is because it takes more man hours than can be spared at the present time from other work. Inspections were made last month in other states as well as California, and will continue to be made in the months ahead. By now you all should know that you risk being put off the air, not just months, but even years, so think hard about the consequences when you are tempted.

"More often than you might think, the Amateur Radio Service is weighed against other services in correspondence, memoranda and meetings where Commission personnel as well as other government agencies, Congressmen and the general public are advised and reminded of the unique self-policing quality of the radio amateurs. Unfortunately, the 'California Kilowatt' disgrace undoubtedly reduces the amateur's comparative stature as a law-abiding licensee group.

"Now, I offer you a solution to your 'power race' dilemma. CLEAN YOUR OWN HOUSE! I am sure you have the intelligence, the skill and the know-how necessary. Do you have the guts and the will power to do it? I earnestly hope so! Certainly, nothing would please me more than to be able to point with pride and boast to all concerned about another example of the ability of the amateurs to solve their own problems." — *William S. Grenfell, W4GF, DXCC, WAZ, (Amateur and Citizens Division, FCC)*

When the Suburban Radio Club of New Jersey completed the process of affiliation with ARRL, they came up to Newington en masse to receive their charter, and brought along well-wishers from other clubs. Hudson Division Assistant Director George A. Diehl, W2IHA, made the presentation at W1AW. Left to right in the photo are: WA2EDF, WA2QCE, K2HER, W2IHA, and WA2ASM.

AMATEURS AND MEMBERS

FCC figures for December 31, 1966 show approximately 10,000 fewer operator licenses outstanding than a year earlier. There are about 10,000 Novice licenses in force and 20,000 new licenses in all during the year (but this figure includes some that are not strictly "new," such as renewals of expired licenses).

League Full membership declined 0.4%, with half the divisions gaining and half losing. The Delta and Rocky Mountain Divisions were way out in front on membership gains, followed by Atlantic, Canadian, Dakota, Northwestern, West Gulf and New England. Entering the year with fewer members were the Central, Great Lakes, Roanoke, Pacific, Midwest, Southwestern, Southeastern and Hudson Divisions. Actually, the "losses" in the Hudson and Pacific Divisions are at least partially due to transfer of members receiving their mail at APO/FPO addresses in New York and San Francisco to their "home" divisions, under ARRL's new "absentee ballot" provisions.

FCC WARNS OF SKIP

The Federal Communications Commission recently warned the mobile services (especially police and fire systems) operating below 50 Mc. to expect long-distance (skip) interference during the present period of increasing sunspot activity, which is expected to peak during the winter of 1968–1969.

While amateurs of course welcome such skip for our own activities, we may occasionally be blamed by the local press in various localities for causing such interference, which actually will be due to similar mobile stations on the same channels several hundred or more miles away. There may even be a few scattered cases of interference to a TV station on Channel 2, 3, or 4 by another TV station half a continent away assigned to the same channel.

This is just one more reason why amateurs should maintain good contact with the local news media. If our fences are kept well-mended, we can expect a call from a newspaper or radio station asking us to comment on such incidents before they are erroneously reported. Hq. will be pleased to furnish its publicity kit to groups on request.

ARRL NATIONAL CONVENTION

The 16th ARRL National Convention scheduled for Montreal, P. Q., is the first to be held outside the U. S.

Headquarters for the gala affair is the spanking-new Bonaventure Hotel and the dates are June 30, July 1 and 2. The program includes antennas, RTTY, home construction, Oscar, transistors, mobile, v.h.f., traffic handling and other public service operation, SWOOP and ROWH initiations, French Canadian night, a fashion show, and the Grand Banquet. Expected among the speakers: President Robert W. Denniston, WØNWX; General Manager John Huntoon, W1LVQ; Ass't General Manager, Richard L. Baldwin, W1IKE; Technical Director George Grammer, W1DF; V.h.f. Editor Ed Tilton, W1HDQ; Lewis G. McCoy, W1ICP of "Beginner and Novice" fame; Bill Orr, W6SAI of Eimac and Oscar and many others. And on the side — Montreal's Worlds Fair, Expo '67! Other details and reservations through Doug Shaw, VE2BSX, 7401 Mount Avenue, Montreal 16, Quebec, Canada.

EASIER VE/FOREIGN RECIPROCITY

The Canadian Administration has further broadened its welcome to foreign amateurs; under new rules adopted in December, the Department of Transport will issue operating permission to an amateur of another country whose government will issue similar privileges to Canadians. Confirmation of reciprocity may be simply an exchange of letters between the licensing authorities, but if the other government desires it, a more-formal "exchange of notes" can be arranged through diplomatic channels. Under the new rule, a foreign amateur would use his home call followed by whichever Canadian prefix would be appropriate (i.e., "F6ABC/VE3"). No fee is charged for this reciprocity, but the visitor must obtain advance authorization in writing from a DOT Regional or Field office. The permit will be for not more than one year, but it will be renewable annually for an indefinite period of time.

"Landed immigrants" and nationals of British Commonwealth countries have long been permitted to obtain VE licenses, upon payment of a $2.50 fee, through the same channels as Canadian citizens; this opportunity continues to exist. However, Commonwealth amateurs now may elect to operate as "portables" under the new system instead of applying for VE tickets; no exchange of letters or diplomatic notes is needed within the Commonwealth.

The 16th National Convention crew pause briefly in their work for this photo: (clockwise from bottom left— VE2PS, VE2AUU, VE2HV, VE2CK, VE2BSX, VE2IJ, VE2AP, VE3CJ, VE2BEC, VE2BK, VE2NV, VE2BQR, VE2ZX and VE2PX.

Director Carl Smith, WØBWJ (1.) presents a Rocky Mountain Division Citation to Bill Greene, WØGVT, for his outstanding work during the Colorado flood emergency of a year ago. *(WØHNC photo)*

LEGISLATIVE ACTIVITIES

This is the year and the season when most state legislatures are active. Amateurs in a position to do so should keep watch on bills being introduced; amateurs may both support worthwhile legislation (e.g., control of electrical noise) and oppose or seek amendment of harmful or poorly-drawn legislation. A few bills introduced for the control of fraud against the telephone companies have been so broad as to impinge on amateur traffic-handling. Amateurs in Oklahoma first spotted and won amendment of a "black-box" bill in that state; the text of the "Oklahoma Amendment" can be obtained from headquarters on request if similar legislation poses a threat.

Headquarters should be sent copies of any State legislation or local ordinances affecting the amateur, whether favorable or not. QST

ARRL AWARDS HONOR ROLL FOR 1966

In a membership association as large and as widespread as the League, much of the organization's work is accomplished by volunteers in the field. The League has some 35 unpaid directors, vice directors and officers, 75 elected SCMs and a like number of volunteer SECs; hundreds of *QST* contributors and authors; thousands of Official Station Appointment-holders; and some 35,000 members of the Amateur Radio Public Service Corps — all participating for the love of amateur radio and in support of League objectives. In addition to more general expressions of appreciation for such cooperative endeavors, the Board of Directors has occasionally singled out some individuals for special recognition on a particular contribution to the art. In the past year, the Board conferred twelve Cover Plaque Awards.

THE HIRAM PERCY MAXIM GOLD MEDAL

The Hiram Percy Maxim Gold Medal was created by the Board at its meeting in May, 1964, as an award for extraordinary contributions to the science of communications by a radio amateur. It is to be conferred only by the Board, and only in exceptional instances.

To date, the sole holder of the honor is the late John L. Reinartz, K6BJ, in recognition of his outstanding achievements of pioneering the early development of amateur radio communications equipments and techniques, which contributed so heavily to the opening of practical short-wave communications.

THE ARRL TECHNICAL MERIT AWARD

The Technical Merit Award was created by the Board at its 1953 meeting to be presented each year to an amateur chosen for his outstanding technical contributions to amateur radio.

These amateurs and groups hold the award: 1953, Philip S. Rand, W1DBM; 1954, Oswald G. Villard, Jr., W6QYT; 1955, Ralph E. Thomas, W2UK and Paul M. Wilson, W4HHK; 1957, Fred Schnell, W4CF; 1958, Paul F. Godley, ex-2ZE; 1959, James J. Lamb, ex-W1AL; 1960, John T. Chambers, W6NLZ and Richard E. Thomas, KH6UK; 1961, F. S. Harris, W1FZJ and the Rhododendron Swamp VHF Society; O. H. Brown, W6IIB and the Eimac Gang Radio Club; 1962, Project Oscar, Incorporated, W6EE; 1965, Project Oscar, Incorporated, W6EE.

Nominations for the 1967 award may be submitted by any amateur to Vice President Wayland M. Groves, W5NW, Chairman of the Merit and Awards Committee, or to a division director (addresses on page 8). Deadline is April 15, 1967.

COVER PLAQUE AWARDS

As its 1961 meeting the Board established an award for *QST* authors adjudged by the directors in mail balloting to have written the best article of each month. A unique plaque goes with the award — the actual printing plate used for the cover that month, chromium-plated and mounted on a polished board.

Cover Plaque Awards for 1966 were earned by these articles:

January: "Accessory Package for Transceivers," by John J. Schultz, W2EEY/-DJØBV

February: "Improving Your Receiver With a Frame-Grid R. F. Pentode," by Joel Balogh, K3CFA

March: "A Wide-Range Voltage-Regulated Power Supply," by John Nydam, WA6JCZ

April: "Electrical Interference," by W. R. Nelson, WA6FQG

May: "A Transistorless 300-Watt Mobile Power Supply," by Frank A. Exum, WØGIL, and Irvin D. Johnson, KØHLZ

June: "An S.S.B. Transmitter for Transceive Operation," by Varoujan Karentz, W1YLB

July: "180-Watt D.S.B. Transmitter," by J. W. Rush, W4EWL

August: "The TR-2 Transceiver," by R. C. Dennison, W2HBE

September: "Station Design for DX," by Paul D. Rockwell, W3AFM

October: "Field-Effect Transistors," by Jim George, W7AWH

November: "The Conical Monopole Antenna," by E. W. Pappenfus, WB6LOH

December: "The Field-Effect Transistor as a Stable V.F.O. Element," by G. D. Hanchett, W2YM

Our hearty congratulations and thanks on behalf of League members to these gentlemen, and to all the authors whose voluntary efforts make *QST* what it is. QST

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION

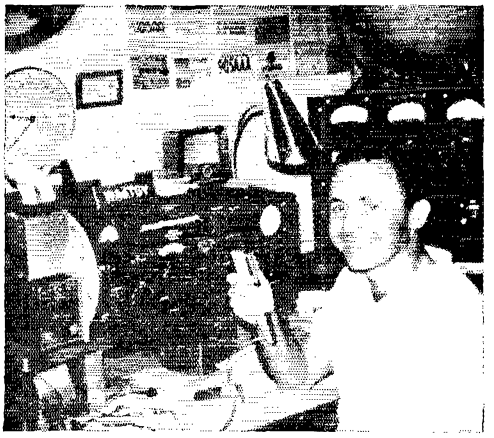
NETHERLANDS — U. S. RECIPROCITY

The reciprocal operating agreement between the U.S. and the Netherlands which was signed last June became effective December 21, 1966 following formal ratification by the Dutch parliament. The agreement includes the Netherlands Antilles.

Further information on the agreement as it pertains to PAØ may be obtained from *Vereniging voor Experimenteel Radio Onderzoek in Nederland* (VERON), Post Office Box 9, Amsterdam, The Netherlands. PJ information is available from *Vereninging voor Experimenteel Radio Onderwoek in de Nederlandse Antillen* (VERONA), Post Office Box 383, Curacao, Netherlands Antilles. Additional licensing information about the Netherlands appeared on page 73, "IARU News", May 1966 *QST*.

The United States now has reciprocal agreements with 22 countries.

Radio Club Peruano President OA4BS, on the left, extends greetings to HC1EL, right, highest scoring foreign amateur in the 1966 Panamerican Peru Contest. HC1EL attended the 36th anniversary of the founding of *Radio Club Peruano* at Lima in December. The OM in the center was not identified.



Uri Barnea, 4X4OC, an electrical engineering student at San Jose State College, is apparently the first 4X4 to operate in the United States under the U. S.-Israel reciprocal operating agreement. OM Barneo's 4X4OC/-W6 authority was issued by the FCC on August 28, 1966. *(WA6TGY photo)*

FOUR NEW SOCIETIES ELECTED

As the result of IARU society balloting, the *Cyprus Amateur Radio Society* (CARS), the *Liberian Radio Amateur Association* (LRAA), the *Amateurs Radios Algeriens* (ARA), and the *Radio Society of East Africa* (RSEA) have been elected to membership in the IARU.

Member societies are now voting on the acceptance of the *Faroese Amateur Radio Society* (FRA) and the *Malta Amateur Radio Society* (MARS) into the IARU. Details on both appeared in last months IARU News.

DX OPERATING NEWS

(**Bold face** indicates changes since the most recent *QST* listing.)

United States Reciprocal Operating Agreements currently exist *only* with: Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, France, Germany, India, Israel, Kuwait, Luxembourg, **Netherlands**, Nicaragua, Panama, Paraguay, Peru, Portugal, Sierra Leone and United Kingdom. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details concerning a particular place.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the

(Continued on page 168)

Correspondence From Members-

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

W1BUD

¶ I am deeply grieved to learn of the death of my very old friend Arthur Budlong, W1BUD. Like his predecessor Ken Warner, "Bud" made a tremendous contribution to amateur radio, particularly within the United States. His knowledge of international conferences was unique in amateur radio circles and there is no doubt that he played a significant part in achieving virtually status quo for amateurs in the Atlantic City Conference when the pressures from without were intense.

To you and your colleagues I extend my deep sympathies in the loss of your one-time leader. — *John Clarricoats, G6CL, London, England.*

¶ Bud's passing leaves me speechless. It is a sad day because with Bud's passing goes a wealth of experience, and an era of frequency allocation for amateur radio.

He was my friend, personal as well as in the same interests of frequency allocation. He did for the Coast Guard what I worked in for the Air Force. As a friend, when he would visit the coast here, we would sit and talk for hours. To say we will miss him does not come close to expressing it. — *Ronald Martin, W6ZF, Napa, California.*

W1CJD

¶ I am very sorry to read that Phil Gildersleeve, W1CJD, has passed away. I have always liked his style and will surely miss his work. *QST* will never be quite the same without W1CJD's talent. — *Russell Hamilton, K3OJX, King of Prussia, Pa.*

¶ One can imagine W1CJD being greeted in Amateur Paradise:

"A fond and hearty welcome to you, Gil, O.T.
Shake hands with Maxim, Woodruff and the gang.
Your cartoons helped us all to laugh away
All the nagging problems of our yesterdays." — *Mike Cavaney, VE3GG, Willowdale, Ontario, Canada.*

[EDITOR'S NOTE: Sincere thanks to many other amateurs who expressed their condolences on the passing of W1BUD and W1CJD.]

NEW MEMBERSHIP APPLICATION?

¶ Your membership application form sure is pretty dry so I thought I'd spice it up a bit by saying: "Being pretty darn addicted to ham radio, I hereby send ya some dough 'cause I know darn well with your declining membership you're gonna accept even me as a member. Enclosed is a cheque for $5.67 (equivalent to $5.25 U.S.) of which $4.50 pays for *QST* and $.50 for ARRL operations (according to W2NSD's research), and $.25 of which is for discrimination against Canadians. I realize that you will not accept $2.50 for a subscription only since it costs ya a lot more than that." — *Ronald Gang, 3C3GAG, Toronto, Ontario, Canada.*

TNX

¶ I am in seventh grade at LaSalle Junior High. This morning I was in a study hall doing homework. The sample *QST* you sent me about a week ago was lying on the desk, and the (science) teacher in charge asked to read it. A few minutes later he returned with a "Thanks." Later, I was called into the storage room and given 40 pounds of "surplus" practically brand new parts. Among these were about ten unused n.p.n. transistors, five good transformers, a steel cabinet with aluminum chassis, two other chassis, about 200 capacitors, resistors including some of 1% tolerance, etc. After all this, I've just got to be a League member as soon as I get a few dollars in one place! — *Bryan Vaughan, WN2ZLK, Niagara Falls, New York.*

STATION DESIGN FOR DX

¶ W3AFM's series, "Station Design for DX," is one of the most useful *QST* has presented in the five years I've been reading it. Far from discouraging those with limited means (i.e., most of us), the writer emphasizes making the most effective use of every dollar invested in the station. After all, isn't this an important part of the amateur tradition? The use of economic trade-off curves is a breakthrough.

The material in the series should be expanded to include v.h.f. and perhaps RTTY, and should be incorporated in the *Handbook*. — *Thomas E. Coates, WA8FQJ, Englewood, Ohio.*

MONOLOGUES?

¶ "What do hams talk about on the air?"

The realistic answer to this question, in most cases, is "essentially nothing." Listen objectively on our phone bands and you will find that most of our QSOs are not really conversations but inane monologues — canned transmissions consisting of a handle, a report, and a list of store-bought equipment. There are valid reasons for this type of QSO on DX contacts where language is a barrier. There is no reason whatsoever for this sort of thing on phone when both hams speak the same language.

I have the following suggestions on the form and substance of a phone conversation:

1. Use push-to-talk or voice controlled break-in exclusively. Break-in operation results in a natural dialogue and avoids monotonous, rambling soliloquies. It keeps the conversation alive. It makes both parties quickly aware of QRM at either end.
2. Avoid cliches and pass quickly over routine items such as report and handle; then move on to the substance of the QSO.
3. Bring out the other fellow's interests — both ham interests and, just as important, non-ham interests. As *The Radio Amateur's Handbook* suggests "Be natural as you would with your family and friends." Discuss the things you would normally discuss — current events, sports, or cultural matters — anything of mutual interest which is in good taste.

Take the initiative and try the above suggestions. You'll be surprised at how much more interesting your QSOs will be. — *Marvin Fein, W2KIT, Scarsdale, New York.*

"PUNKIN" RIG

I guess I'll never lose interest in amateur radio as long as I can keep going physically. I am nearing 70, and the old game is just as enticing today as it was back in 1912 when an ad featuring a "300-mile Wireless set" for $1.50, by the old Electro Importing Co. of Fulton Street, New York happened to catch my eye. Somehow I was intrigued at once. My brother and I had been devotees of Morse telegraphy for several years. I got my first "learner's set" by selling 'punkins' planted in between the rows in Dad's potato patch when I was 7 or 8 years old.

This $1.50 wireless set consisted of one head phone and an autocoherer mounted on a round wood base about 4 inches in diameter. My antenna was 4 wires with bamboo spreaders. The wires, 10 feet long, were made of many pieces of copper wire salvaged at the base of telephone poles where linemen had repaired cables, and snipped off pieces 8 and 10 inches long. These scraps of wire were all spliced together but not soldered — I didn't know how! — *Ross Moorhead, K7EWZ, Whitefish, Montana.*

DUES

Just noticed in my January *QST* that one of the members has suggested a raise in dues.

Five years ago I suggested a raise in dues and gave some darn good reasons why it should be done. Now, it becomes more of a necessity than ever, as the rising costs leave ARRL no other alternative.

Certainly a raise from $5.00 to $6.00 is well within cost increases. I found myself remitting $12.00 this year for two years dues. I can't imagine it will be a big task to get such an increase accepted in the membership, either! ! — *Chas. W. Boegel, Jr., WØCVU, Cedar Rapids, Iowa.*

If you feel that you must up the dues rate because of increased costs, I'm with you.... The price is chicken feed compared to the cost of amateur equipment, and is little enough to pay for services rendered. — *Claire L. Durland, Atlanta, Ga.*

I can't understand how some hams can possibly exist without being ARRL members, and worse yet, criticize you after all you have done and are now doing for the cause of ham radio. *QST* in itself is certainly worthy of the $5. I would not be angry if you raised the membership fee even to $10 if it were necessary to keep your ham service and leadership. And I say this as a 15-year-old high school sophomore who earns all his ham money. — *Sheldon Remington, WN1HED, Hamden, Conn.*

FREE-LOADERS, CONTINUED

I was once a "Free Loader" in a sense but only because I didn't have the price to become a member of ARRL.

When I first started out in amateur radio some years back, I ran into some problems. I turned to ARRL and received help, without any questions asked, and this has always stuck in the back of my mind. Now, I am a proud member and I don't mind paying a little extra if that's what it is going to take to keep our little fraternal organization going and promote good will to those amateurs that are nonmembers. Maybe some of them don't have the money either! Has anyone ever thought of that? — *Robert C. Thornton, WA3FRW/WA4RWW, Bristol, Pa.*

As a member of several years standing, I feel inclined to express my opinion as being opposed to helping support the many free services the ARRL now extends to non-members.

I believe we should impose a fee on these types of services to non-members before any increase is made in membership dues. — *Francis Sable, WØEVJ, Wamego, Kansas.*

Maybe some would change the cover of *QST* to read "Devoted entirely to members of ARRL"? — *Robert M. Park, KØKRX, Harper, Kansas.*

Permit me to add my comments to the "freeloader" issue. Back in February, 1966 I began to study seriously for my Novice ticket using a book published by ARRL which I bought from a local radio store. I was then advised by a General operator to get a receiver and listen to WIAW for assistance in learning code. Later on July 13, 1966, I received my Code Proficiency Certificate. I received my Novice ticket on July 22, 1966 but not until November did I join ARRL. As is obvious, I received much assistance as a "freeloader." It was because of this unselfish and free service that I wanted to join ARRL. The best way to influence people is by doing them a favor, and if they have any decency about them they will be grateful and want to join such an organization. Please continue your excellent services and I for one will be happy to pay more, if necessary, so that another "freeloader" can receive the same benefits. — *Billy R. Davidson, WN4DOY, Christiansburg, Va.*

Have noticed one item bothering the membership — how to handle the "free-loaders." More years ago than I care to count, I can remember getting some "free" help from ARRL, and I still appreciate it. I think you should continue this policy in the interests of promoting amateur radio. If you do find more funds are needed, however, why not install the policy many professional organizations use, i.e., on all publications which carry a price tag, set the price such that non-members must pay double the price charged to members. This would enhance the status of ARRL, would be an incentive to those really interested in radio to become members, and would not be unfair to those who are "just browsing." — *Harvey W. Headley, KØBPW, Omaha, Nebraska.*

Have been reading with interest the latest problem that has arisen concerning the special services offered by the League to non-members. I feel that a certain amount of this "foreign aid" should continue as it has been proven to be beneficial.

I would like to see technical assistance continue for all in this fraternity. However, the awards and certificates and the more costly services should be reserved for the paid-up membership only. — *Bob Sammons, WB6EUM, Newark, Calif.*

In reading *QST*, I was shocked to hear someone, presumably a League member, say he would gladly pay another $5.00 so some freeloader can receive WAS, WAC, DXCC, etc., free. I think if someone wants these awards badly enough they will gladly pay a small service charge. After all we aren't a welfare organization. — *Patrick J. Moynihan, WNØPNX, Rosemount, Minnesota.*

About this talk of freeloaders: We have several of these people here in this area but we are making every effort to bring them to the ARRL ranks as soon as possible! — *Fred Keith, W7CIC, Mesa, Arizona.*

[EDITOR'S NOTE: Policy matters such as whether or not services should continue to be given to non-members are decided by the League's Board of Directors. The next Board meeting will be May 5, 1967. If you are interested in expressing your views, be sure to write your Director; his name and address appear on page 8.] QST

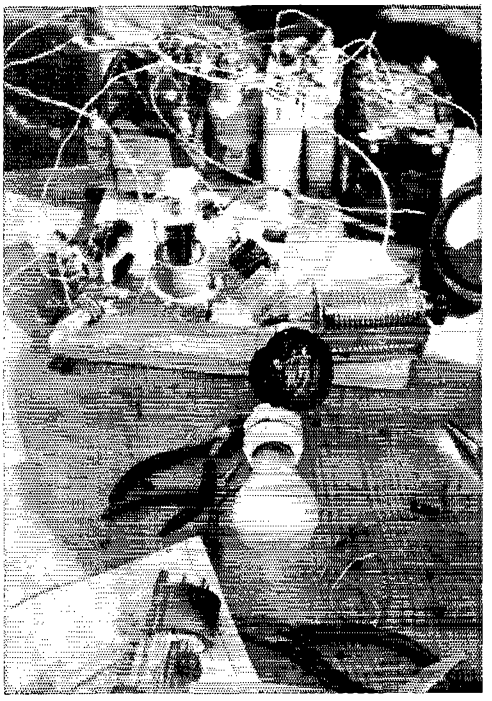
Building Fund Progress

Director Haller, W9HPG, reports that during the last week of January members of the Central Division made contributions in memoriam to three departed amateurs in order to put the Central Division over the top in the Building Fund drive. The contributions were made in memory of Charles Reberg, W9MVZ; Don Peter, WA9HQS; and Alex Reid, VE2BE. The Central Division thus becomes the 12th to reach its quota. Our congratulations to Director Haller and the amateurs in Illinois, Indiana, and Wisconsin who pitched in to help the Central Division reach its goal.

The Honor Roll of ARRL divisions that have now achieved at least 100% of quota reads as follows:

Canada
Central
Dakota
Delta
Hudson
Midwest
New England
Northwestern
Pacific
Roanoke
Rocky Mountain
West Gulf

Strays



The fellows at the Utah Hamfest have come up with an interesting activity—a junk box contest. Groups of about five compete to be the first to put together an operating transmitter from junk box parts at hand. Awards are given to the group who first lights its transmitter's dummy load, and to the group whose transmitter has the greatest power output.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

Australia to California Via The Moon

ONE year ago this month VK3ATN and K6MYC began a series of moonbounce tests on 144 Mc. On several occasions, success seemed close, only to elude them during some critical point in the information exchange. As reported last month, such was not the case on December 29. The two-way contact was made between 1146 and 1210 GMT; not just an exchange of reports, but a real QSO of such quality that Ray was able to request a 7-Mc. sked following the test! Mike, K6MYC, tells us Ray's signal varied from 3 to 6 db. over the noise and was almost constantly readable. In Australia, the K6MYC signal peaked about 18 db. above the noise.

Mike's big signal was launched from a 320-element collinear array built around sixteen bays of 16-element collinears with 64 directors added. The directors were mounted 8½ inches in front of the driven elements.

Before adding the directors, K6MYC had measured the gain of a single bay at 11.7 db. over a reference dipole; the directors added a measured 1.7 db. to each bay. Mike says he measured the entire 16-bay array at slightly more than 25 db. over the reference dipole. The array was 70-feet long and 25-feet high and was steerable in elevation from 55 to 90 degrees, and 3 degrees azimuth. The station was on a hillside at Stanford University.

For transmitting, K6MYC used a Collins 32S-1 and a Hallicrafters HA-2 (a 28-Mc. transverter) to drive a homebrewed 3CX1000A7 coaxial-tank final, producing 500 watts output.

On the receiving side, a 52¢ TIXMO6 transistor preamp preceeded the HA-2 converter which uses a pair of Nuvistors. The 28-Mc. signal was then fed into a pair of Collins R-390 receivers, at the operating position some distance from the array. The amplifier and converter were located near the antenna feed-point.

Down under was Ray's now well-known 150-watt 4X150, driven by a homebrew exciter. (Ray has a request on file with the Australian Government to allow him to run 1 kw. d.c. input on future tests.) VK3ATN's receiving chain is a Parks Nuvistor preamp, an Ameco Nuvistor converter and a Collins 75A-4.

The secret of his signal is a stacked 4-wire rhombic, 342 feet on a leg with a maximum wire sag of 18 inches! Ray said a few months ago he thought the 11°20′ radiation angle was too high. He lowered the angle to 10°40′ and K6MYC reported a noticeable improvement. Ray says he may lower the radiation angle another full degree.

The tests between VK3ATN and K6MYC are continuing, though the 320-element array has been disassembled. Mike now has half of the array polar-mounted on the roof of his Saratoga home. In addition to testing with Ray, he has joined W6DNG in running e.m.e. tests with F8DO. W6DNG's signals have been heard in France on F8DO's 4-yagi array. F8DO has heard his own echoes with his homebrew Nuvistor converter and post detection system (*QST*, October 1965).

On another moonbounce note, W6GXN has control of the SRI 150-foot dish and there may be some further tests from WA6LET this year.

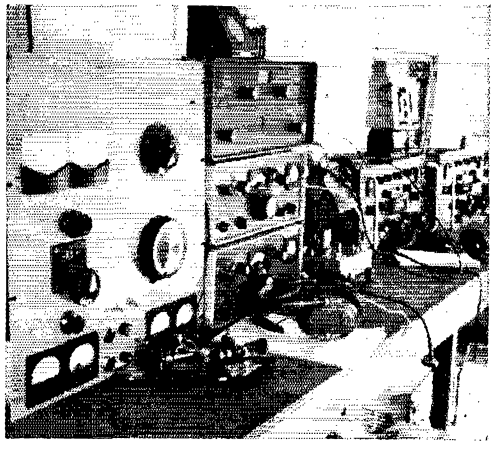
K6MYC says he believes anyone participating in an e.m.e. project must use h.f. for liaison schedules. (The h.f. bands are becoming more popular among v.h.f. men for liaison during other work such as meteor scatter.)

Late Item

W6DNG and F8DO made a successful two-way exchange on 144 Mc. via the moon between 0600 and 0700 GMT, January 27.

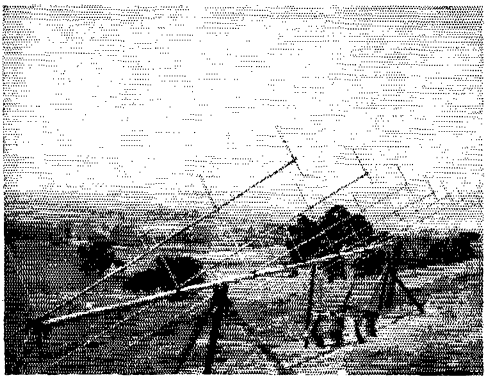
Bill, W6DNG, was using a 32-element expanded-extended collinear array and received F8DO's signals as much as 12 db. over the noise. Bill has measured his antenna gain at 18.3 db. over a dipole.

F8DO used an array of eight 9-element Yagis. No other information was immediately



The rig at K6MYC. On the left is the 3CX1000A7 final with 6-inch coaxial-tank. The pair of Collins R-390s are on the right. W6UGL provided K6MYC with technical assistance.

*P.O. Box 1738, Arecibo, Puerto Rico 00612. Send future reports and correspondence to Bill Smith, W1DVE, % ARRL, 225 Main St., Newington, Conn. 06111.



The 320-element array used to work VK3ATN. The 4-inch center boom was supported by a pair of tripods made of 4X4s. The sawhorses just below the center of the array held the final, HA-2, coaxial filter, preamp and s.w.r. bridge. The equipment was carried from the shack for each test.

available, except that the contact was by slow-speed c.w.

F8DO is the second European station worked by Bill on 144 Mc. e.m.e. (earth-moon-earth). On April 11, 1964 he worked OH1NL in Finland. — *W1DVE*

50 Mc. F_2?

With the increasing solar activity come the first reports of possible F_2 on 50 Mc. during the new solar cycle.

Mel Wilson, W2BOC, (ex-W1DEI) who has studied ionospheric propagation for more than 35 years, says he is fairly certain he recorded the BBC in London on 41.500 Mc. at least three times during January in Pittsford, New York.

Mel started his current series of pen-recordings on December 14. The first indication of 41 Mc. F_2 across the North Atlantic came on December 28 from 1228 to 1229 GMT, and again the following day between 1227 and 1228 GMT. On January 7 between 1431 and 1433 GMT, the 41.5 Mc. signal was recorded relatively strong and with slow QSB. Signals were also copied on January 13 from 1216 to 1217 GMT, and twice on the 16th, between 1213 and 1214, and 1336 to 1339 GMT. Mel says the latter report looks highly valid from the signal fade rate. Good signals were again recorded on January 21 from 1207 to 1208 GMT.

W6BFJ in Hawthorne, California reports the m.u.f. in excess of 40 Mc. on January 12 and 13 when he copied many strong commercial service stations from the East and Southeast. George says the signals peaked between 1800 and 1900 GMT.

On the 14th, he caught signals from the Pacific Scatter System on Midway Island at 49.827 and 49.833 Mc. He says the signals (no time given) were identifiable by the characteristic growling sound of digital-type transmissions with sync pulses every few seconds. The signals were extremely strong with slow QSB. Other signals above and below the Scatter System frequencies were heard but not identified. At the same time, W6BFJ observed back-scatter on Southern California signals with his beam pointed towards the South Pacific.

These openings correspond with the wide-spread aurora of January 13 which produced 432 Mc. contacts between WØENC and WØEYE, W7JRG and WØEYE, W3RUE and K2YCO, K2CBA and K2YCO, and K2GRI and K2YCO. Numerous contacts were also reported throughout the country on 50 and 144 Mcs.

At Ames, Iowa, WØPFP reports the first back-scatter he has heard in several years on January 3 when he worked WA9RDT near St. Louis at 0440 GMT.

Jim and WA9RDT were working K4QKR in Florida, but WØPFP could only hear the WA9 when the St. Louis station had his beam on K4QKR. No direct path signal was evident.

The New York, Iowa and Southern California reports are significant because they represent three entirely different latitudes in relation to the geomagnetic North Pole. — *W1DVE*

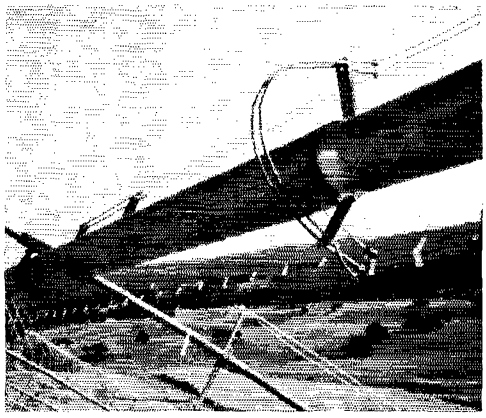
144 Mc. and Up

We don't need it yet but what do you want to bet that some time, in the not too distant future, there will be a box for 1296-Mc. "Standings." The band isn't exactly crowded but the few who do operate the band are some of the dedicated ones. For instance: WA9HUV at Elmhurst, Illinois, is running 10 watts output to a 2C39 cavity amplifier (with 9-db. gain) to an 8-foot dish. The dish is a modified commercial type with hardware cloth extending somewhat beyond the horizontal members. It is fed with a 3-element Yagi cut to 1296 and checks 27.5 db. gain against a dipole in actual tests. Norm is using a crystal mixer 1296-Mc. converter with paramp (Jan. 1961 *QST*) and "works beautifully, easier to operate than my 432 paramp." He is planning to mount the dish above his 64-element 432 Mc. collinear atop a 40-foot tower with high hopes of working the boys in Toledo and Detroit on 1296 Mc. To date three two-way contacts have been made by WA9HUV on 1296 with W9NAU, W9ZIH and W9OKB. Farthest distance is 27 miles.

Norm is also active on 432 Mc. and writes that his activity on December 12 and 13 was just a little out of the ordinary. Contact was made on 432 Mc. with 16 stations in 5 states plus VE3AIB in Ontario, Canada. All contacts (except one) were on phone (s.s.b. at WA9HUV) and signals were extremely loud and steady.

K2ACQ writes that he is back on 432 Mc. after a long absence running a little more power (75 watts) and a better feed line (RG17U) to his 128-element colinear. Successful skeds have been held every night with W3RUE who is 200 miles away with mountains between the two stations. On January 7, Doug, K2ACQ, copied W9ZIH and W8EKJ via aurora but was unable to make contact. K2ACQ is also working on gear for the 2300-Mc. band and would like to know "the most likely frequencies to be used?" Those of you who are on the band might drop him a line and let him know your frequency.

Two more 432-Mc. aurora reports were received and seems that WØEYE had himself a "heydey" on January 7! On that date he worked W7JRG for the first Colorado to Montana contact on that band (420 miles) and then went on to work WØENC for the first Colorado to South Dakota 432 Mc. contact (300 mi). Ken Erickson, W7JRG, writes: "Noticed the familiar whisper on signals near 15 Mc. shortly after 1800 MST but no answers and nothing heard to my CQ on 144 Mc. Called WØNXF on the landline and we had a successful contact on 144 at 1846. I suggested going to 432 for a try and WØEYE, who was reading the mail called to tell me to look for him on 432. Finally got everything hooked up and working and made a good contact with Don on 432 Mc. at 1920 for the first Montana to Colorado QSO via



Close-up of the center boom showing some of the ¼-wave matching transformers. An epoxy material supported the sections and was attached to the boom with silicone rubber. K6CLM and K6MYC built the array.

aurora. No other signals heard on 432 so went back to 144 Mc." Ken then worked 13 stations in 7 states on 144 Mc. and as an added bonus one contact was with K7MKW in Idaho, a new state for Ken (number 26). Rigs are just under a kw. at W7JRG on both bands. 144.010 and 432.030 Mc. 417A neutrode on 144 with 13-element Yagi. Paramp into a transistor converter on 432 with a 32-element W6AJF array.

WØENC writes that at 2317 MST he contacted WØEYE on 432 aurora receiving a report of 3 2 A and sending one of 4 3 A. Rig at WØENC runs 80 watts to a homebrew 64-element quad Yagi at 65 feet and the receiver is a 2-transistor preamp (Tilton), 6CW4 converter and a Drake R-4. "WØEYE's signal on 144 Mc. was S9 before changing to 432 Mc. and I also worked WØNXF and KØMQS on 144 during that auroral session." Bob also heard a number of 7s, 9s and 0s.

"Calibrating the 432-Mc. converter is simple and easy with this unit." So sez Paul, W4HHK, who recently built a two-stage transistor harmonic amplifier with tuned output at 432 Mc. "Drive is supplied by J-K transistor 1-Mc. oscillator. Jacks are provided for feeding modulation to the output stage. Unit is mounted in a Minibox with octal plug on one end for plugging in the chassis panel that mounts the 1-Mc. master oscillator, frequency-divider unit, power supply and spare plug-in unit."

In Pittsburgh, Pennsylvania, The Thomas Jefferson Radio Club, WA3CUY, is working on amateur television and hopes to soon be in operation. However, one little drawback! To date the boys have found no one in their vicinity who is working with amateur TV. They hope to be able to exchange information and make skeds with someone in their their area so if you're interested, write them.

Another plea. This one from WA8DXW. "Just finished building a Vidicon TV camera for ATV but now need a Vidicon to test it out. Does anyone have a spare Vidicon he doesn't need?" Doubt it, John, but you can't say we didn't try.

Out in Oregon K7DVK and K7QXF are already making preparation for the June VHF Contest. The boys are planning to operate from a mountain top and will have equipment on all v.h.f. bands from 50 Mc. through 1215. Anyone want to join 'em? Sounds like a lot of fun and a lot of work.

WB6IOM is working on a cavity design for 1296 with low-cost tubes. He has built one that holds 8 tubes of the 2C39 variety for an expected output of 400 to 500 watts. Both input and output resonate and everything shows good symmetry. "The cavity is quite easy to build and might prove to get more people interested in high-power 1296 work." Hope you're successful with the tests, Pete. Sounds good.

Although the Geminids and the Quadrantids did produce some contacts on 144 Mc. the general consensus of opinion seems to be that those showers were very poor and nothing at all to compare with the Leonids. During the Geminids in December we have the following reports:

K1BKK, Barre, Vermont — WØNXF.* First Vermont to Nebraska.

K1HTV, Thompsonville, Conn. — Worked W8TIU.

K3CFA, Lemont, Pennsylvania — Worked W4CKB.

W6GDO, Rio Linda, Calif. — Worked W5ORH*.

K7ICW, Las Vegas, Nev. — Worked K7ZIR.

W8PT, Watervliet, Mich. — Worked W5ORH. Heard WØEYE and K5WXZ.

Quadrantids: *W6GDO, Rio Linda, Calif.* — Worked W9INW/5*.

* New state for reporting operator.

Negative reports were received from K1ABR (Geminids and Quadrantids), K1HTV (Quadrantids), K3CFA (Geminids and Quadrantids), W3BDP (Geminids), K4EJQ (Geminids), KØMQS (Geminids and Quadrantids). Most of these boys heard a few pings, bursts, etc., but no m.s. contacts were made, and among the comments made were: "A fizzle!" "No results!" "Nil!"

Aurora once again reared her beautiful head and this time during the V.H.F. Contest on January 7 and 8. K1HTV reports that 7 of his 20 sections were accounted for by the aurora. Among the 20 sections, via aurora, were Ohio, W. New York, W. Pennsylvania, VE2, VE3, Delaware, Michigan, Indiana and W. Virginia. In Rhode Island K1ABR also noted the aurora but was too ill to take advantage of it. (Now that boy really must have been bad off!) W3BYF sez the first 100 kc. of 144 Mc. sounded like a power leak and hundreds of signals were coming through. "However, no DX. Best was WA9DOT, heard a W8 calling WØNXF and heard only one W4, that one was W4LTU." At Cedar Falls, Iowa, KØMQS worked West Virginia, during a tropo opening on December 12 for number 23 and then during the auroral session of the 7th and 8th he worked Colorado (WØEYE), Montana (W7JRG) and Wyoming (W7UFB) to bring his two-meter total up to 26 states worked. Thirteen states were worked by Dick during the aurora and he sez he passed up three easy states while trying to get Oregon, Utah and New Mexico. Rig at KØMQS is a kw. to 4CX250Rs, 15-over-15 at 104 feet. Nightly skeds are run with W5HFV (500 miles) and W8TIU (450 miles) and signal reports are exchanged both ways on even the worst nights. A new state via aurora was added to the list of WØNXF in Nebraska, too. Bob worked W7JRG in Montana for his number 33 on 144 Mc. and also worked 14 different states in 5, 7, 8, 9, and Ø call areas.

Good tropo conditions on December 12 were reported by W8PT (worked 8s, 9s and VE3) and KØMQS while WB2RVE and W3BDP both mention the 27th of the month as being a good night for tropo work.

W3UVD and K4EJQ are both using larger antennas recently. Walt (W3UVD) is using two Big Wheels stacked at 40 feet (intends to raise them to 60 feet soon) for net coverage and says they do a real job in covering local areas. Bunky (K4EJQ) sez he now has a new stacked-antenna system (doesn't say what it is) at the mountaintop QTH and it's making a noticeable difference on the long haul-nightly skeds with the low-power c.w. rig.

Wish we had the space to print the list of stations worked on 144 Mc. since October 1963 by KØEMO. Gene and his XYL kindly furnished us with such a list and it makes interesting reading containing call, frequency, mode, date, name and QTH of the stations worked in 20 states, 7 call areas with best DX at 1125 miles. Gene also has 432-Mc. skeds on Monday nights with WA9HUV and W9QXP.

Fritz Hess, W1IGJ, has his 28-foot dish mounted, but he is back in college and no telling when we will hear of any operation. The dish is on an el-az mount. Fritz has a commercially built an anlog computer for el-az equatorial conversion. It is composed of selsyns and a clock. The principles are simple and might be duplicated by a careful ham.

More early reports received concerning the auroral session of January 13 from W1HDQ, WA1GPI, K2YCO, K2HLA, W7JRG and W9YYF, lead us to believe that the auroral sessions are improving. As E.P.T. (W1HDQ) states: "This was about the best aurora I ever heard. 9s very loud on 144, and activity tremendous. Really amazing to have such auroras in January. Wish I knew what this all means."

50 Mc.

50-Mc. "skip" reports are once again in the foreground. WA1DPX/WA1HDQ (He's got to be a vhfer!), K1FWF and K1ZCU report short openings into four land particularly on December 25. A good opening to the Caribbean on December 13 was noted by WB2RVE when he worked a station maritime mobile in that area. W3ELA, K3JHE, K3MSG all caught that same opening but Bob, K3JHE, added December 3, 5, 13, 17, 30 and 31 to his list of skip reports. The 30th and 31st of the month were the best for K4WHW when he heard stations on 50 Mc. in all call areas except 5, 6 and 7. WB4ALN worked stations in Texas on

(*Continued on page 152*)

Final Column

I would like to express my appreciation to the v.h.f. fraternity for the support and cooperation which Helen and I have received in "doing" this column. We've had gripes, we've had kudos and we've had all kinds of encouragement and discouragement, but most of all we've derived a great deal of pleasure through the contact the "column" has given us with others of the v.h.f. gang, otherwise unknown.

Hope to work you all via V.H.F. MOON-BOUNCE (and 50-Mc. skip — *Helen*). 73, *Sam* and *Helen*

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Good Housekeeping is Accident Prevention

CAESAR'S "Ides," St. Patrick's day, and the first day of spring all add up to spring cleaning and the annual turnout of the broom and the brush brigade to get the house ready for Easter, and the summer months. Aching muscles and broken fingernails are undesired bonuses that arrive with clean curtains, fresh paint, and shining windows. When the house proper is spotless, we come to the most important room of all. Housecleaning the shack is a sure topic of conversation on nets, as well as in casual chats, and covers every phase from plain hard scrub brush cleaning to plans for rearranging the gear. (Few YLs there are who don't enjoy changing the furniture around.) There are dreams of master panels, better lighting and easier access to equipment so that everything will not only be in good order, but make the operating much more pleasant.

Along with the elaborate plans it is wise to think about "good housekeeping," and who among the feminine population of amateur radio is not well versed in that department? But are we? Good housekeeping doesn't always mean super clear windows, and highly polished floors, rather it is making a check list of possible hazards that can, and do, exist in the shack. We gals seem to think of "Switch to Safety" as dealing with the antennas and potential major electrical hazards that the OM looks after, yet there are a lot of things that we can easily check on ourselves.

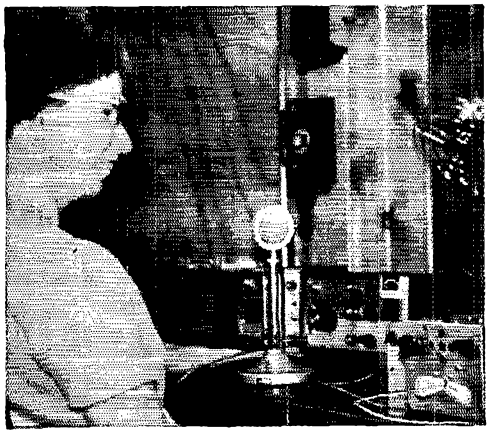
What about fire hazards? Not one of us would think of setting our iron near anything flammable until it is cool, but what about the soldering iron, is there a place for it that isn't cheek by jowl with logs, scratch paper, message blanks, operating aids and the dozen other easily burned items the desk usually holds? How about that ash tray on the desk, is it adequate? Is it large enough to cope with those long contest hours between emptyings? Is the lip deep enough to hold a cigarette so it won't roll off on the floor or under a pile of papers? Don't say it can't happen, it has.

And while we are eliminating fire hazards, what about the wiring, would it pass inspection? Is the insulation on the a.c. cords of the station equipment still in good condition, or has time, temperature, and smog caused it to harden and crack? It might be well to check the circuits and see if they are still adequate, and the proper fusing installed. Maybe it was more than sufficient when originally designed for the station, but how much more equipment has been added since that time?

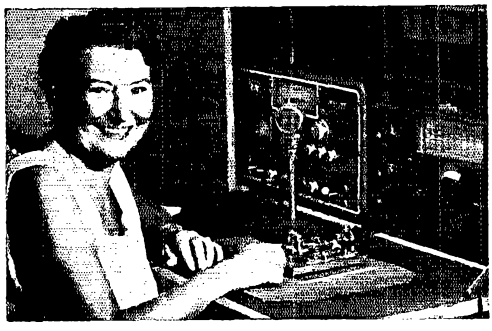
Arlene Kolber, K6USC, publicity chairman for the West Coast Fun Fest, is also vice president of BAYLARC, and editor of that YL Club's bulletin. In her spare time she is a housewife, mother, and a science teacher.

WB6PCQ, Jan Flowers, is an active member of the Northern California Section Net, and RN6. She also enjoys ragchewing, and makes it a point to work at least one Novice a week to help them get started. She is co-editor, with OM Del, WB6PCR, of *Skip*, the Fresno Club bulletin, and is now planning to take the Extra Class exam as soon as she is eligible.

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001



Ruth Vollrath, KØONK shown demonstrating her auditory "gimmick" at a recent meeting of the Kansas City VHF Club. This instrument enables her to tune her equipment by sound. One of the sightless amateurs, Ruth is active as RM, Missouri ARRL Section, with ORS, OPS, OBS and EC appointments. She is a well known traffic operator, and a member of the A-1 Operator Club



W4QBY, Dorothea Seaver, is the busy chairman for the YLRL 4th District. She keeps in contact with her son, W1BLJ several times a week, and with her aunt KØWLF, in St. Louis. She is a member of the Floridoras, and the International Side Band System.

WA3ATQ, Harriet Creighton.

A lot of us have the station in the basement, or the garage with a separate heating unit. If we use a gas heater it is no doubt properly vented or there would have been trouble long ago. Now that spring and warmer weather are here it is a good time to check and make sure that the vent pipe is still in good shape and not rusted out. The gas company is more than willing to check it and insure future safety for the result of asphyxia is a "silent key."

"Switch to Safety" or accident prevention, is just another way of saying good housekeeping, and while we are busy making sure that all the winter accumulation of dust is out of the corners so that we can show off the shack, we can check to make sure that it is as safe as it is attractive.

West Coast YL Fun Fest

The BAYLARC sponsored YL Fun Fest is scheduled for the April Fool weekend, March 31, April 1–2, 1967. This is the weekend after Easter and all the YLs should be in rare form and ready to join in the fun and festivities.

The program includes an eyelash QSO party on Friday evening, March 31; a YL luncheon at noon Saturday, April 1, and a YL/OM Banquet Saturday night terminating in a real April Fool Fun evening.

The Fun Fest will be held at the EL Rancho Motel in Milbrae, California. This location is within a few minutes drive of San Francisco, and the Motel operates a free bus service to and from the San Francisco International Airport.

The OMs have not been left out. While the gals are having their afternoon activities on Saturday they will have the rare treat of a guided tour through Stanford's Linear Accelerator Center.

Registration for YLs is $6.50, which includes the luncheon on Saturday. Banquet tickets for the YL/OM will be $5.00 per person, including tax and tip. Pre-registration will close on Wednesday, March 22, 1967. The pre-registration prize will be an a.m.-f.m. clock radio.

For those who may be planning to be in the Bay Area that weekend, and would like to attend contact the registration chairman, Dorothy Dimitre, WA6LIZ, 532 Santa Barbara Avenue, Milbrae, California 94030, for information.

WA3ATQ

Servicemen and their families know Harriet, WA3ATQ through her message handling, as well as the traffic to and from them that goes through her station in Philadelphia, Pennsylvania. A former member of the Marine Corps, Harriet is well aware of the need of that touch of home, and has completed over 1200 messages for KG4AM in Guantanamo Bay, Cuba.

She also maintained liaison between the Hospital Ship *HOPE* in Nicaragua, and the doctors in Philadelphia so that they could make contact whenever necessary. When the *HOPE* docked in New York last November, both Harriet, and OM, Harry, K3YJK, were guests aboard the ship.

She is an official representative of the Delaware Valley Eye Bank on the Eye Bank Net, as well as active in the Pennsylvania Emergency Phone and Traffic Net, and the 20 Meter North American Net.

Her most recent activity has been clearing the hundreds of massages that originated in the "Send Greetings to your Serviceman" project under the auspices of the Mayor of Philadelphia.

Formerly a dressmaker's designer, Herriet keeps busy as a director of the Needlework Guild of America, and the Alter Guild of her Church.

Both Harriet and Harry have a second station, with calls of WA3BIZ, and WA3AIU, respectively, at their second home in the Pocono mountains of Pennsylvania where they plan to live when Harry retires. QST

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Yestermonth we mentioned the invidious c.w.-phone rivalry of years ago, and emphasized that ops at the rare-DX end are pretty powerful persuaders. For a topnotch DX score a W/K must be ready to use either mode quickly and skillfully. AC3XX at a whim may decide to plug in mike or key — or keyboard!

Have overseas DX men changed their overall *modus operandi* since those feudin' days of yore? From their vantage did anybody really "win" that hoary argument? We pawed through our *QST* file for a possible hint, figuring that comparisons of activity in the annual ARRL DX Competition, amateur radio's perennial proving ground of operating tools and skills, ought to carry some weight. It's a relatively stable set of readily available statistics.

Well, back in 1939, the last big pre-WW-II shindig, we find phone entries constituting 33.7 percent of all non-W/VE logs filed. Last year, nearly three decades later, the figure is 34.9 percent. Some sort of constant at work?

Continentally, the '39 contest, biggest of all time, produced more phone than c.w. logs from South America and non-W/VE North America. In 1966 no such phone-surplus continents showed up. A current surge in Africa and Oceania phone activity is countered by the c.w. boom in Asia (45 code vs. 23 voice entries in 1966, 12 vs. 11 in '39). Figures for Europe are distorted because U.S.S.R. contest entries were nil prior to the war, and Germans were permitted almost no phone in those days.

Entries-per-country comparisons are interesting. For example, French phones outparticipated c.w. stations 16 to 13 in 1939; last year only two Fs entered via voice, 12 on c.w. The British Isles gang was divided almost fifty-fifty in phone-code contesting in '39; the 1966 results went c.w. by a three-to-one ratio. On the other hand, Australia, Holland and other countries have swung voiceward markedly. Phone popularity has mounted in Denmark and South Africa over the past 27 years, c.w. interest in Japan and Cuba.

Yet over all, scant change.

Comparing 1966 statistics with those of the past ten years, however, indicates phone enthusiasm now on the upbeat, gradually approaching 1930s levels. Ratios of 1966/1956 DX contest phone entries are enlarged in all continents but South America. Thus, while code-vs.-voice operating habits at the DX end show little change over almost 30 years, the pendulum now appears to be heading mikeward again after a c.w. peak in the late 1950s.

Single-sideband's efficacy and increased availability doubtless is the central factor in this radiotelephone renaissance, more so than the 1930s boom in Class-B modulation and the narrow-band f.m. phone fillip of the late '40s.

Charlie Queen, David X-ray!

What:

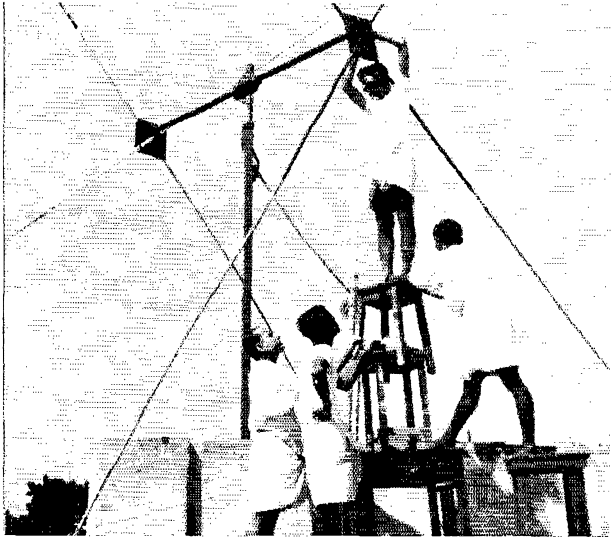
We've said this before, and it's always great to be able to say it again: High-frequency DX conditions should now be the best in years and years. Spring equinox high on the rising slope of a sunspot curve! This is a dream situation for red-blooded DX men, especially those with high esteem for 15 and a keen yen for 10. . . . Bandhoppin' month aboard your "How's" Bandwagon. Here's a small sample of the stuff you may run into during this month's final week ends of the annual ARRL DX Contest. . . .

80 c.w. holds the DX line noisily. **Ws** 1APU 1BGD 1SWX 3DPR and **WB2RSS** recommended 3.5-Mc. consultation with **CO2BO, EA6AC, ET31L** (3502 kc.) 2300 GMT, **GB2SM** 5, **GC4LI, GM6RV, HI3PC, HP1XHG** (10) 3, **HKØAI** (3669) **OZ HZ1AB** (3) 23-0, **PE2EVO, PX1RK, PY1SJ, TAs** 2BK (29) 23, 3FA, **TF3KB, UAs** 2KAW 9DL (1) 0, 9MX ØZB (2) 12, **UB5KAA, UC2AA, UF6BD, UL7GW** (8) 1, **UW3CS, VK5KO, VO1AW, VPs** 1DX (3) 2, 1PV 7NM (5) 2, **VS9AJC** (5) 0, W1FZJ/KP4, **XEs** 1KKV 1OE 2OK, **YN1s** AA (12) 11, YO4WV/mm, **ZC4BN** (7) 0, **ZDs** 7IP (17) 4, 8J, **ZLs** 1AYA 1AYQ 1DI (1) 7, 3LO (2) 11, 4IE 7, 4U1ITU, 4X4s RB VD (3) 0 and VO . . . . S.w.l. P. Kilroy and others find **G3KPV, GI3CDF** 6, **HB9AT** 7, **ON4UN** 5, **OHØNI** 21, **OY7P** 22, **SMs** 4SB 7, 7XV 6, **UQ2KFG, VP9BW** 0, **ZC4MO** 22, **XLs** 2BCG 11, 3RK 11, **3A2CP** 20, **4U1ITU** 21 and **9H1AE** standing out temptingly on **75 phone**, most just below 3800 kc.

40 c.w. keeps **Ws** 1APU 3DPR 3HNK, **K3FKU, WAs** 8GGN 8MCQ 8RQQ ØFRM, **WB2s** PAZ and RSS busy with **CM2s** PY (9) 7, QN (8) 23, **COs** 2BB 2BO 2RL (40) 6, 5EG, **CR7CI** (6) 4, **DM3OZJ, EA8s** FE (12) 0, FF, **ELs** 2D (37) 2, 9NA (6) 5, **ET3RT** (3) 3, **FG7XX** (14) 2, **FP8CY, HAs** 1KAB 5KFR 3, **HIs** 3PC (2) 9, 7NJP (29) 3, 7APO (29) 0, **HKs** 4EX (8) 5, 5JI 5YC (10) 0-1, **HR1JZH** (75), **HZ1AB** (7) 1, **ITIs** AGA (12) 0, AQ, plenty of JAs, **KS6BV** (18) 11, **KV4DB** (5) 1, **KX6BQ, KZ5s** JF (28) 0, TW, **LU1XA** 2, **LZs** 1BI 1KSD (10) 4, 1SS 2KLK 2KST (8) 4, **OD5EJ** (12) 19, **PJ3CJ** (24) 3, many **PYs, SMØBNX, SPs** 8HR 9DH, **TA2BK** (14) 22, **TU2BK** (2) 3, **UAs** 2KAW ØKAE 3, **UB5s** KNF QA, **UC2AR** (3) 3, **UI8LK** (20) 22, **UJ8AV** (12) 19, **UL7QII** (32) 19, **UP2KBC, UQ2s** KCR (45) 7, KFG (8) 4, **UT5s** KSE PK (9) 5, **UR2KAS, UY5FF** (20), various VKs, **VOIs** HQ IM **VPs** 1DX (3) 1, 2FC 2MO (6) 4, 2SJ 3, 7DX, **VQ9AR** (8) 0, **VU2LE** (19) 15, **XEs** at all hours, **YN1s** CJD 2, CRU (20), **YVs** 4AA 4, 5CET, oodles of YOs and YUs, **ZDs** 3G (10) 3, 8J (7) 6, **4X4s** VO WN (2) 1, **5N2ABF** (15) 4, **6Y5AR, 7XØAH** (12) 23, **9H1AB** 2 and **9Y4DS** (11) 5 . . . . . Forty **phone** is as tough as ever but **HI8XAL** (240) 3-4, **HR1HC, IT1ZGY, JA2BTV** 11, **OA4PQ, OX5BJ** 1, **PY7APS. SP9AJK** 1, **VK3VJ, VPs** 1PV 2KJ and WØGTA/**8F4** make the hunt worth while . . . . . Novicewise, **WNs** 5PUQ and 9QWX come up with **HR1ET** (175) 5, an almost nightly phenomenon.

10 phone, back with a bang after its midwinter sag, treats **W1YOK, K7YDZ, WAs** 1FEO/LU 5AER 8GGN 8MQI 9NDV and **WB2PAZ** to a generous helping of **CP6GA, CRs** 6II* 13-14, 6IS 19, 7AJ* 10, 7CZ* (490) 19, **CTs** 1BH (600) 17, 1KT (580) 16, 2AC (600) 18, **CX9s** CO PP (605) 20, **EA8s** BQ* 14, EX 13, EZ* 12, FD (600) 18, **EL8B** (700) 16, **HC4TB** (570) 15, **HI8XDA, HR1JKM*** 17, **MP4s** BEU 11-12, TBM* 12, TBO* (855) 10, **OD5s** AT* BZ (835) 13, CN (600) 14, **SVs** 1JB* (700) 10, ØWL* (880) 13, **TG8CJ** (600) 14, **TU2BA** (610) 17, **UA9SIM*** 12, VE2BUJ/SU 13, **VK6NJ*** (680) 12, **VQ8BJ*, VS9s** APW* (660) 10, AJC 11, ATC* AVW* 11, **ZS8L** (590) 17-18, **ZB2AN** (450) 14, **ZC4s** MA* (735) 12, MO* 12, RM 10, TX* 13, **ZD5R** (630) 17, **ZEs** 1AA (690) 16, 1AS* 1BF 15-16, 6JN*, **ZL2s** BE (600) 22, GB*, **3C8BY** 19, **5As** 1TG (820) 10, 1TS (710) 16, 1TT 10, 3TG (670) 16, **9H1AS*** 11, **9J2s** BC* (470) 18, DT

*7862-B West Lawrence Ave., Chicago Ill., 60656.



4S7GV's DX pad was the scene of recent hamfestivities when 4S7s DA (left) and NE (right) paid a visit to Kurunegala. Glen turned out in minishirt and minisarong for the occasion. At right a stalwart crew assists VU2LE (top) with the hoisting of his cubical quad in Madras. Bala's eldest brother supervises on the left. (Photos via W1YYM)

FK MM (590) 19, **9L1HX** (598) 15 and **9Y4VS*** 18-22, the asterisks for non-s.s.b. a.m., still mighty popular on 28 Mc.

10 c.w. is a favorite with **Ws** 1CNU 3DPR 8YGR, **Ks** 3FKU 9UVK, **WAs** 8GGN 9MQI, **WB2s** PAZ and RSS due to **CR7s** IZ (135) 9, LU 16-17, **CT3AS** (75) 13, **CXs** 2CO (115) 16, 8CZ (50) 22, **DM2XLO** (60) 14-15, **HG2KRD** (44) 16, **HK0AI** (62) 15, **JT1AG** (14) 21, **KG4CX, KV4s** CI (70) 12, CX, **KW6DS** 22-23, **PE2EVO, PJ3CJ** (68), **PYs** 2BNK 5ASN (30, 55), **SU1IM** (155) 10-11, **UF6s** DZ 9, KAF (185) 12, **UG6AB** (170) 9, **UL7YL** (155) 12, **VK7SM, VPs** 1DX (35) 17, 9BK **VU2FN** (165) 10, **W0GTA/8F4** (145) 10, **YV1OB, ZB2AM** (50) 11, **ZDs** 5G 7IP (29) 21, **ZEs** 1A8 (155) 13, 1CK (110) 11, 2KL (15) 12, 3JO (145) 10, **ZL3s** FX IS, several **ZSs, 5N2AAF** (32) 20, **5Z4SS** (40) 18-19, **7Q7RM** (40) 12, **9J2s** BC (135) 8, DT (1) 13, MM WR (145) 9 and **9Q5HJ** (205) 13.

15 phone's vast following includes **Ws** 2DY 3HNK 4YOK 8MLX 8YGR 9LNQ, **Ks** 2KYII 5VTA 7YDZ 8MMZ 9UVK, **WAs** 5AER 6JDT 8GGN 8PKG 9MQI 9NDV, **WB2LBJ**, tuners Kilroy and C, Durnavich who gave us the word on **CPs** 8BK 6FV (383) 19, **CTIs** AW* 21, GK* 20, TRA/m* 14, **CR6FR*** 20, **EAs** 8AH (390) 17, 8EU* (220) 11, **9EJ*** (215) 17 of Rio de Oro, **EI2AV** (385) 17, **EL2s** FD (425) 12, R V, **ET3s** RB WH, **FM7WQ, FR7ZD** 14, **GCs** 2AAO (375) 17, 8HT, **GD3s** RFK 14, TIU (410) 18, **HCs** 4GW (370) 19, 5CA (425) 15, **HI8AJG, HK4TP*** 20, **HR4JDH, IT1CFN, JAs** 2BFC (334) 23, 2GPR (315) 23, 7UJ 8BGZ 9AX 23, **KA2MB, KGs** 4BQ 6AAY (350) 22, **KH6s** EDY (310) 13, CH/**KW6** (350) 20, **KL7WAH, KM6BI** 19, **KR6RB, KSs** 4CC 6BT, **KV4CX** (395) 12, **LX1s** DB WR, **MP4TBO** (420) 12, **OAs** 1OE 4JR* 21, 5AQ, **OEs** 2WSL (350) 18, 3ARW 13, 5CA, **OY4M, PJ2s** CH 16, CR (380) 18, **PY9FJ** (435) 11-12, **PZ1s** BO* 20-21, BX (430) 20, **SLs** 4BP 5AO 7AZ 14, **ST2SA** (220) 12, **TGs** 8CJ 16, 9RR (395) 20, **TF2WKE, TIs** 2EZA (410) 20, 2JVL 5YOR (370) 22, **TN8AG** 19, **TR8AD** 17, **TU2BD** (310) 17, **TY3ATB** (368) 12, **UC2AA, UD6BR, UR2KAA, VE8BB** (255) 0, **VK6DR** (435) 12, **VPs** 1MW* 19, 1RC 2DAA* 2MW 8CW (317) 1, **9WB** (245) 21, **VSs** 6AZ (405) 0, 6EK (310) 13, 9AJC 18, **VU2CQ, W6FWF/DU1** (400) 23, **XE3JD, XP1AB, YO2BB, YS1s** ROP RTG (410) 17-18, **YU6ZAA** 14, YV1LL (375) 23, **ZB2AM, ZC4CN** 14, **ZL1AC*** (250) 9, gobs of ZSs, 3C3FZJ/**SU** 13-14, **4U1s** ITU (425) 15, SU (375) 14, **5A1s** TV (373) 16, TY, **5H3JL** 13, **5N2AAM** (418) 15, **5Z4AA** 14, **6O1PF, 7Q7s** BN EC (410) 18, **7X0AH, 9G1s** DM* 16, FL RW 16, **9H1s** AB (195) 10, AG K 16, **9J2s** DT FK (360) 20, **9K2AM, 9M2OV** 16, **9Q5s** AF (345) 20, RA 18-19, **9U5BB** 14 and **9Y4VT**, the stars for straight a.m.

15 c.w. is a DX snap for **Ws** 1CNU 2JBL 3DPR 3HNK 8YGR, **Ks** 3FKU 5VTA 8MMZ 0DEQ, **WAs** 3DSD 5AER 6JDT 8GGN 9MQI 9NDV 9QBM, **WB2s** LBJ PAZ and RSS because of **CE1AD** (10) 17, **CM1AR, CO2s** BO DR (40) 16, **CP5EZ, CRs** 6CK (44) 11, 6DX 6EI (65) 10, **6JA 7IZ** (63) 15, 9AH (65) 9, **CT3AS** (35) 17, **CXs** 1AAC (20) 19, 1JM (5) 22, 2CO 9AAN (20) 14, **DM7DL** 17, **DU9FB, EA8FF** 12, **EIs** 6BA (45), 9Q 21, **EL2s** AK D (8) 16, NA (25) 14, Y (25) 21, **EP2s** BQ (65) 12, RV (20) 13, **ET3RF** (50) 14, F8TT/FC (30) 13, **FG7s** XJ (20) 12, XP (20) 15, XX, **FP8CQ, FL8RA** (60) 12, **GB2s** SM USA 17, **GC8HT** (8) 17, **GD3FXN** (22) 16, **HAs** 1HA 4KYB 5CNR (47) 20, 6NC 7PG (65) 13, **HC2SB** (53) 23, **HI8XAL, HK0AI** (82) 15, **HM1s** BW (32) 8, DM (32) 23, **HP1XYZ, HZ1AB** (55) 10, **JAs** 1CG 1CGJ 1GTS 1HQG 1KRV 1OYY 1NUH 1SNW 3AYL 3CNQ 3DAZ 3EGG 3EGR 3IG 6CUX 6TQ 6YAF 7BXS 8BGR 8BKO 8BUK 8RXD 8CJY 8CKC 9VQ 0AIF 0BJI 0CGJ 0VKX, **KGs** 4CX (15) 13, 6AQA (24) 23, **KR6s** JZ (16) 23, QW 12, **KS4CC** (40) 13, **KV4CI** (30) 12, **KW6DS** 21, **KZ5WFN, LZ1AG, MP4s** BFK (65) 8, BDF (56) 7, **OAs** 4PF (52) 13-16, 5AQ, **OH0NM**, OK4BI/mm, **OY2GHK** (9) 14, **PJ3CJ** (70) 12, plenty of **PYs** and **OEs, SLs** 5CX 6BH, **SU1s** DL (22) 11-12, IM (50) 16, **TA1DB** (72) 13, TI2PZ 4, **TJ8AC** (30) 17-18, **TN8AG** (128) 10-15, **UAs** 2AG 2KAW 9WS 0KBB 0KKB 23, **UB5s** KBO OD WF 13, **UQ2KCT, UR2CW** (125) 13, **UT5BY, UW0FK, VE0MD** 22, **VKs** 1OL (62) 11, 7SM (38) 11, 8HA (85) 11-12, **VPs** 1LP (30) 20, 1MW (150), 2AZ 2GLE 7DX, **VQ9BC** (40) 7, **VR6TC** (64) 21, **VSs** 6FO (70) 11, 9MB (42) 7, **VU2s** FB (28) 11, TZ WB (25) 11, W0GTA/**8F4** (80) 9, **WP4CSA** (115), scattered XEs, **YN1s** AA (45) 15, GMR, **YO3CR, YUs** 2NEG 6ZAA, **ZB2s** AM (43) 13, AO (45) 13, **ZC4CI** (95) 14, **ZDs** 7IP (70) 16, 8BUD (20) 15, 8CX (55) 15, 8J (50) 9, **ZEs** 1JL (48) 21-22, 3JJ 21-22, 5JJ (30) 7, 7JV (15) 16, 8JV, **ZL3IS, ZPs** 5EC 6AY (65) 10, ZS8L (83) 19-20, 3A2UA, 4U1ITU (128) 15, **4X1s** QA XE (42) 10, ZG (20) 13, **5R8AW** (51) 19, **6O6BW 6W8s** CQ (5) 23, DD (70) 11, **6Y5JB** 11-12, **9J2s** BC (47) 11, HZ (75) 16, IE W (48) 19, WE (50) 15, **9L1TL** (50) 14, **9U5DS** and **9Y4VU**.

15 Novice diggers **WNs** 3GAL 5PUQ 6SAZ 6TIF 8TEJ and 9QWX successfully telegraph with **CEs** ITP 3JP, **CO2s** BB BD DC EJ RL (120) 20, **CP8AM, CR6FA, CT2AY** (105) 17, **DK1GV**, scads of DJ/DLs, **DMs** 2ADC 2AUD 2BTG 3UCA 7DL, ET3GB/m, a dozen Frenchmen, **FG7XT, GIs** 3OTV 6TK, **GM3BGW, GW3s** FWY TKZ, countless Gs, **HAs** 4KYB 5DA, **HB9s** IX MU, **HKs** 3AVK 0AI, **IIs** CVP FIL ROF SF, **JAs** 1CG 1HQG 1JWJ 1KXW 1NRQ 1OMH 2IMS 3AYL 3CWV 6ANT 6RL 6TL 8AAQ 8AXL 0BJI 0CHI, **KL7s** AIZ EKZ ENC FKW FMM FNH, **KZ5s** GRN WF, LA7TH, **LUs** 1BO 6DJX 6DSA, **OA4PY, OE5XSL, OHs** 2TI 3MF 6NH, a batch of OKs, **ON5s** IG KL, **OZ1LO, PA0s** GF SA, **PYs** 2BJK 2BVI 2BVL 5ASN, fourteen Swedes, **SPs** 2BMM 3AIJ 5YC 6TQ 7GH 8SZ, UA3AJ, **UR2CW, UW3ZX, VO1s** EX HS IM IW, **WH6s** GDO GEV, **WL7FQL, WP4s** CPG CSA CSC, **WV4EY, XEs** 1BL 1FFU 2AAG 2EEL, **YO4WO, YU3FS, ZC4TX, ZL2GH** (105) 19, **ZSs** 5QU 6AR, **4U1ITU** and **9Q5HJ**.

160 may have cooled a trifle since previous seasons but many British 10-watters, **HB9TT, HI8XAL, OH0NH, OLs** 1AEM 4AFI and other Czech Novices, **VPs** 1DX 7DX, W5HWR/**VP9**, XE2OK, **ZD8J** and other 1.8-Mc. specimens are on the prowl. W1BB says **KL7FRY** keyed with **JA1PVK** and **ZL3RB** early in December, and W2FYT works G3CHN on s.s.b. without much fuss. **Ws** 5YXG 6BEG 6LRA 6ML 6PBR 6WX 7DOL 7EN 0GDH 0PSF/0, **Ks** 6AEP 7MKL 7ZQU 9PAW and **WA6MLI** were logged by W1BB far out on the Pacific during Stew's return trip from far east. The 1966-'67 160-Meter Trans-atlantic and World-wide DX Tests are over, but don't bet against further late-season 1.8-Mc. developments on the long-haul front!

Next month, space and other factors favorable, we'll deal once more with 14-Mc. DX doings assisted by "How's" helpers Ws 1CNU 2JBL 3DPR 4YOK 4ZSH 8YGR 0CVZ, Ks 5VTA 6SRM/4 ØDEQ, WAs 3DSD 8GGN ØFRM on c.w., Ws 2DY 8YGR 9LNQ, WAs 5AER 8GGN, listeners P. Kilroy and C. Durnavich on phone. Any tidbits for the chowder?

Where:

AFRICA — W9RKP writes, "I have logs for all 5U7AC QSOs since he began operation in March, 1961. Self-addressed stamped envelopes, or s.a.e. with International Reply Coupons, and GMT are musts. I also hold logs for ex-6W8BQ who returned to France in 1963." W9RKP's W/K outbound QSL bureau now is in its twelfth year. Russ will provide information on the service in response to s.a.s.e. inquiry . . . . . ZD3G tells K6ENX his neighbor ZD3E is a solid QSLer. "I must emphasize self-addressed stamped envelopes and Greenwich Mean Time QSO reference as musts in QSLing through managers," continues K6ENX. "So far my experience indicates there are many who don't know how to convert local time to GMT or are careless in doing so. They are frequently off an hour or two in either direction, even wrong on dates." By the way, the current ZD3D has no connection with last year's contest work under his call . . . . . W4NJF, still hunting logs for ET3AC's October contest QSOs, keeps busy managing QSL affairs for EL2AT, 7Q7LC and 9J2MM. "Without s.a.s.e. the cost of card distribution is prohibitive," declares Gay. "I must stack up foreign-bound replies until sufficient piles accumulate for economical bureau shipment. My schedules on Saturdays with EL2AT, and Mondays with 9J2MM, keep statistics current." . . . . . WA4UHK's managership of ZD8JES QSLs deals with QSOs on or after December 24, 1966 . . . . . 3C3FJZ/SU-VE3FJZ/SU assures direct QSLs in answer to all valid cards received . . . . . K6JAJ relieves K4MZU as QSL tender for W6NMC's overseas jaunts as TY4ATC, 9L1NM, etc. . . . . "FL8MC has returned to France for a while," notes W7WLL. "Anyone who still needs his QSL should reapply to me, but be advised I do not handle FL8RA's QSLing. Finally received ET3FMA logs for January clearance."

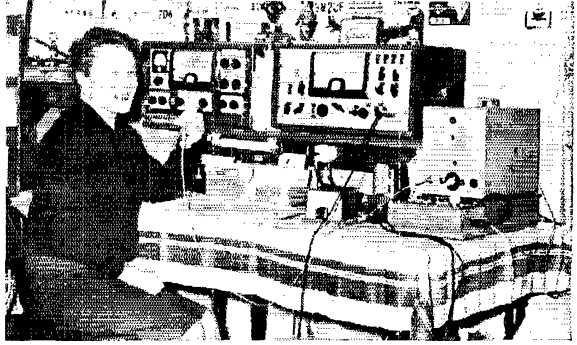
ASIA — YA1HD, whose address appears in the list to follow, offers to act as QSL bureau for any and all Afghanistan stations . . . . . W3KVQ/2, at 2308 Branch Pike, Cinnaminson, N. J., 08077, still tends the QSL store for MP4BDF, VU2RM, 4S7WP and 9N1MM . . . . . If India's ARSI can't get 'em through, LIDXA's *DX Bulletin* suggests Post Box 53, Bangalore, India, as a possible QSL route to VU2 stations. The Long Islanders also specify the address 21 Berwick Crescent, Sidcup, Kent, England, in regard to VS9OC confirmations.

OCEANIA — "International Reply Coupons will be required for direct replies," states G5UG concerning VK8OX QSLs. "Our policy is 100 per cent as checked against log entries. VK8OX cards are rather expensive, worth about fifty cents each." And they are beauts . . . . . "KC6CE is QRT and I'm clearing his last QSLs," comments W7WLL. "Steve's operation as VR4LN was entirely legit but he never signed portable suffixes while using the call." Don says all KW6EK QSL records were turned over to W2CTN.

SOUTH AMERICA — "Please inform your readers I'm now handling QSLs for KC4s USB, Byrd Station, USM at Byrd Conjugate Point Station, and USN of South Pole Station," informs K1TWK. "Requests will be handled promptly, s.a.s.e. required." . . . . . "Tell the gang that many cards are en route via surface mail," assures WA1FEO/LU of LU5DGQ, now collecting quantities of W/Ks on 10-meter phone . . . . . FG7XL regrets, "We met so many difficulties that we are sorry to report we can no longer take care of FY7YL QSLing. All cards and IRCs will be returned shortly." Jean-Pierre and Monique did their best on this one but a QSL manager is helplessly middled without the co-operation of his client . . . . . NEDXA's *DX Bulletin* carries a reminder that the Dutch society, VERON, will forward QSLs to any known PA PE PI PJ or PZ stations whether members or not.

HEREABOUTS — "*No envelopes on file.* This is our big problem," asserts WA4WIP, ARRL 4th call area QSL Bureau attendant, in FDXC's *DX Report*. "There are some five to ten thousand QSLs on hand for which we have no s.a.s.e. Make sure you have at least one envelope on file [with your local Bureau branch]. Then make sure your buddy has his on file even though he may not have worked DX for years." . . . . . W7WLL forwards a statement on IRC redemption policy from the U.S.P.O.'s Portland, Ore., branch: "International Reply Coupons sold in the United States may be redeemed only by the original purchaser at a discount of one cent per Coupon and are exchangeable for postage only in a foreign country. It is recommended that you return Coupons to your correspondents for redemption abroad." Collectors take note . . . . . WB6QQP, QSL agent for Saskatoon ARC's 3C5US, expects to help confirm a minimum of 10,000 QSOs this Canada Centennial Year. SARC member VE5UF writes, "In the past our club has had considerable difficulty getting QSLs out in a reasonable time. With WB6QQP's assistance I feel we can remedy this situation which is due in part to the transient nature of our operating membership." S.a.s.e. and GMT, to be sure . . . . . WA8RWU drew the task of helping K8EIIU confirm his recent Montserrat VP2MO QSOs, according to advices from W3DPR . . . . . "I had the honor of receiving the first call under the reciprocal operating agreement signed by Panama and the United States on November 16, 1966," notifies HP1XYZ. "We are informed that all such calls issued to U. S. amateurs will have the letter 'X' after the numeral call area designator." . . . . . KL7FKO remarks, "I'm at the end of my sixth 1000-QSL batch after only eighteen months in Alaska." Al needs higher s.a.s.e. consistency to hold this pace much longer . . . . . Ws 1SWX 3DPR 8YGR 0CVZ, Ks 5VTA 8GQG ØDEQ, WAs 8GGN 8TFJ 9QBM, WB2s RSS UKP and Mr. Kilroy acknowledge exceptionally prompt pasteboard production in applauding your "QSLers of the Month": CO2EJ, CT1BH, DM3UEA, EA8AH, ET3GB, F2KU, FG7s TD XT XX, G3s BYX EBV PXF VPS, GW3FWY, HB9IX, HKØAI, HM1DE, I1s CVP ROF SF, KC4USB, KH6GCE, KS4CC, KX6BU, KZ5s BI MK, LU6DJX, OE2HVL, SMs 6AFH 6CAW 6CQV 6SR ØBDS, SP9ANH, TF2WKE, TI2TAO, TM8AG, TU2BK, UA3AJ, VK3ABA, VP1RC, VQ9AR, VRs 2DK 6TC, WH6GDO, WP4s CPG CSA, WV4EY, ZD8J, ZS6AR, 4U1ITU, 5A1TV, 5W1AZ, 6Y5BB and 9Q5PI, as well as QSL aides Ws 2CTN 4TAJ 9WHM and WA8GUA. Any recent reliables you'd like to see similarly saluted here? . . . . . 'Alp! The following italicized colleagues lack lowdown on QSL holdouts listed: *W2HAZ*, FP8CQ, VPs 2VI 5AR 6PJ 7EA; *K5TSO*, FA8RJ '60, FE8AH '59, VR3W '59, ZP5JP '59, ZS3E '64, 9G1FK '64; *KØLFX*, CE6DW '58, FQ8AJ '59, SVØWY '59, VP6s GC ZX '58, 5A1TN '60; *WA7AUW*, BV1USA, HK7YB; *WA0FRM* curious YK3AF; *L. Bornmann* of 201 Alameda, Absecon, N. J., 08201, one FR7RA. Pushem datums? W2JBL exclaims happily, "My 'help' plea for QSL info on ZD8J was rewarded by quick direct replies from W2EQG, WAs 2YJN 3DCM 9NXH and 3C3GDB. Thanks, one and all!" . . . . . K7s BHJ YDZ, WB6s QQP and UTC add their availability to the roster of those willing to tackle QSL tasks in behalf of overseas DX stations . . . . . Here's where we peek at individual mailing suggestions as they flutter from the "How's" mailsack, keeping mindful of the fact that these specifications are necessarily neither accurate, complete nor "official" . . . .

EA9EJ, P.O. Box 22, Villa Cisneros, Rio de Oro
ex-ET3AC-FL8AC (via W4NJF)
FH8CE, B.P. 7, Moroni, Grand Comoro, Comoro Islands
FM7WG, P.O. Box 575, Fort de France, Martinique
FY7YL (see preceding text)
G5AFN (to W3INH)
GD3RFK (via K4MQL)
ex-HA4EA-HA4SA (to WA1FHU)
HC9EP (via HC2CRC)
HK0AI (via W9WHM)
HP1XYZ, R. Perry, P.O. Box 241, Panama 1, R.P.
HS1WF (via W2PCJ)
K7HTU/mm, Ens. J. Gilbertson, USS *Sylvania* (AFS-2), FPO New York, N.Y., 09501
KC4s USB USM USN (via K1TWK)
KW6EK (via W2CTN)
KW6EM (via K6JAJ)
SM6AFH (North America via WA8TFJ)
SP5s AIA AKG (via W1RLV)
SU1AR (via WB2UKP)
TF2WJX (via W4WXH)
TF2WKE, Box 6, NCS, % FPO, New York, N. Y., 09571
TG9RU, P.O. Box 892, Guatemala City, Guatemala
TI2CEF, Box 4492, San Jose, C.R.
TR8AH, Box 3122, Libreville, Gabon
TY4ATC (via K6JAJ)
UA3AJ (via WA8TFJ)
VE8BZ, Box 151, Frobisher Bay, Baffin Is., N.W.T., Canada
VE0MD (to VO1AW)
VE0NP (via VE1AQI)
VK2s AVA/2 EX/2, % A. Bles, VK2AVA, P.O. Box 23, Springwood, NSW, Australia
VK3AHY/VK9 (via VK3ACW)
VK5XK/2 (to VK5XK)
VK8OX (via G5UG)
VKØCR, via G. Johnston, 3 Inglis St., Newtown, Hobart, Tasmania, Australia
VP1NW, Box 554, Belize, Br. Honduras
VP1VR (via W4VPD)
VP2GSM (via W9YSM)
VP8IY, N. McLaren, % British Antarctic Survey, Port Stanley, Falklands
VQ9AR (via WA8GUA)
VS9ABL (via W4NJF)
VS9ALV (via RSGB)
VS9HRV (to VS9ARV)
VS9MB (via W2CTN)



HB9YL's DX feats include a 160-meter contact with W1BB. Amy's OM is HB9TT, also a well-known call in DX circles. Another happy Swiss ham is HB9PQ, right, who enjoys QRP DXing with his HX-20, R-4 and 14-AVS. Josef's seven sons and daughter keep the OM in good trim for ham band QRM. (Photo via W1BB)

W4HMA/KH6 (to W4HMA)
W7s FFF/mm ZMD/mm (via K7TNW)
W9RQF/VP9 (to W9RQF)
WA8SDP/VP9, D. Callaway, Box 2532, Hq. Sqdn. Sect., 1604th Air Base Gp., APO, New York, N.Y., 09856
WP4CSA, A. Sharpe, 123 Atlantic, Arecibo, P.R.
XW8CA, % U.S. Embassy, APO, San Francisco, Calif. 96352
YA1HD, H. Decker, P.O.B. 389, Kabul, Afghanistan
YS2BB, 13 First St., West, Santa Ana, El Salvador
ZC4RM (via G3EMY)
ZD3F (via W2CTN)
ex-ZD8BB (via K7TNW)
ZD8JES (via WA4UHK)
ZM7FL (via K9OTB)
ZS1XR (via W7VRO)
ZS3YK, H. Kahlert, Box 25, Keetmannshoop, S.W. Africa
ZS6BLP (via SARL)
3C5US (via WB6QQP)
3V8AC (to W6BBE)
4M0s A AB, Box 1019, Maracaibo, Venezuela
4W1K (via HB9AAT)
5N2ABI, P.O. Box 2469, Lagos, Nigeria
5U7AC (via W9RKP)
ex-6W8BQ (via W9RKP)
7Q7LC(via W4NJF)
9L1NM (via K6JAJ)
9Q5GO (via 9Q5GE)
9Q5SS, % U.S. Embassy, APO 09662, New York, N.Y.
9V1NV (via MARTS)
9Y4TR (via W2CTN)

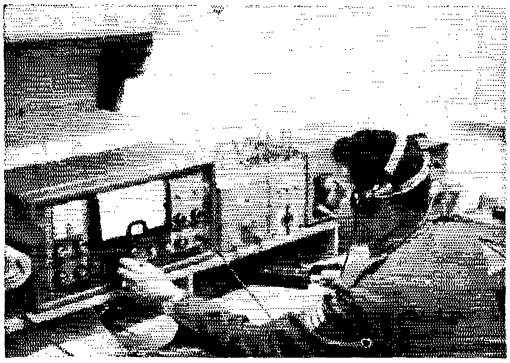
Contributors of the foregoing catalog include **Ws** 1CNU 1DVE 1SWX 1UED 1WPO 1WPR 1YYM 2DY 2JBL 3DPR 4YOK 4ZSH 6GSV 7QY 7UVR 7WLL 8YGR 9LNQ, K6SRM/4, **WAs** 1FEO/LU 4UHK 5OVA 8GGN ØFRM, **WB2s** QZE RSS, G5UG, W. P. Kilroy, DARC's *DX-MB* (DLs 1EP 3RK), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2LL), Florida DX Club *DX Report* (W4MVB), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (WA2EFN), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DX*er (Box 608, Menlo Park, Calif., 94025), Ontario DX Association *Long Skip* (VE3EWY) and VERON's *DXpress* (PAØs FX LOU TO VDV WWP). Bravo — and encore!

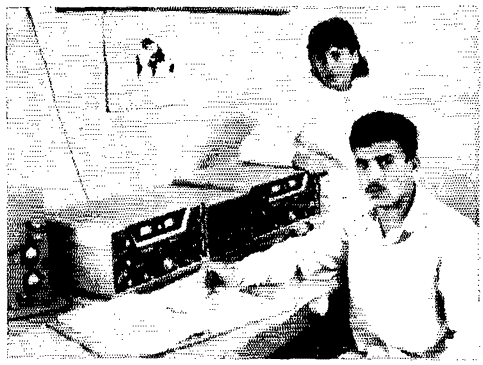
Whence:

AFRICA — "First ran into TN8AF when he came chirping through on 21 Mc. as FQ8AG in 1957," recalls W9NLJ. "We've exchanged infrequent correspondence over the years. Stan tells me he's leaving Congo Republic for keeps, possibly to become a 6W8." Thus a rare country gets even rarer . . . . ZD3G tells K6ENX of burgeoning DX doings in the Gambia. "ZD3D makes occasional QSOs on 20 sideband with a Heath rig but is not a DXer type. Cecil is most interested in schedules with his homeland, Guyana, and may spend another year as a ZD3. ZD3E likes to work U.S. Sixes and Sevens on 10-meter a.m. and is regularly workable at 1600–1900 GMT. Charles also tries 21-Mc. phone. W4WRK apparently holds the call ZD3C." G3BID apprises, "I've been allocated the callsign ZD3F, and intend much sideband work on 10 through 80 meters. I'll have a spare v.f.o. on hand to avoid listening on my own frequency with my transceiver." ZD3G, most active of the bunch, must transceive for the present with 60 watts and a dipole. Ray hopes to have a beam and greater flexibility going before conclusion of the ARRL DX Test now under way . . . . W9RKP finds 5U7AC gunning for Mont., Nev., Utah and Hawaii to wind up his WAS. "Yves will greatly appreciate your QRX when he's calling for those states." . . . . "W6NMC of the famed Global Zobel travelogs will make another trip around the world this summer," understands K6JAJ. Myron used TY4ATC, 9L1NM and other calls last year . . . . W2JBL has it that 9G1FQ's departure to Burundi leaves Ghana c.w. work mainly up to 9G1FY . . . . 9Q5GE writes from Kapanga, "I've returned to this Methodist mission after a two-year absence and brought back an HT-44, SX-117 and TA-33. I keep s.s.b. schedules daily at 1800 GMT on 21,385 kc. with W9s ARK HSP and others. 9Q5s AR AX BD CR DA EL FF GO and KC, other amateurs here, also use that frequency or 21,330 kc. We depend on radio a great deal and have had lots of interesting QSOs since 1960. W9ARK's recent help saved the life of one of our missionaries who needed serum after being bitten by a rabid dog." Glen is also licensed as *K8MZG* and G5ABL . . . . "FL8HM still operates c.w. sporadically," observes W7WLL. "FL8DY is a new one over there but FL8MC took time off for France." . . . . "SU1AR, licensed over a year now, sticks to crystal-controlled c.w. on 14,027 kc.," confides WB2UKP "Mel may have a higher class of license by now and will build a v.f.o. transmitter for increased activity." SU1AR says there are eight active Egyptian amateurs . . . . Africa addenda courtesy clubs and groups: TR8AH joins TR8AG's Gabon game with dextrous c.w. around 14,025 kc. at 2100 GMT. . . . TY2BC, operated jointly by 5N2s AAW and AAX, remains a week-end threat. . . . 3V8AC identifies himself as W6BBE on a one-year Tunisia tour and roams from the low c.w. edge of 80 through 20 sideband. . . . Sao Thome's CR5SP wants more W/K confabs on 75. Watch for his s.s.b. near 3800 kc. at 2300 GMT. . . . Fiat technician FH8CE generates sideband ruckus on 14, 21 or 28 Mc. at 1200–1800 GMT. . . . W8JEY may expedite 5U7AK QSOs, 14,190 kc. at 1900 GMT. . . . EA7s CF and JQ prepare possible Rio de Oro, Ifni and Annobon activity while EA9EJ keeps Rio de Oro slightly workable, 21,210-kc. non-s.s.b. at 1600–1900 GMT.

ASIA — HS1WF displays single-sideband on 20 but W2PCJ says there's no ITU/FCC clearance for W/K/VE/VO contacts. Same goes for 3W8D . . . . JA9BM made it all Japanese call areas for W1CNU on 20 c.w. You lifetime Sixes should try this from the east coast some time . . . . Orientations culled from the clubs press: VS9ARV & Co. made good their Kuria Murias promise in January as VS9HRV on 15, 20 and 40. . . . Ex-VS5JC expects to sign 9M2XX for a spell near 14,030 kc., 1200–1600 GMT. . . . KA2EB, in FEARL's commendable *News*, credits K6CT with the outstanding Stateside signal into Asia on 28 Mc. . . . . New or renewed Far East Auxiliary Radio League memberships are held by KAs 2DJ (WB6AGF), 2IJ (KH6IJ), 2JP (W4FRU), 2JR (WB4CNF), 2VT (W5DXN-W7CKL), 2ZZ (WB6KDP), 7AB (K1KTH) and 9AK (K6KGX). You'll find many KAs Sunday-netting on 7053 and 14,195 kc.

OCEANIA — VK5XK/2's 547 QSOs from Lord Howe island last November-December, including some 400 with W/Ks, inspire Arch to "Give the wristies a plug. My small two-stage 25-watt transmitter showed that c.w. is still supreme over all other modes of transmission. For reliability and simplicity, c.w. stands alone." If you missed VK5XK/2, get ready for VK2s AVA/2 and EX/2. VK2AVA reveals, "Another DXexpedition to Lord Howe is tentatively scheduled for May 5th-15th. Dates are subject to cyclone conditions in the area. Operation will be on 10 through 80 meters using s.s.b. under my call, c.w. under VK2EX, both portable/L.H. An attempt will be made to work the



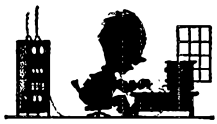


4X4UL of Jerusalem likes c.w. and s.s.b. on 20 and 15 with 75 watts and a ground-plane. Meir is heard from club station 4X4QG quite often. 4X4VG and sister Yaffa also try their DX luck at 4X4QG now and then. (Photos via W2IWP and K9DKU)

maximum number of stations all over the world with Galaxy and Hy-Gain equipment. Split-frequency operation will be standard, on-frequency calls discouraged." . . . . . K2KYH remarks, "KX6s DB and DC do a fine job passing traffic for the boys on Guam and the Marshalls. They can be heard nightly, 2300 GMT, on 21,350-21,400-kc. s.s.b." . . . . . W9RKP tried his DX hand from Hawaii last October. "West coast QRM is terrific during daylight hours but nighttime 14-Mc. DX conditions are a treat in KH-6-land." . . . . . "On behalf of the British Museum and a number of scientific bodies in the United Kingdom, the British Armed Forces have mounted an expedition to the desert areas of west central Australia," announces G5UG of RSGB. "Biological, zoological and geological research will be carried out, as well as survival and leadership training. Extensive radio equipment includes amateur facilities, a KW-2000 transceiver and portable Vee beam, for operation as VK8OX on 14,105 and 21,120 kc. G8FC, RAF Amateur Radio Society, has the task of handling the expedition's communications back to supporting authorities in the U.K. with its Collins station and large Vee centered on Alice Springs." . . . . . Pacifigrams via club newsmen: VR2FFis reportedly responsible for ZM7FL DXcitement. . . . Macquarie's VK0CR is a Sunday treat on 14,170 kc. or so. . . . VK9JA's 14,180-kc. s.s.b. joins VK9RH on Norfolk isle. . . . The grapevine has ZK1AR taking up 5W1 residence. . . . WB6KBG is reported behind that 20-meter VR2FG mike. . . . New England DX Association, W5KUC, Ks IIMP 6CAZ, FK8AU and ZL3OY are working up DXtensive plans for Oceanian operations, the vehicle a Swan 210.

EUROPE — VERON's 1966 all-c.w. PACC DX Contest results list K4BYN, W3s BYX UVH DXT, K2KBI, WA1ANR. Ws 8KPO and 4HOS as scoring in that order for the U.S.A., with VO1AW, VEs 2IL and 1AE running 1-2-3 for Canada. PA0s VDV LV AAJ ZAV PO SNG VB FAK COE and PN placed 1st through 10th on the home front. Country leaders include DL8YR, F8OP, G2LU, HA5KDQ, HB0QA, HI8XAL, LA2Q, LZ1KAA, OH2YV, OK1AFN, ON4XG, OX3KI, OZ1LO, PJ3CI, PY2SO, SM7BUE, SP6TQ, UAs 1KAG 9ES, UB5KBA, UD6BD, UM8KAA, UO5QN, UP2KBA, UQ2KCS, UR2LO, VK3APJ, YO5KDL and 4X4NY. Finland, Germany, Poland, European Russia and the Ukraine each came through with more entries than W/K-land. How about more followthrough on the paperwork, you Yank participants? . . . . . Radio Society of Great Britain's *Bulletin* points out that reciprocal licensees in England now need sign only their G5 calls. A constructive move, for identification is tending to become topheavy in DX two-ways . . . . Check with OZ1FF concerning B1A, the Bornholm Island Award, which non-Europeans can earn with two confirmed contacts (Class 1) and other qualifications (Class 2). Some fifty OZs are available there . . . . . ON4GK offers details on Antwerp C.W. DX Club's new OSA-MM sheepskin, a certification based on QSOs with maritime mobiles . . . . . Supersuffixed U5ARTEK hails from the Crimea's Radio Club of Lenin Pioneers at Camp Artek . . . . . Ex-HA4EA-HA4SA now signs W1FHU. Laci enjoys QRP winter c.w. sport on 160 . . . . . SP5s ALA and AKG are DXing brothers in Warsaw, according to W1RLV . . . . . UA3AJ tells WA8TFJ that Russia's Class I ham ticket calls for 24-w.p.m. code proficiency. Their Novice minimum is 12 w.p.m. . . . . RSGB DX scribe G3FKM points out that Gs 2BOZ 3HCT and 3HDA, father and sons, have about 1000 countries stashed away . . . . . K7HTU/mm has an SB-100 and 35-ft. vertical going aboard the Navy's USS *Sylvania* in the Mediterranean area, mostly on 20.

HEREABOUTS — Virginia Century Club, through award chairman W4NJF, presents its 1966 DX Award to Lloyd and Iris Colvin, W6KG and WB6QEP, widely worked DXpeditioners. Formers winners are Ws 2GUK 4BPD 4ECI 9WNV and the late K7LMU . . . . . W9NLJ says spinal troubles have temporarily slowed W9RBI, W9NDA's archrival for midwestern DX supremacy. Ross still keeps an ear on 20 — stay with it, OM! . . . . . Adelaide islander VP8IY, through Ws 7QY/CVZ and others, pleads for greater 14-Mc. c.w. courtesy during his attempts to work Europe. Nick next heads for South Shetlands for the British Antarctic Survey . . . . . YV5ANF and friends propose additional Aves isle activity . . . . . LU1ZG can give you South Orkneys on 14,200-kc. a.m. at 0500-0600 GMT or so, they say . . . . . "I'd like to see a 20-meter DX selection every month as in the old days," yearns K5VTA. "Less 'easy' ones on 21 Mc. would make room for more rare 14-Mc. items." W9NLJ has another view: "With the sunspot surge why not delete the 'heard and worked' stuff in favor of more news-type material?" Both appreciate our space problem. Generally speaking, "How's" is merely a composite open letter formed by all monthly DX mail received. Your December '55 column goes into detail on our format, how it comes about and how it continues to evolve . . . . . WN6SAZ closed his Novice DX books with WAC, WAS and a 70/53 worked/confirmed countries total including 103 JAs. Hq.'s W1DVE notes WN9ROT's recent WAC on 15 . . . . . Lots of mailed comments deplore the passing of *OST* cartoonist W1CJD. W8YGR comes through with a homedrawn QSL confirming QSO with the 5-watter of 1ANE, Gil's call back in 1926. Jack was Canadian 3GJ in those days . . . . . W4CRW, still giant-killing with his 45-watt DX-20, finds a vertical folded dipole superior to his old ground-plane. Bob's 155/118 now . . . . . VE0MD is operated by VO1AW aboard ferryboat *Leif Eiriksson* plying the Port aux Basques-North Sydney run . . . . . K0YIP invites DX stations to hit the 4th Missouri QSO Party slated for April's final week end. The Zeroes will concentrate (c.w.) on 3520, 7025, 14,050 and 21,050 kc.; (phone) 3950, 7225, 14,330 and 21,350 kc. More complete details will appear elsewhere in *QST* . . . . . W6ITH takes issue with DXpeditioners who underestimate 40-meter phone possibilities. Despite world-wide SWBC usage, "There are numerous open spaces in the 7100-7300-kc. range for plenty of contacts. I worked hundreds of W/K/VEs from FS7RT in 1966 contesting, all multipliers except VE8." . . . . . WA8GGN finds ex-ET3AC-FL8AC gadding about as K4CGC/m . . . . . "Too many lines in the same spot foul W4NJF, decrying excessive CQ-DXing . . . . . Occasional whirls at 80-meter traffic restore W3DPR's DX appetite . . . . . KL7FKO, who works sideband and c.w. On five bands from Anchorage, finds Alaskan QSOs in heavier demand than ever . . . . . W7WLL mentions that an appropriate diploma awaits those who contact ten or more members of Willamette Valley DX Club . . . . . DX Club of Puerto Rico notes ex-KP4OS signing W6FXR on 20 sideband and acknowledges VE3FXR's attainment of 8X8X8 certification . . . . . Fresh NCDXC brass: W6WX prez, W6RGG veep, and K6CAZ acting sec.-trez. W6PIF inherits *DXer* duties . . . . . W6MQT/OX allegedly rides a glacier for two years with ham radio his only means of outside contact . . . . . W4MVB, in an FDXC *DX Report* editorial, protests an armament race aggravated by manufacturers' superpower claims. True, much rare DX seems to be in full retreat from 14-Mc. overkill. QST



Operating News

GEORGE HART, W1NJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.
Administration: LILLIAN M. SALTER, W1ZJE — *DXCC:* ROBERT L. WHITE, W1WPO
Contests: STANLEY H. ISRAEL, WA2BAH/1 — *Training Aids:* GERALD PINARD

New Masthead. With this March issue your old Communications Manager turns over departmental responsibility to George Hart, W1NJM. The names on the masthead will give you an idea of the new alignment of responsibilities. The Communications Department as of today has some fifteen dedicated workers in a Hq. staff of about 70. Back in '49 we posted a slogan over the departmental door, "Service to the Membership." This remains the keynote of the operations. We predict the CD will continue the hard core of League loyalty and results. Both our pleasure in being amateurs, and our identity with Public Service stem from *operating* our amateur stations.

Teamwork and Staff. Your retiring CM at this juncture wants to say to every active member, appointee and League official, thanks for your never failing enthusiasm, for your activity and ready cooperation over the years. We enter '67 with a solid functioning traffic system and field organization, around 1½-million annual message handlings reported, with outstanding W1AW services, an improved Official Observer Form 10-A, now backed by a Technical Assistance Sheet (TAS-1) if called for; also brand new Official VHF Station certificates. Operating amateur radio has its problems but all in all is in pretty good shape. 'Twas a grand year with your support. It has been a challenge and a pleasure to try with your help to do meaningful things with our amateur radio. The function at ARRL is largely to coordinate, to assist with the plans and ideas of the good people who step forward and implement net patterns, organization meetings, contest activities, etc. Any and all results are due to the teamwork of Hq. staff, and constant participation and support in the field by all amateurs concerned for which our thanks.

It's probably not possible to relax all at once from a post like that of Communications Manager. Hiram Maxim once described this post to us as thankless and impossible. Surrounded by thousands of amateurs and hundreds of ideas you come to realize you can't please everybody. What remains is to make decisions from conviction for the good of the whole. ARRL standards must be kept *high*. Plans (all have drawbacks) must be those with the best *chance* to succeed. I look forward, of course, to pursuing a slightly more leisurely pace in amateur radio, now that I can cut out the tyranny of paper work and datelines.

George Hart, W1NJM. George, of course, needs no introduction. But we can say that with George at the CD helm I can now relax and look the other way. GH has been through the mill and knows about every problem. You have known him as the emergency chief and leader in the field of public service and traffic handling; earlier as training aids developer and W1AW op. We can tell you he's a thoughtful administrator, also an innovator and implementer of the National Traffic System. One director puts it this way, "You just can't possibly find anybody better, inside or outside the staff, for this job."

Your Participation Invited. George's and the department's operation have to do with everything from club training aids, creation and bookings, to DXCC, emergency alerting plans, awards and contests, SCM elections, CD Parties, Field Day rules and new operating aids, are responsibilities, as well as the welfare and relations with affiliated clubs and helps in organizing a club. To get the most from your Amateur Radio may I suggest a tangible program for readers, related to the many things the CD has to offer. Report your operational results to your SCM; ask the SCM about an appointment, if you don't already hold one. Aim at some new awards (WAS, CP or other) as your goal. Take part in a net. Add your support to the Amateur Radio Public Service Corps.

In conclusion, may I ask your cooperation and support for W1NJM, as fully and freely as you have given it to me. Working together as a team, amateur radio knows no limits. ARRL provides numerous services and recognitions. The detailed information appears in *Operating an Amateur Radio Station*. You are invited to take part. George will welcome your participation, interest, and ideas.

OBS Coverage Survey. In addition to radio bulletins from the ARRL Hq. station, SCMs select a certain number of member-stations in their areas (those stations that can offer most in guaranteed number of reported transmissions, or have best choices of frequency bands, and power, for service coverage) to transmit Official Bulletins. There are some 450 OBS appointees that cover the U.S. and Canada, coast to coast . . . and it is mainly in the v.h.f.'s that SCMs can find room for more appointments. The SCMs viewpoint is one of arranging the best section-wide radio coverage for amateurs, rather than

one of recognition of who would like to have the honor of appointment.

A recent 'keyed' Official Bulletin asked amateurs responding to identify the station from which a given OBS message was sent. The purpose was to examine the coverage. In view of the full number of bands used daily, and our many scheduled transmissions (all modes) it is understandable that W1AW's sending of this OBS message brought in 24% of all reports. But the organization of OBS "of, by and for" the amateur is exceptional. We would feel remiss if we failed to report that runners up (to W1AW) for OBS duty were, in this survey: K4LPS and WA4GOL

DX CENTURY CLUB AWARDS

From December 1, through December 31, 1966 DXCC Certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

W5UKK....330	SM6CUK...125	W6CRT....108	YO7DL....105	K1QWK....102	K2YEK....100
W5WLD....215	K3ZCA....120	DJ4KO....106	YU2LA....105	W1BUB....102	K3ZVM....100
W6OAQ....202	K7QWI....120	VE3CEA...106	K4YZR....104	WB2AMRA..102	K5IIN....100
W3QCM....180	VS9AZ....116	W1ROM....106	K6YNB....104	DJ4BE....101	K5WTM....100
HB9RB....150	WB4CIT...115	W3ZPO....106	WA3CGE...104	K1QZV....101	OE3SBW...100
ON4ZU....150	PY1NEW...110	W4ILE....106	F5GV....103	K5IXH....101	PA0PAH...100
PA0ULA....141	YO4WU....110	DJ5JK....105	K9RDY....103	K6BAG....101	WA2IOG...100
WB2NYM..141	YU1QBC...110	G5ABA....105	SM3WB....103	WA4SYA...101	W8QXQ....100
LA3XI....134	LZ1KDZ...109	JA1QCA...105	WA7EDB...103	WA9DBS...101	WA8OVC...100
PY5QE....133	W1STW....109	WA0MOB..105	DL3JR....102	G3LNO....100	WA9AJF...100

Radiotelephone

W3QCM....165	WA6WXP..129	K7QWI....117	WA8LYJ...107	WA0IHQ...104	G5ABA....100
WA4QBX...164	G3UYJ....127	GW4NZ....115	VP7NH....106	JA1MIN...103	HK5DE....100
ON4ZU....140	PA0ULA...126	WB6LQR...109	WA6HKG..106	WA0MOB..102	K3ZNS....100
IIFDC....135	SM6AEK...119	K1ZUP....108	W7KOI....105	VE3DVT...101	W6AOI....100
WB2NYM..133	WB2IEC...119	K9PQG....108	W3ZPO....104	W1MX.....101	WB6POP...100
KØTYO....130	W5UKK....118	HR1KS....107	WA4FDR...104	W8PQD....101	WØSHY....100

Endorsements

Endorsements issued for confirmations submitted from November 1, thru December 31, 1966 are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

330	W9TKD	JA6AD	W8ILC	W3AG	WØCVZ	WØNCK	W7BCV
K2DCA		OH3UO	W8RCM	W4GTS			WA7BOB
W1BAN	**300**	OK1GT	W8ROC	W4OMW	**160**	**140**	WA8HFN
W2FXN	HB9KB	SM1CXE	W9EGQ	W7JWE	HB9AAW	DJ5BW	WA9IBT
W2PCJ	K2YXY	W1WQC		W8OQV	JA7MN	IITIC	WØGQL
W3EVW	KØEZH	W4EJN	**220**	W8UCI	K4RSY	JA4XW	
W9AMU	OE1FF	W4FRO	EP3AM	W9IGW	K4THA	K1OBT	**120**
W9YSX	VE2WA	W5IPH	K2ISP	W9PWM	K6SVQ	K2CHS	HK7UL
	W1UOP	W6EUF	VE3IR	YU1BCD	K9AWK	K3HTZ	K2LAI
320	W2KJZ	W9KXZ	W3HQU	YV5BNR	K9WDY	K8EHU	K4ORQ
K6LGF	W5BUK		WA4WAO	4X4TP	PAØXPQ	KØGSV	OZ5MJ
VE2BV	W6GRX	**240**	W8NUU		SM4CMG	OE5CA	VP7CX
W2MES	W6PQT	HK3RQ	W7MH	**180**	UC2WP	SM2BYW	WA2BEX
W6LN	W8KIT	K2KBI	WA8DXA	G8KU	VP7NA	SM3YF	WA2WEE
W9RCJ	W8KMD	K3HHY	W9ALI	PY1BTX	W2NR	UC2AF	W4FPW
		K4OEI	W9ZTD	VE7BW	WB2CDZ	W1ODI	W4LXX
310	**280**	LA5Q		OH3QC	WB2JYN	W2BWC	WA6FOF
GI3JIM	IT1ZGY	SMØAJU	**200**	W2MZV	WB2KTO	WA2CYQ	WB6IUH
K4HYL	W2CZF	VE3DDR	JA1FHK	WB2FOV	WA3ATP	W4JD	W7VSM
K4PDV	W8IJZ	W1BFA	K1OZR	W8ELE	WA4NST	WA4VAI	WA7BOA
W2BMK		W2FVI	K1SCQ	W8NPF	W5QIX	W4YZC	WA8RWU
W3GJY	**260**	W4BRB	K5STL	W8TRN	W7NNF	W5GZR	WAØCPX
W4HUE	G2RO	W4HKQ	LA2B	W9LKJ	WB6HGH	W5KGJ	WAØHVR
WB6OOP	G3GM	W4SNU	WB2FON	WA9LZA	W9ALP	W7AZG	ZS6AJO
W8KBT	IIBAF	W7MX			W9NNC		

Radiotelephone

330	**280**	**240**	**220**	W1BFA	WØIJM	ZL3MN	**120**
VK5MS	GI3JIM	EA4GZ	K8AJK	W2MOF	4X4TP		DJ4VZ
	W1DGT	G3WW	K8AXG	WA4WAO		**140**	K1WYD
320	W1ORV	K3YBR	K9LKA	WA5LOB	**160**	DL1RA	K4VKW
W2TP	W4UWC	K8IKB	W2GRY	W7MKI	F5JA	HB9RB	K6RSY
	W5TIZ	K8PPX	W2JSX	W8ROC	HP1JC	IITIC	VE3BLD
310	W8IJZ	W4EFX	W3GRS	WØSFU	IITMG	K1SCQ	VE3EVU
W9ILW	WØLIL	WA4IOS	W6EUF		K1BPJ	VS6EK	W2SSC
		WA6FPB	W9EGQ	**180**	VE3FHO	W1EJE	W2URM
300	**260**	W8CUO	ZS5PG	IIJT	WB2NIC	W2LJF	WB2BEE
ON4DH	IIBAF	DL7FT		K4YYL	WA3ATP	WB2BBZ	WA4LSK
W1UOP	OA4CV	EP3AM	**200**	K9WTS	W5EDX	WB2FWE	W7VSM
W8NGO	W1WQC	IIZJG	K1BDP	VE2CJ	W6ABJ	W5LDH	W8BRL
YV5AFF	WA4W1P	IT1GAI	K2ISP	W1BFA	W6PQT	WA8HFN	WA8OUM
YV5AXQ	W8IPH	K4OEI	K5DFZ	W4ELB	WB6HGH	WA8LUC	WØYDB
ZL1KG	W6WX		OH1TM	W5WLD	W8LUZ	YU6CB	
ZS6LW	W9TKD			W6GPB	W9ZTD		

(over 5% each), also W9SNP, K9GSC, WA5MDN, K6BPI, WAØNIK, K4YZE and K7IFG. Honorable mention for their coverage goes to K9IVG K6DYX, W6BHG, WA9GJU, WØIRZ, WA2TEK, K4WXS, K8-WVZ and W9NOK. Dozens of other ORS appointees also brought us one or two reports showing their satisfactory operation, but those mentioned above were the more outstanding stations — to whom go our thanks for the service to us all.

Some Operational Points for the Novice. If you would care to send a self-addressed stamped envelope to ARRL, we'll send a copy of a reprint of W6DTY's *QST* contribution *Your Novice Accent*. This has helped a great many "new" amateurs in their early on-the-air operating and may, we should think, be of use to you. As a Novice we believe you should make it a *first* aim to build your code speed steadily, so you may be *sure* of getting General Class before time runs out on you. Some have found it a mistake to play with voice work on two meters instead of making contacts *each* operating period using c.w. Keep a record of all the states you work! (Ask us for Op. Aid 8.) Your Novice contacts, confirmed by QSLs can, by themselves, or when combined with a few more after you get General Class, earn you the League's WORKED ALL STATES certificate. Here are some operational pointers which we hope will give you best results, when working on the air. Point one will keep you out of FCC difficulties. Other points, we hope, may help you look to those you work like an experienced amateur.

1. In changing bands *be sure* you have the right crystal for the band you are going to work on (or you could be out of amateur territory!) and get an FCC citation. Likewise be

DXCC Notes

Announcement is hereby made of an addition to the ARRL Countries List. The addition is *FARQUHAR*.

Farquhar, formerly one of the Seychelles, is now one of the islands making up the British Indian Ocean Territory. Contacts made with amateur stations on Farquhar November 10, 1965 or later will be counted as separate from the rest of the Seychelles.

Honor Roll credits for Farquhar QSLs may be claimed in March, all others in accordance with DXCC submission rules announced in January, 1966 DXCC Notes.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Dec. Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
KØONK	154	6000	5050	187	11391
K6BPI	1562	3252	2964	288	11066
W3CUL	1439	3112	2569	491	7611
K6EPT	22	1322	1256	66	2666
W1PEX	236	1132	1016	58	2442
W6GYH	58	973	954	7	1992
W7HMA	106	936	927	6	1975
W7BA	19	956	896	55	1926
K3MYS	184	796	732	23	1735
WØLGG	21	887	797	12	1717
W8RYP	51	765	738	17	1571
W6RSY	104	854	456	50	1464
W3EML	30	718	609	7	1364
WØLCX	36	644	619	25	1324
WB6BBO	134	606	515	44	1299
K7TCY	12	587	511	72	1182
W8UPH	16	588	474	96	1174
W6EOT	1	571	573	3	1148
W3VR	129	496	461	22	1108
W7ZIW	24	540	534	6	1104
WB6JFO	223	340	400	75	1038
W5OBD	17	514	514	0	1045
W6VNQ	18	523	489	1	1031
W7DZX	14	505	449	17	985
WA4SCK	23	467	473	14	977
WA7DXI	73	463	417	11	964
K6IOV	18	476	416	0	910
WB6QXY	32	438	408	30	908
K9IVG	17	544	333	5	899
W6JXK	27	426	97	329	879
K2KQC	12	433	409	15	869
K6DYX	6	421	422	9	858
WØZWL	1	518	2	317	838
WA9CCP	370	337	101	11	819
WB6PCQ	25	398	305	84	812
W6WPF	285	259	203	56	803
W6EMS	32	376	354	29	791
W2OE	176	345	246	10	777
WØINH	105	335	331	3	774
K3PIE	32	367	352	15	766
WAØGHZ	15	398	350	0	763
W3EEB	114	294	321	33	762
W6KVQ	6	358	358	0	722
W1EFW	33	368	318	2	721
WB6HVA	72	390	190	66	718
W2SEI	21	328	344	12	705
K7NHL	15	311	324	28	678
WAØIAW	15	320	315	5	655
K8KMQ	50	289	276	21	636
WA9SEO	34	294	284	22	634
W1DOM	37	307	287	2	633
WB2OHK	234	198	195	1	628
W7JEY	7	306	304	5	622
W6BGF	34	283	279	18	614
WA2GPT	65	282	205	52	604
WAØPVJ	21	289	278	9	597
W5NBI	29	279	272	7	587
W8CHT	75	273	214	23	585
W6YBV	6	281	258	29	574
W1TXL	99	246	170	51	566
W7OEB	19	287	238	22	566
K6LRN	66	249	226	22	563
W4TUB	15	278	252	7	552
W6IPW	10	270	227	43	550
VE3BII	493	40	11	1	545
WA3ATQ	171	187	82	95	535
WØTDR	19	269	210	36	534
W6IDY	3	265	257	7	532
W4RUW	211	158	147	11	527
WB4BGL	15	263	239	9	526
W9ZYK	29	242	231	16	518
W8IWF	71	225	204	15	515
WB2HZY	43	236	205	29	513
WA5MXY	58	230	219	5	512
W6MLF	0	256	250	5	511
K1ESG	81	219	198	7	505
WB6BOS	45	230	221	9	505
WA6EPX	66	225	172	38	501
WA9NPH	89	214	155	42	500
Late Report:					
WB6JFO (Nov.)	40	300	213	65	618

More-Than-One-Operator Station

W7DZX (Nov.)	13	284	232	13	542
K6MCA	50	600	600	6	1256
W9ODD	549	7	3	8	567

BPL for 100 or more *originations-plus deliveries*

WA4BMC 322	K1ENS 128	W7OCX 109
WA5NTI 306	WA4ZEV 128	K1RQO 108
W6BHG 292	W4ILE 125	WA3AFI 107
W8IV 245	WA5KZA 120	W4WLD 105
W3TN 199	K8UBK 119	W2URP 103
K2UBC 181	WA4NEV 118	K5GKN 103
K1PNB 171	WA5RAN 117	W8FSX 103
WA7BEU 164	W5BGE 116	K3YVG 102
W4PQP 148	WA3BSV 114	W3ZRQ 102
W6TNJ 148	WB2RBA 112	WA7CFN 102
K7CTP 145	W2RUF 112	WA7CPI 102
WA8SHP 145	WA4LRW 112	WA9GJU 102
WAØMKF 140	WA5AGH 112	K3WEU 101
KØRPH 138	W6DSC 111	WA4VUE 101
K3TNL 131	WA8PII 111	WB6KGK 101
K9FHI 131	WA9QKP 111	VE4LG 101
WB6KIL 130	WA9QXT 111	W3RV 100
WA8RWI 130	WA4IZZ 110	Late Report:
WA6AGQ 129	K4YZU 110	WA4RIH(Nov.) 149
	W3MPX 109	W6JXK (Nov.) 146

More-Than-One-Operator Station

WØEEE 232	K9IU 204	WØZLN 113

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing: WB2HZY, W6TYM, WA7CFN.

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 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.

A.R.R.L. ACTIVITIES CALENDAR

(Dates are shown in GMT)

Mar. 2: CP Qualifying Run — W6OWP
Mar. 4–5: DX Competition (phone)
Mar. 16: CP Qualifying Run — W1AW
Mar. 18–19: DX Competition (c.w.)
April 7: CP Qualifying Run — W6OWP
April 14: CP Qualifying Run — W1AW
April 15–17: CD Party (c.w.)
April 22–24: CD Party (phone)
June 10–11: V.H.F. QSO Party
June 24–25: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor and page reference of *QST* issue in which more details appear.

Mar. 4–6: BARTG Spring RTTY (p. 73, this issue).
Mar. 11–12: YL-OM Contest c.w., YLRL (p. 81, January).
Mar. 13: W1EIA High Speed Code Test, Conn. Wireless Assn. (p. 105, this issue).
Apr. 1–2: Florida QSO Party, *Florida Skip* (p. 142 this issue).
Apr. 29–30: PACC Contest (next issue).
Apr. 29–May 1: Missouri QSO Party (next issue)
May 13–14: Hawaii QSO Party (p. 132, this issue).

sure you are free from *harmonic* radiations. Get a local amateur to listen to the frequency twice or three times that of your crystal. *Only* when such a radiation is reduced to *negligible* proportions (by a transmatch or other remedies) should you go on the air to work others.

2. Keep CQs *short*. After three or four and identification, *listen*. Repeat this if no answer. *Look over the band* before you call any CQ.

3. Call the stations nearest your frequency. Make it a two-by-one or two-by-two call in your replies. Do not send "R" (receipting) if you have not correctly copied all that was said.

4. Do not send faster than *you* can receive; the good operator will adjust his sending to your speed capability and has to judge by your sending.

5. Answer any directional CQ (such as CQ Mass) *only* if you are in that state. Receipt for (R) any traffic only when completely and correctly copied. The "R" or O.K. tells the operator you have the whole thing, and accept responsibility for delivery or prompt relaying onward to the addressee.

6. Omit any antics that make you look childish, such as the shave-and-a-hair-cut six-bits sign off. A brief "ga" or "k" for go-ahead, B for more-to-follow, $\overline{\text{AS}}$ for wait or "i" for I understand, on the other hand, make you look like a real communications experienced operator. Follow *established* abbreviations.

7. Try keying in step with W1AW on those dates each month when, under Code Proficiency Program, we show where to look for specified Practice Text from *QST*. This helps give you a good fist. Be sure to use a local oscillator or buzzer for keying practice — and until you can use a bug correctly do not put any automatic key on the air. Listen to traffic nets and netters to get the practical know-how on use of procedure and message form.

Additional Official Observers Wanted. More v.h.f. observers, 2-6- and 10-meter workers are needed. Also additional OOs equipped for RTTY and in most sections some for h.f., additional actives to watch over the harmonic shadows of all our amateur bands, are invited to make application to SCMs. The OOs function, as mentioned at length (October '66 *QST*, page 52) is the sending of friendly card notices on forms which ARRL furnishes. The purpose is to help amateurs keep out of trouble from poor signals or failure to observe the government rules for the amateur service. Our *Operating Booklet* explains the four classes of OO activity — phone observing, c.w. observing and in the frequency measuring specialty, two degrees of precision. These last require capability in W1AW frequency measuring tests. While Class I/II work may be deferred, full activity in the phone band and c.w. observing, Classes III and IV and receiver-monitored approximate frequency spotting of harmonics, require no such test. Since amateurs expect their OOs to have lots of know-how and experience, four years of licensed amateur experience is prerequisite to application for these posts. A form-application asks a prospect his equipment and aptitude etc. ARRL Observers are appointed by SCMs (see page 6 *QST*) only in ARRL field organization territory in the U.S.A. and Canada. The FCC General or Conditional license or higher, or in Canada equivalent DOT license-standing are required.

New Observers receive our *Standing Information for OOs* (CD-100) as the guide to system operations, as well as all required forms for their operation. Quarterly bulletins are sent to Observers and include announcement of frequency measuring tests, as held.

The task of keeping unsuspecting hams with signals informed so they avoid FCC trouble is a worthy one. Many commendations are received by OOs as their reward. If you are equipped and experience-qualified to help in assisting other operators through the ARRL OO program, please drop a line to your SCM and ask about OO work. Or let ARRL Hq. send you the CD-45 application forms today.

— *F.E.H.*

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 GMT conversion card is available, free of charge, from the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

IMPORTANT NOTICE

Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying please give old as well as new address *and your zip code*. Your promptness will help you, the postal service and us. Thanks.

DX COMPETITION MARCH 5-6, 18-19

Two weekends still remain for DX contest fans in the contest granddaddy of 'em. Full rules appeared in January *QST*. This will serve to remind you of the April 22 postmark deadline!

HIGH SPEED CODE TEST, MARCH 13

The Seventeenth Semi-Annual High Speed Code Test of the Connecticut Wireless Assn. is scheduled for March 13, 1967. The test is transmitted by club station W1EIA simultaneously on 3637 and 7120 kc., and synchronously by a number of other volunteer stations in the midwest and far west to give nationwide coverage. The exact identity of the latter have not as yet been fully settled, but look for transmissions on 3640, 3653, 3660, 3690 and 7115 kc.

Call-up for the test will commence at 0115 GMT, consisting of announcement, identification, and a plea for a clear channel. At 0130 GMT very important instructions will begin, which all operators intending to participate in the test should copy. The first speed run, 40 w.p.m., will begin at 0150 GMT and will last for exactly five minutes. Subsequent speeds will be 45 w.p.m. at 0200, 50 w.p.m. at 0210, 55 w.p.m. at 0220 and 60 w.p.m. at 0230, all GMT. Text will be plain English with common punctuation and numerals in stride, with no intent either to deceive or make it easy. One minute of consecutively-solid copy out of any five-minute transmission is required to qualify for a certificate.

There are other rules for which we do not have space here. Copy the instructions at 0130 GMT, March 13. (Note that this is the evening of March 12 if you are still using local time.)

This is *not* a part of the ARRL code proficiency program. All correspondence should go to W1NJM at his home address.

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 Mar. 16 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on listed c.w. frequencies. The next qualifying run from W6OWP only will be transmitted Mar. 2 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example*; In converting, 0230 GMT Mar. 16 becomes 2130 EST Mar. 15.

Any person can apply. Neither ARRL membership for an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 0030 and 0230 GMT, simulataneously on all listed c.w. frequencies. At 0230 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 0030 GMT daily, speeds are 10 13 and 15 w.p.m. 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 fist by sending *in step with W1AW* (but not on the air!) 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 Jan. *QST*
Mar. 1:	*It seems to Us*, p. 9
Mar. 7:	*WWV Moves to Colorado*, p. 11
Mar. 10:	*A Novice Frequency Standard*, p. 22
Mar. 23:	*A Two-Tube 75-Watt Transmitter*, p. 34
Date	Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Mar. 27:	*A.G.C. in C.W. and S.S.B. Reception*, p. 62
Mar. 29:	*Beat-Frequency Oscillators*, p. 63

QST

W1AW SCHEDULE, MARCH 1967

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 3 P.M.-3A.M. EST, Saturday 7 P.M.-2:30 A.M. EST and Sunday 3 P.M.-10:30 P.M. EST. The station address is 225 Main Street, Newington, Conn. about 7 miles south of Hartford. A map showing local street detail will be sent upon request. The station will be closed March 24, Good Friday.

*GMT**	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	.....	.....	.....	RTTY OBS[3,7]	.....	.....
0030	**Code Practice Daily[1] 10–13 and 15 w.p.m.**						
0100	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0120–0200[4]	.....	.....	7.080	3.555	7.080[6]	3.555[6]	7.080
0200	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0205–0230[4]	.....	.....	3.945	50.7	145.6	1.82	3.945
0230	**Code Practice Daily[1] 15–35 w.p.m. TThSat., 5–25 w.p.m. MWFSun.**						
0330–0400[4]	.....	.....	3.555	7.080	1,805	7.080	3.555
0400	RTTY OBS[3]	.....	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]	RTTY OBS[3]
0410–0430[4]	.....	.....	3.625	14.095	7.045	14.095	3.625
0430	Phone OBS[2]	.....	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]	Phone OBS[2]
0435–0500[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0500	C.W. OBS[1]	.....	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]	C.W. OBS[1]
0530–0600[4]	.....	.....	3.555[6]	7.080[6]	3.555	7.255	3.555
0600–0700	.....	.....	7.080	3.945	3.555	3.555	7.080
0700–0800	.....	.....	3.945	7.255	3.945	3.555	3.945
2000–2100	.....	14.280	21/28[5]	14.095	21/28[5]	14.280	.....
2100–2200	.....	14.100	14.280	14.100	14.280	14.100	.....
2300–2345	.....	7.255	21/28[5]	21.1[6]	21/28[5]	7.255	.....

[1] C.W.OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625, 7.045 and 14.095 Mc. 170/850 cycle shift optional in RTTY general operation.
[4] Starting time approximate. Operation period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.
[6] W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.
[7] Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.
Maintenance Staff: W1s QIS WPR NPG. *Times/days in GMT. General operating frequencies approximate.

Station Activities

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

ATLANTIC DIVISION

DELAWARE—SCM, John M. Thompson, W3HC—SEC K3NYG. RM: W3EEB. New appointment: W3DKX as OPS. New officers of the First State ARC are W3KET, pres.; W3DEO, secy.; W3URR, act. dir.; WA3ENX, pub. dir.; K3JXR, trustee. New officers of the Kent County ARC are K3WEE, pres.; K3OCE, vice-pres.; WA3FRC, secy.-treas. The club awarded K3OCE a plaque as outstanding amateur of the year at its Annual Dinner Meeting. Congratulations to W3EEB on making the BPL the hard way. W3CGV and K3MPZ supplied communications for the Jewish Community Center's Annual Race. K3UHU and K3QMK sent messages direct from bedridden patients at Veterans Hospital to K3MPZ, who relayed them via NTS and MARS. WA3CRU has a new homebrew modulator and worked 10 countries on 15 and 40. Traffic: W3EEB 762, K3MPZ 173, K3URP 106, K3NYG 82, W3HC 51, W3DKX 41, WA3CRU 13, WA3DUM 11, WA3FRC 2, W3HKS 1.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: K3YVG, K3MVO, W3CBH, W3EML. PAMs: W3FGQ, W3SAO. The year 1966 and the month of December attained a few records for the section. EPA and PTTN QNI and traffic broke all previous records. 14 BPL certificates were issued, the highest ever recorded for the section. The December total of traffic reports topped the previous record of May 1963 by 72. The annual total number of traffic reports received overrided the previous record in 1962 by 602 reports. R.F. Hill ARC, under the leadership of W3IMW, is starting a class for new hams. New club officers: Abington ARC—WA3CNC, pres.; W3VAP, vice-pres.; K3CCV, secy.-treas. Philmont Mobile RC—W3YHV, pres.; W3OWK, vice-pres.: K3UWO, secy.; WA2RDC, treas. The only station reporting new gear from Santa was K3HHB, a Swan 350. K3BWB is now General Class. W3EU is snowed out of his shack in the back yard. The IRC Radio Club may have to relocate because of plant expansion. W3ID is having antenna and receiver troubles again. WA3EXB received a citation from the American Legion for traffic work. W3ELI received a letter of commendation from the Mayor of Philadelphia for holiday traffic to servicemen. WA3FWT and WA3ECI were visitors to League Headquarters. WA3DQR entered our traffic nets and uses a DX-60 and an HR-10. K3MVO spent the holidays in Kentucky. K3MYS participated in the "City of Philadelphia Holiday Radiogram Greetings" program. "First timer BPLs" go to W3MPX, K3TNL, K3WEU, WA3AFI and WA3BSV. W3CUL and W3VR are Florida-bound. Our traffic nets would suffer a slight drop in traffic if the fracus in Viet Nam should halt, but I know our nets would survive. Let's pray for peace in 1967. Traffic: W3CUL 7611, K3MYS 1735, W3EML 1364, W3VR 1108, K3PIE 766, WA3ATQ 535, K3YVG 354, WA3CTP 279, K3MVO 279, K3FSV 270, W3AIZ 258, W3MPX 225, K3TNL 190, W3ZRQ 172, W3FGQ 159, WA3AFI 158, K3WEU 147, WA3BSV 146, W3RV 132, K3RTX 129, WA3BYH 102, W3CBH 98, W3JKX 91, WA3AIB 84, W3OY 73, W3VAP 60, K3KTH 57, W3NNL 53, W3KJJ 52, K3HHB 51, K3VBA 48, K3WAJ 48, WA3DQR 46, W3ELI 36, W3PVY 36, WA3EXW 29, W3BFF 25, WA3FWT 25, K3HKW 23, WA3EXB 22, WA3CFU 19, K3KKO 14, W3BUR 11, W3ADE 10, K3FOB 9, K3HLN 8, W3FAF 5, W3OML 5, WA3BJQ 2, K3HNP 2, W3ID 2, K3JHE 2, K3AOH 1, WA3EEC 1, W3EU 1, K3MSG 1, W3NNC 1, K3NOX 1, K3NZD 1, K3RDT 1, W3YPF 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ—SEC: W3CVE. RMs: K3OAE, W3ZNW. PAMs: W3JZY, K3LFD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*Ave.*
MDD	3643	0000Z	Daily	31	401	12.8
MDDS	3643	0130Z	Daily	31	69	2.2
MEPN	3820	2300Z	M-W-F	21	89	4.2
MEPN	3820	1800Z	S-S			
MSTN	50150	0100Z	Daily			

K3QDC is a new ORS. K3CYA and W3SMR have been busy OOs. K3LLR winds up 1966 with the last of his troubles as vandals have eliminated his antennas. WN3GKH has sent in his AREC application. Welcome to W8IBX/W3DPR in Baltimore, who is a relocated Ohio OO. He also is the Vicar of Christ Lutheran Church in Cantonsville. W3TN reports he is a regular QNI on the Morning Watch and Hit N Bounce Nets. Welcome to W1CDN/3, now located at Ft. Meade, who is a traveling ORS from Ft. Devens, Mass. W3TXQ reports that a first-floor apartment QTH isn't suited for spectacular amateur operation. WA3CEK soon will be on MDDS with a rebuilt Ranger I. WA3CFK has a new SB-401 and a new keyer to celebrate the completion of his first year as an MDD traffic-handler. K3URE's traffic total contains Vietnam via MARS messages. The Nite Owl Net gang put up a beam for W3NO at his new QTH. K3NOM has been QRL with Christmas traffic. WA3EOP put his peanut whistle on for the ARRL V.H.F. Contest. W2NIY/3 has his receiver working, now to get his transmitter off the sick list so he again will be operational. W3MCG has outgrown his shack so was in the process of remoting his finals in the garage (make DXing easier and band-changing quicker) in preparation for the ARRL DX Test. Two sad notes reported by W3ECP: W3LQY is in St. Agnes Hospital, Baltimore, and K3FIB became a Silent Key on Dec. 19. To W3LQY, a speedy recovery; to the family of K3FIB, our sympathy. Traffic: W3TN 369, K8MZY/3 257, WA3EEQ 226, K3LFD 199, WA3CFK 148, K3OAE 131, K3JYZ 123, K3WKV 117, W3PQT 105, W3EOV 104, WA3BNL 96, W3DPR 57, K3QDC 53, K3GZK 46, K3URE 42, W3ZNW 42, W3ECP 38, K3NCM 24, W3PRC 22, W3MCG 18, WA3EOP 13, W3LBC 13, WA3CCN 12, W3UE 11, WA3BDK 1.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Ast. SCM: Charles E. Travers, W2YPZ. SEC: W2BZJ. RMs: WA2KIP, WA2UPC. PAM: and NJPN Net Mgr. W2ZI. NJN reports QNI 614, total traffic 415. NJPN reports QNI 713, total traffic 253. It is my sad duty to report that old-timer and faithful trafficker for many years, W2RG passed away Jan. 6 right after the NJN session. Also regret to report that W2ADA and W2DMU became Silent Keys recently. W2BLM is a new traffic station reporting from Windsor, N.J. WB2GTE worked VU2KJ. WA3BBI/2 is a new station reporting in with traffic from Bordentown. W2ZEW is a newly-appointed OPS. W2ZI copied the new WWV on 2.5 Mc. from Ft. Collins, Colo., and submitted his QSL card. Wonder how many heard WWV on from the new location Dec. 1. WB2NEW, a new station in Trenton, wants an AREC application. WB2ELF is the new call of the Princeton Univ. Radio Club. A revised NJPN roster is available from me. Thanks to W2YPZ for the print job. Anybody need net certificates? Request them through W2ZI via a radiogram. W2VU recently returned from Walter Reed Hospital, Washington, D.C. K2BPI recently was married, as was K2SNK. N.N.J. SCM W2QLP paid us a visit recently and talked over section problems. W2EUH flew to Durban, S. Africa, to see his grand-kids for the first time in Jan. K2CDH now has his 2nd-class commercial phone ticket. WA2KIP's XYL, WB2BFA, helped in relaying traffic during the Christmas rush. WB2TEN was high man during the SS on c.w. while W2ORA topped the score on phone. Traffic: (Dec.) WA2KIP 219, WB2MOQ 157, WB2TEN 139, W2YPZ 139, W2ZI 98, K2SHE 93, W2RG 73, W2BLM 23, W2ZEW 23, WA2BLV 16, W2BEI 10, W2BZJ 10, W3BBI/2 9, WA2DVU 7, WB2GTE 7, WB2SBD 6, WA2KAP 3. (Nov.) WA2BLV 60, K2SHE 53, WB2TEN 49, W2BLM 13.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RMs: W2EZB and W2FEB. NYS C.W. Net meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800. NYSPTEN on 3925 kc. at 2200 GMT. NYS C.D. on 3510.5 and 3993 kc. (s.s.b.) at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT. NYS County Net on 3510 kc. Sun. at 1400 and 2345 GMT Mon. Congratulations to K2KQC, W2OE, W2SEO and W2RUF on making the BPL. K2LGJ has been appointed OVS. Endorsements:

WB2GAL as OPS, WB2NNA/WA2PZD as ORS, K2LGJ as OO. W2RUF spoke to the RARA or ARPSC and traffic at its Dec. Meeting. The AREC Training Net started Feb. 4. Look on 80 meters every Sat. at 1730. This will be a real slow-speed net, so that everyone can check in. K2VOX reports that the Western N.Y. 2-Meter f.m. group helped local WKBW on a Red Kettle drive for the Salvation Army. The WB2TLJ repeater was used to dispatch mobiles W2EUP, K2GUG, K2BNO, WA2MSV, WA2ZZZ, WA2DZA and WB2NFB. Erie County RACES is cooperating with the Red Cross, local fire and rescue teams, sheriff and the National Ski Patrol system to form a winter disaster team. Objective is to provide first-aid and communications in the event a school bus load of children has an accident during the typical hazardous driving conditions to and from the local ski areas. Temporary hospital facilities, intercommunication and transportation has been worked out. 2-meter f.m. will be used exclusively. Sorry to report that the State Radio Officer for C.D., K2SFY, has joined Silent Keys. W2CVB, from Arcade, also passed away. The NYSPTEN elected WB2QAP, WB2NGZ, K2SJN and K2AAS as officers for 1967. The 1967 officers of the Erie County Emergency Net are WB2-WJF, K2EQB and W2SSG. Officers of the ARARTS are WB2VJY, pres.; WA2BYN, vice-pres.-treas.; K2RTQ, secy. GRAMS elected WA2CTI, pres.; WB2MXO, vice-pres.; WB2MXB, secy.; K2IAQ, treas.; WB2MXE and W2CUY, directors. W2SAW spoke at a recent GRAMS meeting. WB2VPH and WB2VPK are now General Class. WA2KND has been appointed Asst. Director of ARRL by W3YA. K2DNN reports that Chemung AREC purchased a Clegg Thor 6-Meter transceiver including an AR22 rotator. Chautauqqua County AREC was activated for a recent 40-inch snowstorm emergency. The RACES Net also participated. Traffic: K2KQC 869, W2OE 777, W2-SEI 705, WB2GAL 364, W2RUF 318, W2GVH 195, K2SSX 110, K2RYH 99, W2FEB 97, WA2UFI 93, W2HYM 73, K2DNN 65, WB2SMD 57, W2FCG 54, WA2HSB 54, W2-RQF 53, K2OFV 44, WB2OYE 40, WA2MWF 28, W2DJN 27, W2MTA 21, K2IMI 19, K2MQN 17, WA2GLA 12, W2-PNN 6, WB2IPX 2, WB2NZA 2, W2PVI 2, WA2PZD 2, WB2FPG 1.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: K3KMO. V.H.F. PAM: K3-VPI. RMs: W3KUN, W3MFB, W3UHN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 0000 GMT and KSSN, 3585 kc. Mon. through Fri. at 2330 GMT. K3KMO hit the jackpot in December when his extra effort pulled in five new ECs in one month and all good men, too. Welcome to W3BIH, W3KUN, W3LNE, W3MFB, K3CHD as new ECs. A big welcome to K3SJN as a new ORS from Johnstown. W3UVD and K3RBH are new OVSs with much v.h.f. experience. Welcome aboard, men. The *Spark Gap* reports that K3QHM was Santa Claus on 10 meters to talk to the kiddies via radio from that far-out land. Congratulations to WN3GMR and WN3GUN, new Novices. W3WLF and K3RBH have new Swan 250s to help their v.h.f. activities. W3RUC has a new Drake receiver. K3SAA and K3RLB are sending TV pictures to each other on 432 MC. over a distance of one mile. WA3-EGW has a new Hammerlund HXL-1. W3GJY now has 313/312 for DXCC. W3KUN now has 124 confirmed DX contacts on 80 meters. WA3BGE has received his 25 w.p.m. sticker. K3AKR, a highly efficient v.h.f. contest man with many years experience, worked his first h.f. contest (Sweepstakes C.W.) and did a fine job, too. Everybody reading this column, please take a look at your amateur license (which should be in your wallet) and check your expiration date. It hurts to stop your activities because of lapsed license. Traffic: (Dec.) W3NEM 306, W3KUN 293, K3HKK 270, W3BLZ 269, W3MFB 234, W3LOS 108, WA3AKH 100, K3SJN 76, WA3AKB 58, K3RZE 30, WA3EPQ 29, K3TEZ 27, WA3BLE 19, WA3BGE 18, W3-OEO 18, K3AKR 15, W3UHN 13, W4ZAU/3 10, W3YA 8, W3ELZ 6, W3GJY 6, W3SMV 4, W3LOD 3. (Nov.) W3KUN 195, W3BLZ 129, K3SOH 123, K3PYS 38, WA3-AKH 37, K3EXE 17, WA3EPQ 7.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: WA9GUM. PAMs: W9VWJ, WA9-CCP and W9KLB and WA9RLA (v.h.f.). Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	Tfc.
IEN	3940 kc.	1400Z	Sun.	49
ILN	3760 kc.	0000Z	Daily	462
NCPN	3915 kc.	1300Z	Mon.-Sat.	489
NCPN	3915 kc.	1800Z	Mon.-Sat.	580
Ill PON	3925 kc.	1700	Mon.-Fri.	592
Ill PON	50.28 Mc.	2000	M&Thurs.	No report
Ill PON	145.5 Mc.	2000	M-W-F	365
TNT Net	145.36 Mc.	2100	Sun.-Fri.	311

The new officers of the Twin City Amateur Radio Club are W9MTO, K9PGM and K9WGY. W9REC, W9HPG, K9IFE, K9RAS and K9VVL participated in the recent Frequency Measuring Test. W9NWK reports that the 75-Meter Interstate Single Sideband Net had a traffic count of 1062 for the month. K9KGN, K9QYT, K9YDG, K9RHY and WA9FIH were elected new officers of the Lawndale Chicago Boys Club Amateur Radio Assn. K9AYR received his General Class ticket. K9HRC was appointed EC of DeWitt County and W9GEG was appointed an Official Observer. W9PHS, now W6PIC, would like to air schedule some of his Cicero friends. The Ninth Regional Net's traffic count for Dec. was 773. New officers of the Midwest Amateur Radio Club are K9ZKN, K9YVK, WA9PLL, WA9QPD and WA9EEB. A new call heard on 6 meters was WA9SRE. WN9RSN has his station equipped for 2-meter RTTY. WA9POZ has a new Hornet beam. W9HAS is operating portable 7 from Arizona State University at Tempe, Ariz. W9HJM built a Heath 401 during the Holidays. W9HPG spoke at the meeting of the Motorola Amateur Radio Club, which was recently formed. WA9HVQ and K9RAS have acquired new Heath SB-100 transceivers. WN9TKD is a new Novice licensee. K9DEV received a Christmas gift of a T4X-R4A. WA9CCP, WA9SEO and WA9QXT are recipients of the BPL award. Traffic: (Dec.) WA9CCP 819, WA9SEO 634, WA9MIU 435, K9KZB 428, W9AXR 340, W9JXV 286, WA9PPA 216, K9AVQ 210, K9CYZ 184, W9CGC 175, WA9GUM 159, W9EET 155, W9HOT 143, W9DOQ 141, WA9NFS 140, W9ELL 136, W9NXG 132, WA9QXT 121, WN9SPA 113, WA9BRQ 97, WA9POZ 87, WN9RSN 74, WA9OTD 70, K9BTE 69, W9GFF 54, W9UHD 48, K9-WMP 43, W9YCH 38, WA9HVQ 30, WA9LGT 29, W9-PRN 26, W0LDC 25, K9HSK 24, W9HAS 20, WA9RLA 20, K9SNC 15, W9IJJM 14, WA9FIH 6, W9MTO 6, W9CWH 1. (Nov.) W9EET 80, W9CGC 63, WA9QXT 21, K9WMP 10. (Oct.) K9WMP 35, WA9QXT 13. (Sept.) WA9QXT 11. (Aug.) WA9QXT 5. (July) WA9QXT 1.

INDIANA—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: K9WET.

Net	Freq.	Time	Dec. Traffic	Mgr.
IFN	3910	1330Z Daily. 2300Z M-F	532	K9IVG
ISN	3910	0000Z Daily. 2130 M-S	1008	K9CRS
QIN	3656	0000Z Daily.	253	W9HRY

W9PMT, mgr. of Hoosier v.h.f. nets, reports Dec. traffic of 173. K9YFT reports Dec. traffic of 18 for the White River Valley AREC Net. WA9KVP reports Dec. traffic of 58 for the So. Bend ARC Net. W9QLW, RM of 9RN reports Indiana was represented 100% in Dec. QIN Honor Roll: K9VHY 29, WA9FDQ 23, K9HYV 23, W9HRY, K9WWJ, W9ZYK 19, WA9OYI, W9QLW, K9RLW 17, WA9RNT 16, W9SNQ 15. New Generals heard around the bands are WA9QOF, WA9MVW and WA9QJQ. W9-GHO is operating /4 at Ft. Knox, Ky. WA9TNQ has built an amplifier and put up a new trapped antenna. K9KFM also is enjoying a new amplifier. Evansville's Harrison ARC is experimetning with amateur TV, thanks to WFIE who helped with equipment. WA9BNX is sporting a new Olds equipped with mobile gear. W9YZO is back on the air and on s.s.b. W9PU has upped its power with an SB-200. WA9AUM has been working lots of DX on 15. K9SFY is building a new 2-meter final. W9BRF has a new 20-meter rig. W9SWD and K9IXD have moved to Shelbyville. WA9GJZ has beams for 2, 6, 10, 15 and 20 meters and dipoles for 40, 75 and 160. New officers of the Clark Co. ARC are WA9INJ, pres.; W9HRY, vice-pres.; WN9RUP, secy.; K9QWK, treas. WA9QMW built a CQ machine and has put up an eleven-element beam. *Amateur radio exists because of the service it renders.* K9EFY, mgr. of PON reports Dec. traffic of 222. BPL certificates went to K9IVG, W9ZYK and K9IU. Traffic: (Dec.) K9IVG 899, W9ZYK 518, K9FZX 444, WA9OYI 371, W9MM 340, W9HRY 330, W9QLW 317, W9JUK 304, W9JVV 261, W9BUQ 250, K9IU 222, WA9FDQ 176, W9UB 174, W9CC 127, K9HYV 126, K9VHY 80, WA9GNA 76, W9SNQ 74, WA9BWY 73, K9RWQ 59, W9DKR 48, WA9-GJZ 47, WA9BGI 42, K9EFY 41, K9FUJ 38, WA9CHY 33, W9PMT 32, W9VYX 32, W9LG 30, WA9CJR 26, W9-USL/9 26, WA9BHG 25, W9BDP 24, W9FWH 24, K9YFT 24, WA9AOS 21, W9RTH 20, WA9AUM 18, K9JQY 18, WA9CYG 16, W9EJW 16, WA9RNT 16, W9DGA 15, WA9CFW 14, W4DZC 14, WA9LUG 14, WA9NGN 14, WA9JIX 13, K9GBR 12, K9ILK 12, WA9BNX 10, K9UEO 7, W9CMT 6, W9DOK 6, K9LZJ/9 3. (Nov.) W9JUK 171, WA9KOH 10, W9CMT 3, WA9QMW 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. RM: WA9MIO. PAMs: W9NRP, K9IMR and WA9QKP.

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
BEN	3985 kc.	1300Z	Mon.-Sat.	27	324	249	W9NRP
BEN	3985 kc.	1800Z	Daily	31	667	464	WA9QKP
WSBN	3985 kc.	2315Z	Daily				K9IMR
WIN	3662 kc.	0115Z	Daily				WA9MIO
SWRN	50.4 Mc.	0300Z	Mon.-Sat.	23	336	6	W9JZD

New appointment: W9PJT as OVS. Renewed appointments: W9YT as ORS, W9DYG as ORS, K9DTK as OPS. WNA officers elected at the Dec. meeting are K9IMR, chairman; W9NGT, secy.; K9HJS, treas. *All traffic men;* get ready for the W9YT Engineering Exposition in April. This is a good chance to make the BPL. WA9NPB made the A-1 Operator Club. K9FHI is on 2-meter a.m. BPL certificates were earned by WA9GJU, K9FHI, WA9NPB, W9ODD and WA9QKP in Dec. K9GDF led the OOs with 51 notices in Dec. K9UTQ has completed his new gg amplifier, and is a delegate to the WNA. WN9RQJ is *waiting for* his General Class ticket. W9RTP is building a 2-811As amplifier for c.w. WA9KFL has a new 20-meter quad and says it works better on 10. Traffic: (Dec.) W9ODD 567, WA9NPB 500, W9CXY 437, W9DYG 420, W9YT 410, WA9QKP 275, WA9OMO 260, K9FHI 209, WA9NFG 180, WA9NVY 161, WA9GJU 145, W9AOW 117, K9UTQ 110, W9IFS 108, W9DND 96, W9SUF 90, WA9QNI 82, K9GDF 68, W9CBE 66, W9NRP 61, W9KRO 55, K9JMP 51, W9AYK 50, W9KQB 45, WA9NDV 36, W9ONI 34, W9RTP 23, WA9IZK 21, WA9KFL 19, WA9NBU 19, W9OTL 14, WA9LWJ 12, K9QKU 11, W9HQT 6, K9GSC 5, K9JXW 4, WA9SRV 3, K9OSC 2, K9ZMS 1. (Nov.) W9JKM 100, W9RTP 7, WA9NBU 4, K9ZMS 2.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØIEF. RMs: WØISJ, WAØEPX. PAMs: WAØMMV, WAØJKT, WAØDWM, WØHEN. MSN meets daily on 3595 kc. at 0030Z. MJN meets Tue.-Sun. on 3595 kc. at 0100Z. Noon MSPN meets M-S on 3820 kc. at 1805Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 kc. at 2300Z. MSTN meets Tue.-Sat. on 50.4 Mc. at 0430Z and Sun. at 0200Z. Congrats to WAØMMV, the new PAM for the Noon MSPN, and also to new ECs WAØEZQ for Carlton Co., WØMZR for Nobles Co. and WAØDAS for Mahnomen Co. Appointments renewed: KØVMW and WAØEDN as ECs, WØTIV and WØAIH as OOs, KØUXQ as ORS. Many thanks to KØQBI for serving as Noon MSPN PAM the past 17 months. OOs WØTIV and WAØIAW report sending 21 advisory notices in Dec. SEC WAØIEF is all set for an emergency with a 600-watt generator and a stand-by antenna system for 75, 40 and 20 meters. WAØHRM and WAØMLJ both have new Swan 350 rigs. WAØQXK is back on the air with an HQ-129X and a Globe Scout. WØMFW, who has left for warmer climes, will be back in May. The E. F. Johnson Co. employees have organized a radio club in Waseca and are conducting code and theory classes. The St. Paul ARC also is conducting code and theory classes again this year. WAØIAW, WAØEPX and WAØMKF qualified for the BPL award. Your SCM would appreciate a few more news items included with the fine station activity reports he has been receiving. Traffic: (Dec.) WAØIAW 655, WAØEPX 501, WAØJKT 297, WAØHRM 229, WAØMKF 141, WØISJ 116, WAØEDN 80, WAØPEV 51, KØQBI 49, WØMFW 31, WAØMMV 31, WØTCK 31, WAØIEF 26, WAØJPR 25, KØAQT/Ø 23, KØSRK 21, WAØQAK 20, KØAKM 18, WØUMX 17, KØZKK 15, WØBUO 12, KØFLT 12, WØHEN 11, WØATO 10, WAØLVK 9, KØORK 9, WAØJJR 8, WAØKQU 8, WAØNQH 8, WØEQO 7, KØZRD 7, KØIGZ 6, KØZRC 6, WØKLG 5, KØIIP 4, WØSZJ 4, WØTIV 4, WAØDFT 3. (Nov.) WAØPEV 44, WØISJ 31.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. KØSPH would like all those with 160-meter equipment to please contact him by card to see what potential exists for a 160-meter RACES net. The YL Weather Net needs more check-ins. WAØMND, WAØGRX, WØEFO and KØSPH are NCSs. This net meets at 8:00 CST on 3996.5 kc. Mon. through Fri. WØPUP is back on the air from Velva. WAØOIZ is a new call in Portland. KØYWD's car went out on him down Harvey way and it was through the RACES Net that a tow truck was dispatched *to get him going.* W9QNI/Ø is a new station at Crosby. Spense is stationed at the Fortuna AFB. WAØKSB needs help for a c.w. net to feed traffic to the national nets. Get in touch with him. KØOVE was mobile on a trip to Iowa during the Christmas holidays. KØITP reports a very worthwhile activity as a ham operator—that of helping people to be reunited after long periods of time. She gets a lot of enjoyment out of it and the heartfelt thanks of many who have received this aid. The PO Net reports 8 sessions, 33 stations, 112 check-ins, 90 traffic. The RACES Net reports 22 sessions, 969 check-ins; 269 traffic. Traffic: KØITP 130, WAØAYL 117, WAØHUD 106, WAØKSB 49, KØSPH 44, WAØAAU 20, WØEFJ 19, WØKZL 17, WØCGM 15, WØDM 15, KØTYY 15, WAØBIT 13, KØPZK 13, WAØEWW 11, WAØGZA 11, WØBHT 2.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WØSCT. RM: WAØAOY. PAM S.S.B. Net: WAØDEM. The So. Dak. S.S.B. Net, with KØBSW as NCS, assisted in getting aid to WØDGJ mobile, near Ft. Collins, Colo. WØVQC and WØCYG as well as others were especially helpful. WAØCKH and his XYL mobiled to No. Dak. for the Christmas holidays. We welcome WAØIPF, *of Huron, to our section.* Some contacts have been made with KØBQS at his winter home in California on 75 meters. The number of reports are increasing. Glad to have them. We regret to report WØFLP as a Silent Key. Les was SCM back in 1956. Traffic: WØZWL 838, WAØAOY 216, WAØNZA 196, WAØLLG 81, KØVYY 73, KØAIE 53, KICAU 39, KØTNM 34, WØDVB 29, WØZRA 26, KØJYF 24, KØYGZ 23, WØDJO 22, WØSCT 21, WAØMWN 16, WAØCKH 8, WAØNEQ 6, KØTPF 6, WØRWM 4, WAØNES 3, WAØBMG 2, WAØBWJ 1.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—SEC: WA5KTX. PAM: WA5GPO. RM: K5TYW. NMs: WA5PPD, WA5HNN W5MJO and K5ABE. We regretfully accept the resignation of K5TYW as RM. John has served faithfully for many years and his able assistance will be missed. Congratulations to W5NND on his appointment as RM, succeeding K5TYW. Thanks to W5DTR publication of the *OZK Bulletin* has resumed and the Nov. issue was a real fine bulletin. If you're not on the mailing list to receive the *OZK Bulletin* let Curt know and I'm sure he'll see that you get one. WA5PPD is doing a fine job as Net manager for the Razorback Single Sideband Net. Net reports for Dec.

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*QNI*	*Net Time*
RN	3815 kc.	0001Z	Daily	31	154	840	665 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	27	79	906	2096 min.
OZK	3790 kc.	0100Z	Daily	31	202	?	?
APON	3825 kc.	2130Z	Mon.-Fri.	22	284	501	660 min.
Late report for AFN Net for Nov.							
AFN	3885 kc.	1200Z	Mon.-Sat.	26	32	905	1659 min.

Speaking of traffic! Don't know if this is a record but it sure is a good average. W5OBD has earned 71 BPLs and has over 80,000 QTCs. Traffic: (Dec.) W5OBD 1045, W5NND 370, W5MJO 284, W5CAF 148, K5GKN 108, K5TVC 102, WA5KEF 95, K5EDH 61, K5TYW 47, WA5LYA 37, WA5HGP 19, W5RIT 3. (Nov.) W5YM 68.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: None. RM: W5CEZ. V.H.F. PAMs: W5UQR, WA5DXA.

Net	*Freq.*	*Days*	*Time*	*Net Mgr.*
LAN	3615	Daily	0030	W5GHP
Delta 75	3960	Sun.	1330	WA5EVU
LAPON	3870	Sun.	1300	W5KC

W5BUK has received his "300" sticker for DX. W5JFB, in spite of converter troubles, has found activity good on 10 meters. K5WOD reports no real news from Springfield. K5OKR reports into four nets regularly. W5KRX also continues active in traffic-handling. K5VJZ sends in a nice traffic total. WA5LQZ ably represented Westlake Area in the La. QSO Party. WA5KLF is rebuilding the rig and has a new ham shack. W5CEZ has a new Tecratt 2-meter converter. W5KC reports more and more activity on LAPON. W5EA handled some Christmas traffic. WA5FNB, resting on his laurels as former net mgr. of LAN, still handles traffic. W5CQS reports that an average of twenty stations report into the GNAR Net. WA5DXA reports the 146.94 C.D. Net now covers 8 towns in South Louisiana. W5MBC has a new Drake. WA5EID says that in spite of harder studies he is moving the shack into the house to catch a bit of operating on 10. WN5QIN reports his first traffic total. WA5LGO received an R4A/T4X cobination from Santa. Yours truly, W5PM, celebrated forty years of ham radio Dec. 23! W5BJG reports his traffic total, as did WA5QVN. W5MKI has a regular listening schedule to handle his OO chores. WA5JVL *reports the GNOARC held its annual banquet Dec.* 28 with K5USO as speaker. WA5CFS is going to Viet Nam for IBM. WA5ERC was home for the Holidays. W5NQR received a Heathkit Cantenna and s.w.r. bridge for Christmas. The Ozone Amateur Radio Club held its second dinner meeting of the year in mid-Dec. W5PM spoke on chasing DX. I know all of you join with me in wishing Ed Handy all the best in his retirement which became effective the end of Jan. Traffic: W5CEZ 451, W5KRX 352, K5OKR 215, W5PGT 147, W5MBC 131, W5BJG 128, WA5LGO 114, W5MXQ 93, WA5LQZ 91, K5VJZ 73, WA5FNB 51, W5PM 21, WA5DXA 12, W5KC 12, W5EA 11, WA5QVN 10, W5BUK 8, K5WOD 8, WA5KLF 7, WN5QIN 4.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. New officers of the Jackson Club are W5EVY, chairman; WA5IXC, vice-chairman; WA5JDH, corr. secy.; WA5ECL, treas. WA5CAM now has his SB-100 built and on the air with a fine signal. W5WZ has his usual good signal and W5BW is just as faithful to the nets. If

Technical Notes from RAYTHEON

About antennas whose loading was tops.

The center (or top) loaded antenna used today for lower frequency marine and vehicular work has been around a long, long time—thirty years or more.

In the late thirties VHF had not yet come into its own and many of the commercial services limited their communications by necessity to the 1600-3500 kc range. Amateur activity on the 160 meter band (then a phone mainstay) and the 80 meter band was at a high level but amateur mobile operation on these bands was limited. The subject of antennas — particularly shortened ones for mobile — came in for careful consideration. A great deal of work was done both by radio amateurs and commercials—articles written—patents applied for —the overlooked work of engineers involved in 100-500 kc beacon and LF range antenna designs was reviewed. But everything slipped quietly into the archives as WW II came on—and largely remained there as the state-of-the-art advanced and opened wide the frequency spectrum—VHF, UHF, microwaves.

Originally, most mobile antennas were random length whips (or wires for boats) operated against ground and established at quarter-wave resonance by a base loading coil; the antenna high current loop occurring generally within a well-shielded auto trunk or at the very least, within some semi-shielded area where coupling to existing wiring was probable. (On certain boats, hand railings have resonated and absorbed power).

Then some creative technician working with the commercial fishing boats tried something different. He wrapped insulated wire in a helix extending from tip to base of a tapered bamboo outrigger fish pole and found that signal strength picked up substantially!

A weird series of antenna configurations came into being before intuitive reasoning gave way to mathematical and experimental proof. One of the original prototypes was a coil 6 feet long, close-wound with insulated wire on a 1½"D form! Strangely, it gave good performance. It became evident that even a small capacity added to the top of the elongated coil resulted in a drastic reduction in the number of coil turns required for resonance at a given frequency. Thus was born "solenoid," one of the first commercially available top loaded antennas.

The "solenoid" was streamlined, mechanically sound and rugged but sacrificed some coil "Q" to achieve these desirable characteristics. It did put the current loop well up into the antenna column and was an excellent performer. The **Webster Standard Marine** used on thousands of boats throughout the world and the **Webster Band-spanner** for amateur mobile use are outgrowths—greatly improved through the use of modern materials and techniques—of the original "solenoid."

A contemporary school advocated positioning the loading coil up in the antenna column and designed the coil for optimum shape factor and lowest losses. (**Webster BIG-K** follows these precepts). For highest coil "Q" the coil had to have the least possible number of turns for a given frequency and this in turn meant an increase in capacity of the top whip.

As a point of information Webster holds a valid U. S. Patent with numerous claims granted, for an encapsulated top whip in which geometry(and hence capacity) of the whip is increased by using various arrangements of the center conductor. In any case, a myriad of configurations came into being in an attempt to optimize top capacity—metallic top hats, discs, helix's, spirals, wheels, bird cages, and these along with some truly king-size loading inductors! Many of these "ancient" designs were technically sound, yielded outstanding results.

All of the foregoing happened thirty years ago. Any top hats or bird cages you might see today are possibly either reinventions or are built by people who have access to almost forgotten antenna lore of the '30s.

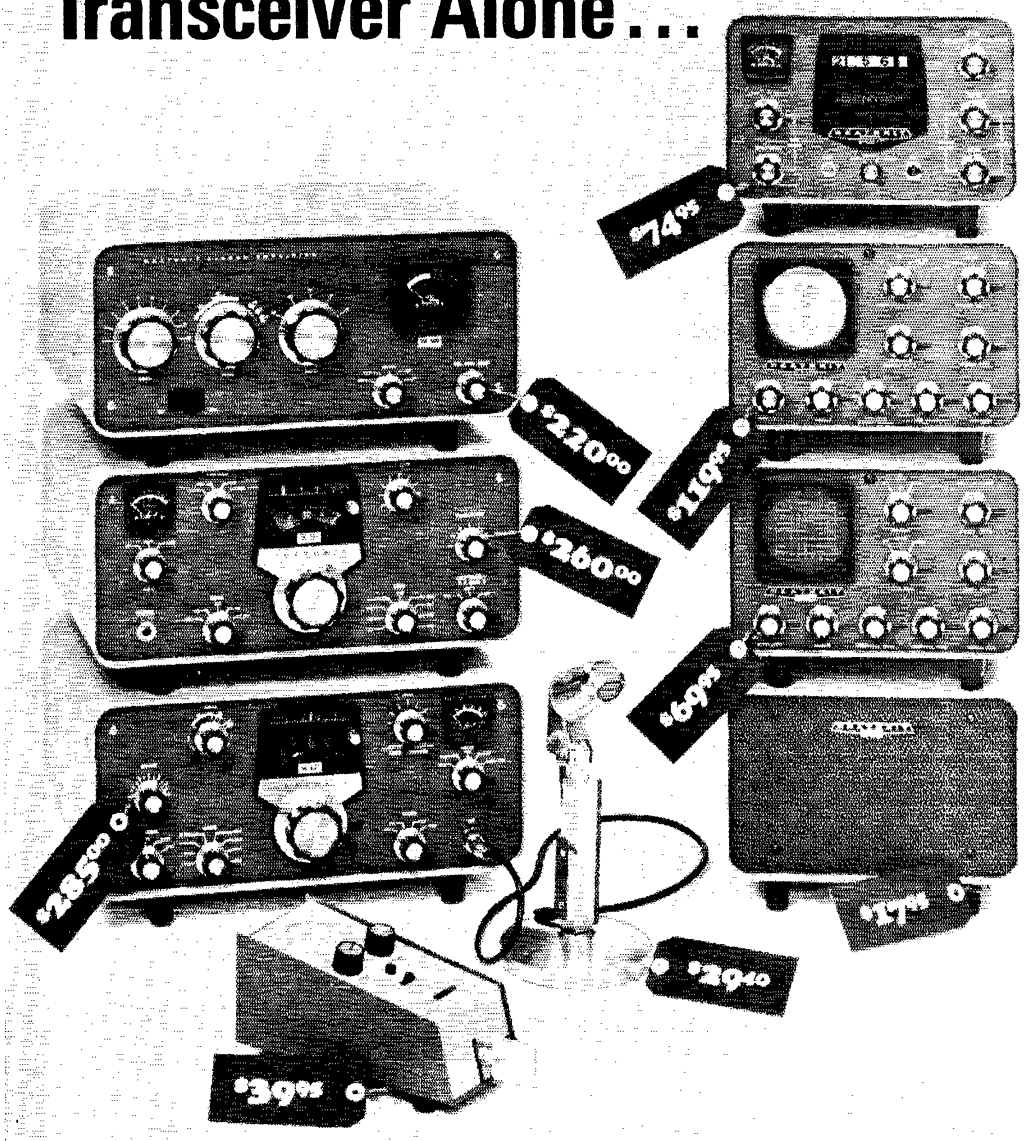
For information on current **Webster** mobile antennas write: **WEBSTER**, 213 E. Grand Ave., South San Francisco, Calif. 94080.

W6WB

RAYTHEON

EXCELLENCE IN ELECTRONICS

You Can Own This Entire HEATHKIT® Amateur Station For Less Than The Cost Of Our Competitor's Transceiver Alone...



$220.00 **SB-200 Kilowatt Desk-Top Linear Amplifier**

• 1200 watts PEP input SSB — 1000 watts CW • 80-10 meter coverage • Built-in SWR meter, antenna relay, solid-state power supply • Ideal for use with SSB-CW transmitters in 100 watt output class • Two 572 B/T-160-L tubes in parallel, fan cooled • Automatic Level Control (ALC) • Pre-tuned cathode input circuit for maximum efficiency and low distortion • Circuit breaker power supply protection — no fuses • 120/240 v. AC operation. 41 lbs.

$260.00 **New SB-301 SSB Amateur Band Receiver**

• 80-10 meter coverage, plus 15 to 15.5 MHz for WWV reception • SSB sensitivity 0.3 microvolt for 10 db signal plus noise to noise ratio • Built-in ANL, and 100 kHz crystal calibrator • Heath Linear Master Oscillator (LMO) with 1 kHz dial calibration for true linear tuning • USB, LSB, AM, CW, and RTTY modes • Front-panel switch selection of optional 6 and 2 meter converters. 25 lbs.

SBA-301-1, AM crystal filter (3.75 kHz)... **$20.95**
SBA-301-2, CW crystal filter (400 Hz).... **$20.95**
SBA-300-3, 6-meter converter..... **$19.95**
SBA-300-4, 2-meter converter..... **$19.95**

$285.00 **New SB-401 SSB Amateur Band Transmitter**

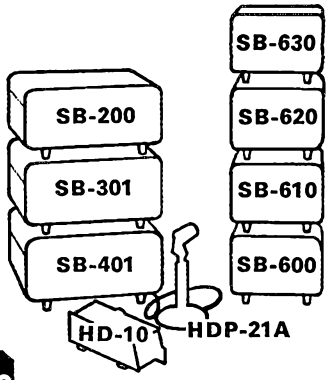
• 180 watts PEP input SSB — 170 watts CW • 80-10 meter coverage, USB or LSB • Built-in power supply, VOX • Famous Heathkit LMO with 1 kHz dial calibration for true linear tuning on all 5 bands • Transceive and independent operation with Heathkit SB-300 or new SB-301 (above) • Automatic Level Control (ALC) for higher talk power • Built-in antenna change-over relay • Crystal filter SSB generation • Requires SBA-401-1 crystal pack ($29.95) only for use *without* SB-300 or SB-301 receivers. 36 lbs.

$39.95 **HD-10 Solid-State Electronic Keyer**

• Dependable solid-state circuit with built-in keyer • 15 to 60 words per minute, optional 10 to 20 WPM range • Built-in sidetone speaker and power supply • Self-completing dashes • Adaptable to right or left handed operators • Variable dot-space ratio • Use *only* with grid block keyed transmitter. 6 lbs.

$29.40 **HDP-21A SSB Desk Stand "Ham" Microphone**

• High impedance, dynamic Electro-Voice microphone • Grip-to-talk stand • Cables and wiring option instructions included. 4 lbs.



$74.95 **SB-630 Amateur Station Console**

• Four control/monitor units in one . . . SWR meter, 24-hour clock, and other accessories • Push-to-reset automatic electronic 10-minute timer has both audio and visual signals • Handsomely styled to match Heathkit SB-series amateur gear. 10 lbs.

$119.95 **New SB-620 "Scanalyzer" Spectrum Monitor & Analyzer**

• Narrow sweep function with sharp crystal filter for single signal analysis — measure carrier and sideband suppression and distortion product levels down to 60 db • Increased wide sweep capability permits monitoring band activity in segments up to 500 kHz wide • Both linear and logarithmic display • Long persistence CRT for optimum display • Operates with IF's between 455 kHz and 6 MHz • Improved voltage doubler power supply • Matches Heathkit SB series in styling and performance • Available May, 1967. 15 lbs.

$69.95 **New SB-610 Signal Monitor**

• Displays transmitted signal as wave envelope, RF or AF trapezoid • Displays received signal wave envelope from receiver IF's between 455 kHz and 6 MHz • Automatic switching between transmitted & received signal displays • Operates 160 through 6 meters, 15 watts to 1 KW • Use as RTTY tuning meter • Improved two-tone audio test oscillator with separate balance and output level controls • Designed and styled to operate with Heathkit SB-series amateur gear. 14 lbs.

$17.95 **SB-600 SB-Series Communications Speaker**

• 8 ohm 6" x 9" speaker with shaped 300-3000 Hz response for voice communications • Optional HP-23 AC power supply ($39.95) may be mounted in handsome metal cabinet • Measures 10" W x 6½" H x 10½" D • Styled to match Heathkit SB-series amateur gear. 5 lbs.

FREE CATALOG

Describes these and over 250 kits for stereo/hi-fi, color TV, amateur radio, shortwave, test, CB, marine, educational, home and hobby. Save up to 50% by doing the easy assembly yourself. Mail coupon or write Heath Company, Benton Harbor, Michigan 49022

HEATHKIT

HEATH COMPANY, Dept. 9-3
Benton Harbor, Michigan 49022

☐ Enclosed is $_____, plus shipping.

Please send model (s)_____

☐ Please send FREE Heathkit Catalog.

Name_____
(Please Print)

Address_____

City_____ State_____ Zip_____

Prices & specifications subject to change without notice. AM-180

we had more like them and like WA5OKI and W5WMQ we could do fine in Mississippi. WA5OKI is active. Glad WA5JWD can check in more often now. K2DEM/5 is doing a fine job as OO at Kessler. He is running a swan 350 and a T4X in addition to his other gear. Glad to see 6- and 2-meter activity picking up in Miss. W5ODV/K5-JCT/5 is now located in Olive Branch. WA4MPH/5 is doing a good job from Louisville. Contact him on 6 and 2 meters. There are appointments open. Check into our nets. The Mississippi Sideband Net has really been active in the last couple of months. Traffic: WA2WBA/5 400, W5WZ 230, WA5JTB 62, WA5OKI 55, W5BW 35, WA5-JWD 6, WA5CAM 3.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: K4RCT. PAMs: WA4CGK, W4PFP, WA4EWW. RM: K4UWH.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
TSSB	3980 kc.	Tue.-Sun.	0030Z	26	1410	259
ETPN	3980 kc.	Mon.-Fri.	1140Z	22	369	74
TPN	3980 kc.	M-Sat.	1245Z	31	1152	311
		Sun.	1400Z			
TN	3635 kc.	Daily	0100Z	56	413	185
			0230Z			

Glad to announce the appointment of WA4CGK as PAM for TSSB. Congrats to W4RUW and W4PQP on making the BPL. K4EJQ is having fun with a 6N2 Thunderbolt. WA4CLR recently was married. K4SXD was active during the holidays on nets from the Army. K4DXS, K4BOM and W4YMG were home in Memphis during the holidays. The Knox code and theory class is active. K4TOM and WB4EHK are new ECs. Others are needed. Contact K4-RCT or W4UVP. W4TYV is visiting clubs with reference to the Tennessee Council. If your club is not a member, contact John. Plans are being made for the Shelby County *Hamfest* in May. W4PFP is sporting a new linear. Traffic: W4RUW 527, W4OGG 386, W4SQE 300, W4PQP 266, WA4-YEM 227, K4UWH 129, W4UVP 69, W4DIY 59, W4CXY 57, W4WBK 54, W4PFP 39, W4MXF 29, W4TYV 20, K4-UMW 18, W4CAT 15, WA4EWW 13, WA4GOL 13, WA4-CGK 12, WA4MCC 12, W4YAU 11, WA4NEC 10, WA4-NUJ 10, WA4ZBC 9, W4VJ 7, W4SGI 4, K4MQI 2, WA4-PCW 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYI.

Net	*Freq.*	*Days*	*EST*	*Sess.*	*QNI*	*QTC*	*Mgr.*
EMKPN	3960	M-F	0630	22	377	132	K4KIS
MKPN	3960	Daily	0830	25	279	102	WA4KFO
KTN	3960	Daily	1900	31	748	283	WA4AGH
KYN/KSN	3600	Daily	1900/1700	49	396	574	W4BAZ
KPON	3945	Sat.	1300	No report			

WA4WWT reports receiving his TCC certificate. WB4AIN is busy working and going to school in Louisville. K4-DZM works DX on 80 in between traffic net skeds. K4TXJ is getting started with his OO work. W4NBZ QNIs five nets and uses two transmitters. WB4AFH still is waiting for the gear he has on order to complete his station. K4YZU is active on four nets and MARS. K4KZH reports six sessions for the Falls City Area Traffic Net in Nov. This net operates on 50.7 Mc. at 2100 EST. The Bluegrass Club in Lexington has helped attendance by showing films of appropriate subjects. Let's make 1967 a big year for Kentucky. W4WZI has taken the job as chairman for the 1967 Louisville Ham Kenvention. A tentative date of Sept. 9 has been set. Traffic: (Dec.) WA4WWT 430, WA4DYL 315, WA4AGH 299, W4BAZ 274, K4DZM 189, K4YZU 175, WA4VUE 155, WA4KFO 137, WA4GHQ 114, WA4IBG 101, K4MAN 81, WB4BTM 63, W4RCE 63, W4NBZ 50, WB4CIY 47, WA4VEC 46, W4-EON 44, W4OYI 36, K4NHY 32, W4KJP 24, WA4ZIR 21, WA4GMA 20, W4YOQ 20, W4BTA 15, WB4AIN 12, WB4-AFH 10, K4UMN 10, K4VDO 8, K4TXJ 1. (Nov.) W4-YOQ 17, K4KZH 5.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—Asst. SCM: K. E. Stecker, W8SS. SEC: K8GOU. RMs: W8ELW, K8QLL, W8EU, K8KMQ. PAMs: W8CQU, K8-LQA, K8JED, V.H.F. PAMs: W8CVQ, W8YAN. Appointments: W8SLV as EC; W8SCW, W8SJF, W8FX as ORSs. New officers: Mason County RC—WA8ORC, pres.; Dr. Pugh, vice-pres.; K8JED, secy.; WN8ORB, treas.; W8UMN, trustee. TASYLs—WA8ENW, pres.; K8VCB, vice-pres.; WA8CTE, secy.; WA8ARJ, treas.

Net	*Freq.*	*GMT*	*Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300	Dy	989	689	31	W8ELW
WSSB	3935	0000	Dy	1031	147	31	K8VDA
U.P.N.	3920	2230	Dy	836	88	31	W8OQH
B/R	3930	2230	M-F	762	112	22	K8JED
MICH 6	50.7	2400	M-S	296	193	27	WA8LRC
PON-CW	3645	0000	M-S	156	126	27	VE3DPO
PON-DAY	3860	1600	M-S	683	825	27	WA8OGR
M.E.N.	3930	1400	Sun	222	14	4	K8JED
M.T.N.	3605	0245	?	32	27	11	WA8MAM
29ers	29.0	0300	Sun	?	?	4	K8ETU
SW TWO	145.26	0100	Mon	96	1	4	W8ELW

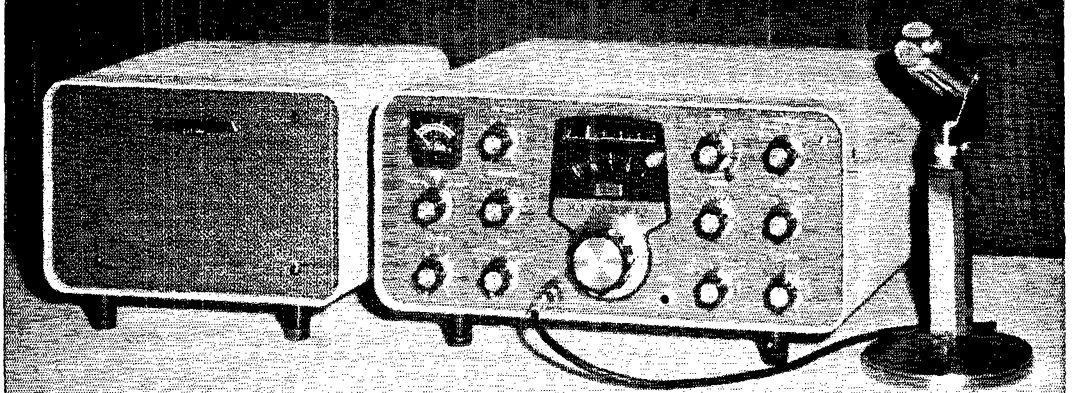
BPLers: K8KMQ, W8IWF, WA8PII, W8IV, WA8RWI. Those making General: WA8OXS, WA8OYH. W8IDC is recuperating from surgery. W8ZV retired from GM. W8-VWY has a new quad up 50 feet. W8HKL visited So. America during the Nov. eclipse. Silent Keys: K8DHG, W8PDZ, K8VLP, WA8CQR. W8HAV, WA8LHC, W8LSZ, WA8SLP, K8TNZ, WA8TVQ all get kudos for handling traffic for stranded motorists during the U.P. blizzard. W8MWG bought a tape machine to help with code practice. W8PHJ retransmits 20-meter QSOs from Luxemburg on 6 meters. The SEMARA has been running a code and theory class assisted by W8HID, WA8NYK and WA8SIQ. WA8MINF has a job with Heathkit. WA8HHD has a new SB-100. W8JPJ is recovering from surgery. TASYL News says the club has 78 members. Traffic: (Dec.) K8KMQ 636, W8IWF 515, WA8OGR 330, W8IUC 300, WA8PII 292, WA8LRC 284, W8IV 257, WA8MCQ 242, W8HQL 239, WA8IAQ 216, W8YAN 194, WA8RWI 135, WA8ENW 133, W8BEZ 130, K8HLR 108, W8PBO 101, K8ZJU 101, WA8MAM 99, WA8CZJ 86, K3KRX/8 81, WA8LXY 80, W8FX 78, W8MIRM 74, W8RTN 72, K8QKY 69, W8EU 67, W8ELW 57, W8CQB 56, K8JED 56, K8JJC 50, W8OQH 49, K8VDA 48, WA8TDY 41, WA8GTM 39, W8TBP 38, K8QLL 37, W8MPD 21, WA8MGM 19, WA8-PIM 19, K8PBA 18, WA8TBL 17, WA8ORC 15, W8IBB 14, WA8PWF 13, W8UFS 13, W8AUD 11, WA8OLD 10, W8SWF 9, K8YEK 6, W8MGQ 4, W8QF 4. (Nov.) W8-OQH 75, W8ELW 73, W8UM 20, W8SCW 3.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ and K8UBK. W8AQ is on the mend after an operation.

Net	*QNI*	*QTC*	*Sess.*	*Avg.*
OSSBN	1879	1625	59	27.5
BN		312	28	11.3
OLN	186	179	29	6.1
OSN		70	28	2.47

W8EEQ was in the hospital. W8WCW received his WAS and WAC certificates. WA8SED retired from the Air Force. K8BXT reports that K8OZK was married. WA8-SDX received his Technician Class license. K8WJB has a new TX62 rig and new 6&2 beam and WA8LBT is attending Kent State U. W8PMJ was made a member of QCWA. W8RYP, W8UPH, W8CHT, K8UBK, WA8SHP and WA8FSX made the BPL in Dec. Lancaster & Fairfield County ARC's *The Rag Chewer* says WA8TBI and WA8TBJ received their General Class licenses. WA8RTH is in Dayton VA hospital and K8YYO is now KR6KN. Inter-City RC's *IRC News Bulletin* tells us the club toured the computer section of Westinghouse Mfg. Co. Massillon ARC held an auction. Columbus ARA's *Carascope* informs us its 1967 officers are W8IJV, pres.; WA8-NTA, vice-pres.; W8RVP, secy.; W8OIH, treas.; W8-KJM and W8QQ, trustees. From Parma RC's *P.R.C. Bulletin* we learn that K8CQJ joined the Silent Keys, the club elected W8CZM, pres.; WA8OYP, v. pres.; ex-WN8PLC, secy.; K8BQY, asst. secy.; K8JZI, treas.; and WA8CGH, asst. treas., the Apricot Net held its Annual Awards Banquet and K8CUT moved to N.J. Toledo's *Ham Shack Gossip* says W8BME joined the Silent Keys, WA8VDJ received his General Class license, WN8VDS is a new Novice. K8WDZ and K8BAT celebrated their 25th wedding anniversary. WA8RXU tells us K8AXK has a new Drake L-4 linear WA8PCH has a SB-200-avertical and a new harmonic, WA8LIA has a new Drake R-4 and received his WAS certificate, WA8BXR and WA8FKD have a new SB-200 linear and a TA33 beam. W8IS was the guest of honor at a dinner. WA8MBH has a new *Swan* 350 and WA8RXU has a new HT44. Queen City Emergency Net's *The Listening Post* informs us its 1967 officers are WA8ELC, pres.; W4PII, vice-pres.; K8JZA, secy.; W8MXR, treas.; WA8GPQ, comm. mgr. West Park Radiops' 1967 officers are K8DZR, pres.; W8AJW, vice-pres.; W9FTK/8, secy.; W8WUO, treas.; W8YPT, trustee. K8HDO is attending Kent State U. Sweepstakes awards by the Ohio Council of ARC were won by W8FY, WA8CAE/8 and W8VVL/8. K8HZN is at Coast Guard boot camp. WA8NCK joined the Navy. W8GYR and K8MZS were elected trustees of Canton ARC. WA8PVW has a Viking Adventurer. Steubenville Area RC has 13 enrolled in its code and theory classes. Many thanks for bulletins from Cincinnati ARA's *The Mike & Key*, Canton ARC's *Feedline*, Kettering ARC's *A-Q*, Dayton ARA's *RF Carrier*, Inter-City RC's *IRC News Bulletin*, Lancaster & Fairfield County ARC's *The Rag Chewer*, Columbus ARA's *Carascope*, Parma RC's *I.R.C. Bulletin*, Toledo's *Ham Shack Gossip*, Queen City Emergency Net's *The Listening Post*, V.H.F. High Banders' *The Log*, Westpark Radios' *The Radiops Log* and Springfield ARC's *Q-Five*. Traffic: (Dec.) W8RYP 1571, W8UPH 1174, W8CHT 585, WA8CFJ 342, WA8SHP 281, K8UBK 276, W8NAL 275, WA8PZA 271, WA8FSX 248, W8DAE 226,

the only "no compromise" six meter SSB transceiver



the Heathkit® SB-110...full features...new lower price—$299.00

• The only truly high-performance SSB transceiver on six meters • Uncompromised engineering — the SB-110 features the same quality crystal filter found on Heathkit 80-10 meter SB-Series rigs • The same Heath LMO (Linear Master Oscillator) found on 80-10 meter SB-Series rigs • Built-in VOX • Built-in Crystal calibrator • Upper & Lower sideband selection • Full CW provisions, including built-in sidetone

You Can Work "Six" With A Truly High-Performance Rig . . . get lowband stability, 1 kHz dial calibration, linear tuning, and a backlash-free dial mechanism, plus all of the other standard "built-in" features found on the Heathkit 80 through 10 meter SB-Series equipment. The SB-110 runs 180 watts P.E.P. SSB input, 150 watts input CW . . . considered the ideal transceiver power level by most ham radio communications engineers. It is one unit of the famous Heath SB-Series, meaning availability of matching low-band transmitters, receivers, and transceivers, plus accessories such as the SB-600 Communications Speaker, SB-630 station console, and SB-610 Signal Monitor. And the SB-110 goes fixed or mobile with the appropriate power supply . . . the same versatility you experience with the famous Heath SB-101. Call it the one "no compromise" six meter SSB transceiver.

Kit SB-110, 23 lbs.....**$299.00**
Kit HP-13, Mobile Power Supply, 7 lbs.....**$64.95**
Kit HP-23, Fixed Station Power Supply, 19 lbs.....**$49.95**
Kit SBA-100-1, Mobile Mounting Bracket, 6 lbs.....**$14.95**
Kit SB-600, SB Series Speaker, 5 lbs.....**$17.95**
Kit HS-24, Mobile Speaker, 4 lbs.....**$7.00**
HDP-21A, SSB "Ham" Microphone, 4 lbs.....**$29.40**

PARTIAL SB-110 SPECIFICATIONS—RECEIVER SECTION: Sensitivity: 0.1 uv for 10 db signal-plus-noise to noise ratio. **Selectivity:** 2.1 kHz @ 6 db down, 5 kHz max. @ 60 db down. **Image rejection:** 50 db or better. **IF rejection:** 50 db or better. **Audio output power:** 1 watt. **AGC characteristics:** Audio output level varies less than 12 db for 50 db change of input signal level (0.5 uv to 150 uv). **TRANSMITTER SECTION: DC power input:** SSB, 180 watts PEP; CW, 150 watts. **RF power output:** SSB, 100 watts PEP, CW, 90 watts (50 ohm non-reactive load). **Output impedance:** 50 ohm nominal with not more than 2:1 SWR. **Carrier suppression:** 55 db down from rated output. **Unwanted sideband suppression:** 55 db down from rated output @ 1000 Hz & higher. **Distortion products:** 30 db down from rated PEP output. **Hum & noise:** 40 db or better below rated carrier. **Keying characteristics:** VOX operated from keyed tone using grid-block keying. **GENERAL: Frequency coverage:** 49.5 to 54.0 MHz in 500 kHz segments (50.0 to 52.0 MHz with crystals supplied). **Frequency selection:** Built-in LMO or crystal control. **Frequency stability:** Less than 100 Hz drift per hour after 20 minutes warmup under normal ambient conditions. Less than 100 Hz drift for ±10% supply voltage variations. **Dial Accuracy:** Electrical, within 400 Hz on all band segments, after calibration at nearest 100 kHz point. Visual, within 200 Hz. **Dial backlash:** No more than 50 Hz. **Calibration:** Every 100 kHz. **Power requirements:** High voltage, +700 v. DC @ 250 ma with 1% max. ripple. Low voltage, +250 v. DC @ 100 ma with .05% max. ripple. Bias voltage, —115 v. DC @ 10 ma with .5% max. ripple. Filament voltage, 12.6 v. AC/DC @ 4.355 amps. **Dimensions:** 14⅛" W x 6⅝" H x 13⅜" D.

FREE CATALOG

Describes these and over 250 kits for stereo/hi-fi, color TV, amateur radio, shortwave, test, CB, marine, educational, home and hobby. Save up to 50% by doing the easy assembly yourself. Mail coupon or write Heath Company, Benton Harbor, Michigan 49022

HEATHKIT®

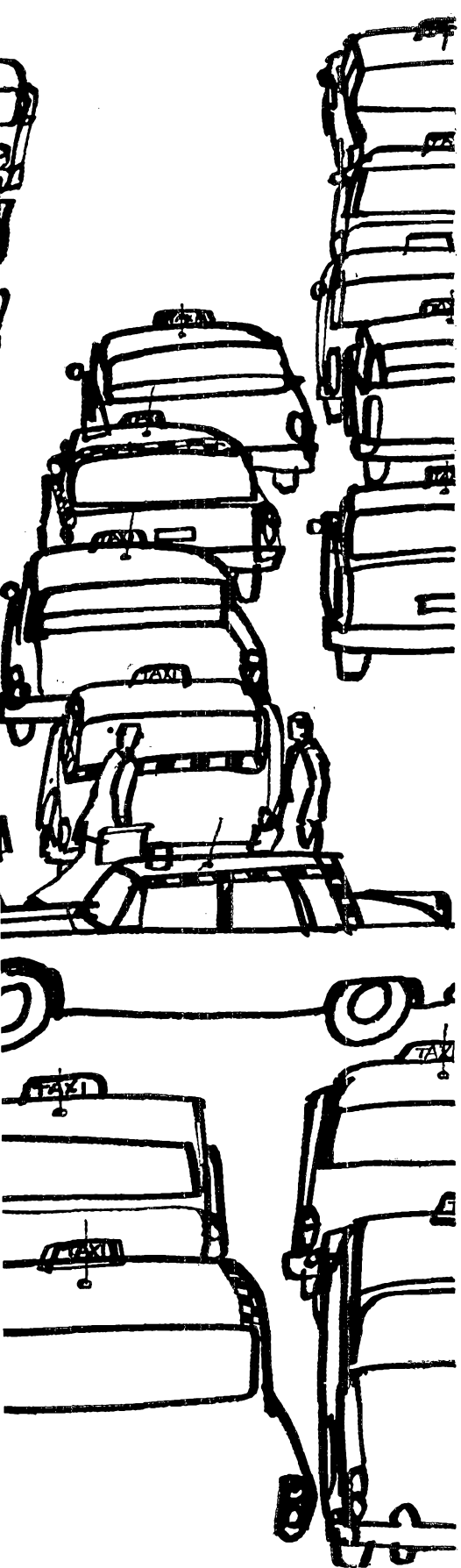
HEATH COMPANY, Dept. 9-3
Benton Harbor, Michigan 49022

☐ Enclosed is $_____, plus shipping.
Please send model (s)_____
☐ Please send FREE Heathkit Catalog.

Name_____
(Please Print)
Address_____
City_____ State_____ Zip_____

Prices & specifications subject to change without notice. AM-178


TAXI



153,472 radio-dispatched taxicabs and only one tetrode rated for PTTS*

The cab driver is rarely on the air with his dispatcher for as long as 60 seconds and he drives at least 5 minutes between calls. The same goes for most radio-dispatched vehicles.

PTTS* (Push-To-Talk-Service), with its duty cycle of ONE MINUTE ON and FOUR MINUTES OFF has been shown to be the most realistic, economical and practical rating system for vehicular communications systems.

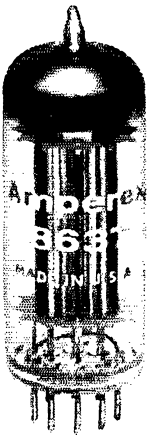
For this reason, Amperex developed the 8637, the only twin tetrode ever designed and rated for PTTS. Featuring high thermal inertia anodes and incorporating a wealth of twin-tetrode manufacturing experience, the 8637 offers the designer a new approach in creating a better vehicular radio. Fewer, and less costly components may be used. Some typical operating conditions which bear this out are shown on the chart at right . . . lower plate voltage, lower drive and higher efficiency at the VHF frequencies.

The 8637 is a 'small tube', (only 3⅛" seated height), perfectly suited for today's low-profile designs. Its cost is lower than ICAS and CCS rated tube types of the same power.

For data, applications reports and engineering assistance, write: Amperex Electronic Corporation, Tube Division, Hicksville, L. I., N. Y. 11802.

ALL THIS—and AMPEREX QUALITY, TOO!
ONE 8637—PUSH-PULL
Internally Neutralized Throughout Entire Freq. Range

50 MHz	PLATE	OUTPUT	DRIVE
CCS	375v.	25w.	0.67w.
ICAS	450v.	34w.	0.82w.
PTTS	**600v.**	**84w.**	**0.86w.**
175 MHz			
CCS	300v.	18w.	1.4w.
ICAS	350v.	26w.	1.6w.
PTTS	**560v.**	**63w.**	**2.2w.**



Amperex®

TOMORROW'S THINKING IN TODAY'S PRODUCTS

(*Continued from page 112*)

WA8NTA 226, WA8OCG 223, W8BZX 218, W8TV 174, W8QZK 170, W8QCU 154, WA8KUW 137, K8LGA 120, WA8SED 114, WA8PQL 111, W8PMJ 99, K8EZJ 87, W8GOE 83, W8CXM 76, W8WEM 72, W8FGD 68, WA8MHO 64, K8VMI 61, K8LGB 47, W8OUU 46, WA8CPT 42, W8DQD 41, W8ERD 41, W8OE 40, WA8FKD 37, WA8JXM 35, K8BNL 34, K8BYR 33, WA8LOW 30, WA8RWK 30, W8LAG 27, K8YDR 26, W8LT 18, K8TVX 17, K8DDG 16, K8LFI 16, WA8BXN 15, WA8OVC 14, WA8AJZ 13, W8DVM 10, W8DJD 8, W8WEG 8, WA8KPN 7, W8LZE 6, W8AQ 4, WA8TYF 4, K8RXD 3. W8EFW 2, K8BXT 1. (Nov.) WA8BXN 43, WA8SED 14, W8ERD 11, WA8TYF 5.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: 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. Appointment: K2ZEL as OVS. Congrats to our two BPL winners for Dec. traffic: WB2HZY and W2URP. W2CIW/K1QIM has retired from the Navy and settled in Schenectady. Co-chairman for the Mid-Season Dinner Party of the Albany Club were WA2DTF and WA2DTE. The speaker at the family-nite of the Schenectady Club was WA2SFP, who described his European trip and personal ham contacts. The RPI Club reported a shortage of c.w. operators during the SS: a familiar problem to most groups. In White Plains, the Westchester Club's Christmas Banquet featured W2TUK and W2SKE as speakers. WB2SHU has a new Swan 350 and 6-meter converter. The Yonkers H.S. Club reports a new DX-40 and Valient I. WA2BAH/1 and XYL are the proud parents of a new YL harmonic. Aurora produced impressive DX among the v.h.f.ers during the V.H.F. Sweepstakes. WA2SFP picked up traffic from the U.S.S. *Repose* with wounded servicemen anchored off Viet Nam. Also congrats to WA2WGS who telephone relayed messages from the Chilean earthquake area. Two WBFM repeaters on 146.94 Mc. create quite a stir around the northern end of the section. More are using them every month for long-range QSOs. Traffic: WB2HZY 513, WB2UHZ 412, W2URP 183, K2SSX/2 135, WA2VYS 121, K2LKI 101, WB2UUD 79, WB2JYV 72, W2UC 61, K2SJN 59, W2EAF 55, WA2WGS 48, W2ANV 27, WA2HGB 23, W2ODC 18, WB2FOA 15, WA2ZPD 12, WB2SHU 8, WB2UEQ 7, K2HNW 6, K2AJA 2.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW. Section nets:

NLI	3630 kc.	1915 Nightly	K2DXV-RM
NLIVHF	145.8 Mc.	2000 TWTh	WB2RQF-PAM
NLIVHF	146.25 Mc.	1900 FSSnM	WB2RQF-PAM
NLIPN	3932 kc.	1600 Daily	WB2SLH-PAM
NLS (Slo)	3630 kc.	1900 Nightly	WB2UQP-RM

BPL certificates were awarded to WA2GPT, K2UBG and WB2RBA. Listen, our own W2OBU (ex-SCM, ex-Hudson Division Director) is now W4LEP down in the E. Fla. section. Look for him on 80 and 20. WA2FTS, who is teaching at Midwestern out Iowa way, was home for the holidays. K2UBG says the Christmas traffic wasn't what it used to be and he's still searching for the rest of it. WA2RUE, a Navy sailor home for the holidays, regaled the guys at WB2SLH's with sea stories. WB2RQF says W2EW has done such a fine job with the V.H.F. Net, and in general is so public-service-minded, he may very well adopt him! WB2UQP built an SB-401 in four days and behold—it worked! A five-element beam is ready to go with the Ameco 6-meter converter at W2GKZ. Have you guys picked up your Clamdigger certificate issued by the Mid-Island RC yet? WA2LJS reports the RTTY Net on 146.52 every Sun. morning at 1030 is looking for new members. The WB2SLH beam fell down and broke up a pretty good DX career. W2DBQ just got an L-4 linear so stand back! WB2JJW runs the Swan 350 into a Swantenna in the mobile and into a TA-33 Sr. back at the ranch. Hey look, WB4APN has a new Heath SB-630 console for his ham set! WB2EUH also was home for the holidays and is reputed to be back this way by Easter. WB2PFT is at ivy-type Yale and is checking into NLS with an apartment-type Joystick. W2PF was at the "Gold Coasters" Luncheon Club near Ft. Lauderdale last Dec. and met a whole flock of former W2s from the QCWA. WB2AWX was elected pres. of the student chapter of the IEEE of CCNY. Didn't tell ya WB2FDH is the Director of QRP I. did I? Santa Claus hit the Big Wheel over at WA2IPC's which fell on the twelve-element beam and both ended up in the back yard. New officers of the Crossband Communication Club are WB2QGF, pres.; WB2PZR, vice-pres.; WA2SFF, secy.; K2ZKE, treas. WA2THR reports WN2ZMD, WN2ZLM and WN2ZLN have received their Novice licenses. WA2KQZ is a member of the Kings County Band Scanners. W2BCB latched on to a Collins 32B. K2CYX worked a KH6 with his new quad. WN2VSF put up a new tower and beam. New Officers of the Suffolk RC are K2OHK, pres.; WB2AGI, vice-pres.; WA2VDA, corr. secy.; K2LOT, rec. secy.; W2DID and W2OKK, treas. The Massapequa Radio Club is brand-new. A passing storm snowed all over the WB2TCS beam and down she came. Talk about farms, W2SEU has an inverted "V" on 80, dipole on 40, 5 elements on 6, 22 elements on 2, 44 elements on 220 and he's looking for a spot to hang the 10-Mc. dish. WB2UIV is working in an off-Broadway theater. Listen, the V.H.F. Net badly needs stations to liaison with the h.f. nets. Lately, we've had to route traffic through other than section nets but if we had more liaisons we wouldn't have to do that. We've made this appeal before, but it's like W2EW says, "You can lead a horse to water, but if your golf ball falls into a hippopotamus footprint, you lose a stroke!" So, c'mon in. Traffic: WA2GPT 604, K2UBG 443, WB2RBA 211, W2EW 143, WB2RQF 121, WB2UQP 120, W2GKZ 94, WB2TZX 85, WB2NGZ 78, WA2LJS 74, WB2SLH 70, WB2SLI 70, WB2TCS 66, W2EC 46, WB2AEK 41, W2GP 28, WB2YUV 19, WB2NZH 15, W2DBQ 14, WB2JJW 14, K2IDB 12, WB4APN/2 9, WB2EUH 6, WB2MBU 6, W2SEU 6, WB2PFT 4, W2PF 3, WB2SIZ 3, WB2UIV 3, WA2QJU 2.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: K2ZFI. ARPSC Section Net Schedules:

NJN	3695 kc.	Daily	7:00 P.M.	WA2KIP-RM
NJ Phone	3900 kc.	Ex Sun.	6:00 P.M.	W2PEV-PAM
NJ Phone	3900 kc.	Sun.	9:00 A.M.	W2ZI-PAM
NJ 6	51,150 kc.	M W Sat.	11:00 P.M.	K2VNL-PAM
NJ 2	146,700 kc.	Tu Sat.	10:00 P.M.	K2PTZ-Mgr
NJ P.O. Net	3900 kc.	Sun.	6:00 P.M.	WA2TEK-Mgr

All times shown local. AREC Net skeds are available from SEC K2ZFI. New appointments: W2ANG as ORS, K2AFQ as OO, and WB2SKD as ORS. WB2WWH has a new keyer. WB2GFY has been accepted into the early sessions at Rutgers and expects to see more of NJN with this change. WB2UFV received WANJ No. 251 and also applied for WAC. W2CVW is having problems with vandals cutting the guy lines supporting his antenna system. Homework is keeping WB2SEZ QRL. WA2KZF is running 1200 p.e.p. on 50 Mc. The Landover ARC, W2FCL, operated portable from the Delaware Water Gap during December and expects to begin furnishing contacts from rare counties when the weather improves. WA2SRK was back in NJN during the holiday break. W2NVA installed a new rotator for his 2-meter beam. WB2LAM *is fully recovered from surgery and back on* the job. WB2QGB installed a Johnson directional coupler and indicator. WN2YON got an ARC-4 and is converting it for 2 meters. WB2KTC moved his NCX-3 to school in order to activate the radio club. WB2URD, WB2YBA, W2VMX, WB2YHG, WB2LYY and W2LQP appeared on the Channel 13 program "New Jersey Speaks on Amateur Radio." WN2YPQ is up to 22 states. WN2ZBI is interested in traffic-handling. K2AGJ is Asst. Net Control on a 14-Mc. s.s.b. net. W2JCI is homebrewing an s.s.b. exciter. K2IEF completed his HBR-13. WB2RJJ is getting FB results with his new quad. WB2SKD will be in a Baltimore school until June. WB2TAR with a dipole and 100 watts p.e.p. has no trouble working DX. WB2ICY acquired a TV camera. WN2YXV got a new bug. W2LQP visited ARRL Hq. and W2ZI, SNJ SCM, during his Christmas vacation. NJN, the state's c.w. net, lost a distinguished pioneer with the passing of W2RG on Jan. 6. Ed was one of the founders of our net and set a QNI record that will be hard to beat. He will be missed by his many friends. Traffic: (Dec.) WB2OHK 628, WA2TEK 216, WA2GQZ 193, WB2WWH 120, WB2GFY 107, W2QNL 103, WB2UFV 90, WB2RKK 87, WB2WNH 76, W2PEV 70, WB2JWB 65, W2LQP 63, WB2TKP 58, W2OVW 53, WB2SEZ 47, WA2TBS 46, WB2VUJ 40, WB2SSZ 34, WA2KZF 31, WB2IYO 30, K2SLG 27, W2IGL 23, WB2SJH 19, WA2TAF 19, WB2UIR 18, WA2VYN 18, WB2BCS 16, W2BVE 15, W2DRV 14, K2VNL 14, K2MFX 12, K2ZFI 11, WB2NZU 9, WA2SRK 8, WA2CCF 7, WB2UOQ 7, WB2SKD 6, WB2URD 4, WB2YJS 4, W2EWZ 2, WN2YPQ 1. (Nov.) K2VNL 11, WB2NZU 6. (Oct.) K2VNL 251.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. The Fairfield High School Amateur Radio Club elected KØFLY, pres.; KØBRE, vice-pres.; KØIQV, secy.-treas.; KØEAK, act. mgr.; KØMEP and KØUXW, assistants. WAØATA and WØPFP report some good openings on 50 Mc. WØJAQ transmits Bulletins on 3850 kc. Mon., Wed. and Fri. at 1800Z. WA9RCS/Ø is now operating at Grinnell College, handling traffic for the students. The TLCN (Tallcorn Net) meets on 3560 kc. at 6:30 P.M. CST Mon. through Fri. for those who are interested in a

EIMAC

3-400Z's used in prototype 6-meter linear amplifier for 2 kW PEP at 50 MHz

The prototype Swan linear amplifier shown here uses two EIMAC 3-400Z triodes in grounded grid circuitry to achieve two kilowatts PEP input at 50 MHz. Drive power is less than 100 watts PEP. The prototype amplifier features a tuned cathode circuit for low intermodulation distortion, and uses a pi-network plate tank circuit. The new linear may be driven with modern six-meter SSB transceivers, and offers real operational economy at 50 MHz.

Swan chose EIMAC 3-400Z's because these compact, high-mu power triodes are ideal for grounded grid operation. They can provide a power gain as high as 20 in a cathode-driven circuit.

For more information on EIMAC's line of power tubes for advanced transmitters, write Amateur Services Department, or contact your nearest EIMAC distributor.

3-400Z TYPICAL OPERATION
(Minimum IM Distortion Products at 1 kW PEP Input)

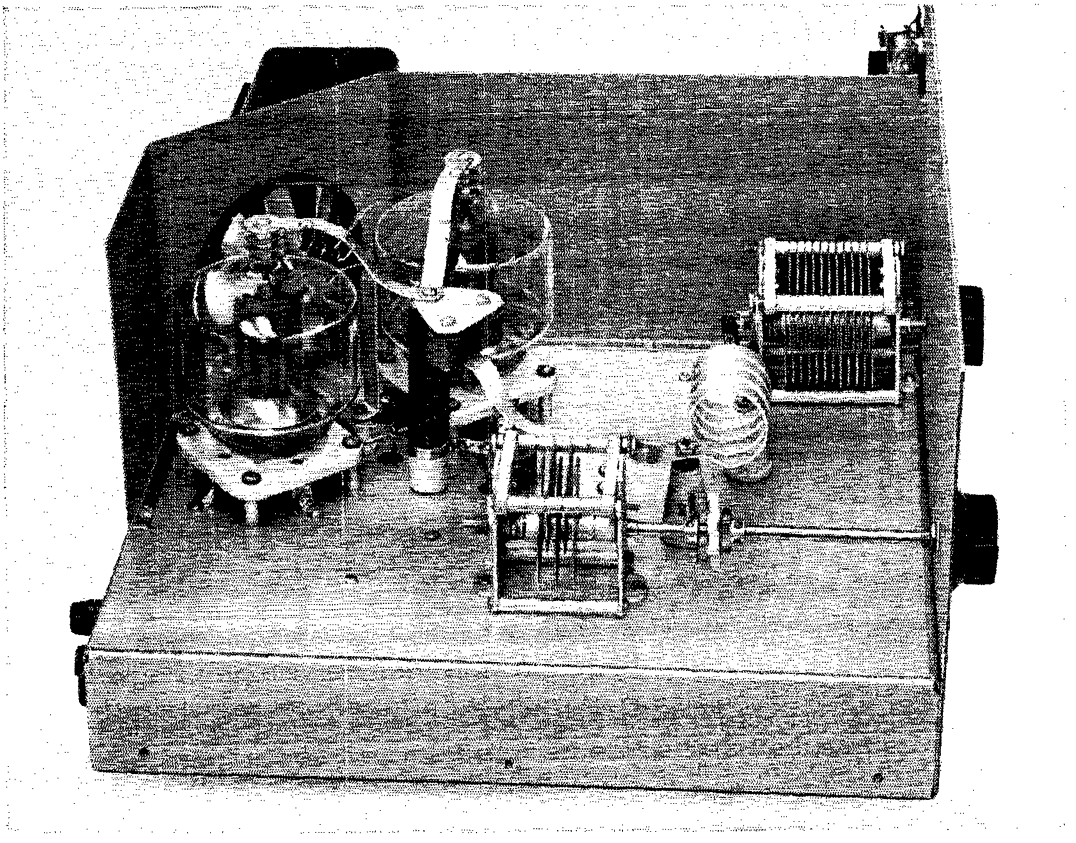
DC-DC Plate Voltage	2500 V
Zero-Sig DC Plate Current*	73 mA
Single Tone DC Plate Current	400 mA
Single Tone DC Grid Current	142 mA
Two Tone DC Plate Current	274 mA
Two Tone DC Grid Current	82 mA
Peak Envelope Useful Output Power	560 W
Resonant Load Impedance	3450 ohms
IM Distortion Products	−35 db**

* Approximate

** −35 db or more below one tone of a two tone test signal.

We have a new brochure entitled "Linear Amplifier and Single Sideband Service." Write for your copy.

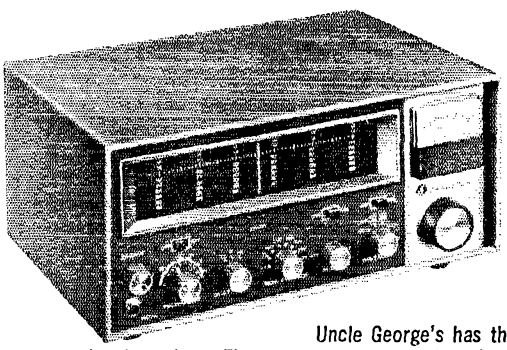
EIMAC
Division of Varian
San Carlos, California 94070

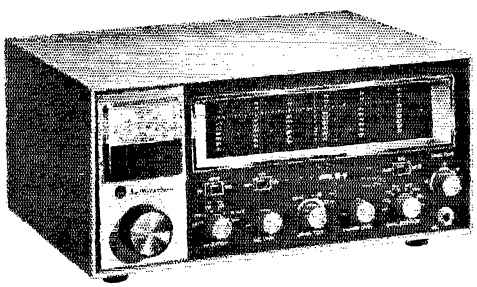


See the World of Varian at 1967 IEEE,
Booths 3F01-3F17 through 3F18

PUTS YOUR SIGNAL

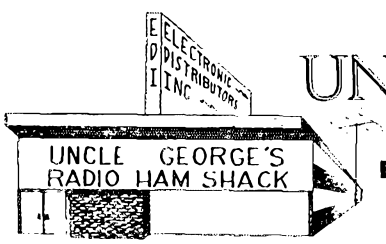
See it, hear it, operate it at Uncle George's! This high performance Hallicrafters Hurricane transceiver gives you the big signal and more. Receiver Offset Control (RIT) permits ± 2 Kc adjustment of receiver frequency, independent of transmitter, for round table, net or CW operation. Full coverage of 80, 40, 20, 15 and 10 meters. AND maximum legal power in a minimum of space—nearly 5 watts of power per square inch! SR-2000—**$995.00** P-2000 AC power supply/speaker with 115/230V AC inputs—**$395.00**





Uncle George's has the all new HT-46 transmitter and matching SX-146 amateur band receiver. These operate as separate units or function as a highly stable 5-band transceiver featuring 180 watts PEP on SSB; 150 watts on CW. The advanced design SX-146 receiver assures high order frequency stability and freedom from adjacent channel cross-modulation products. Come in and try it out! SX-146 Receiver, **$269.95**, HT-46 Transmitter—**$369.95.**

Our 12th year of service as Ham Headquarters for the Nation's Capital.



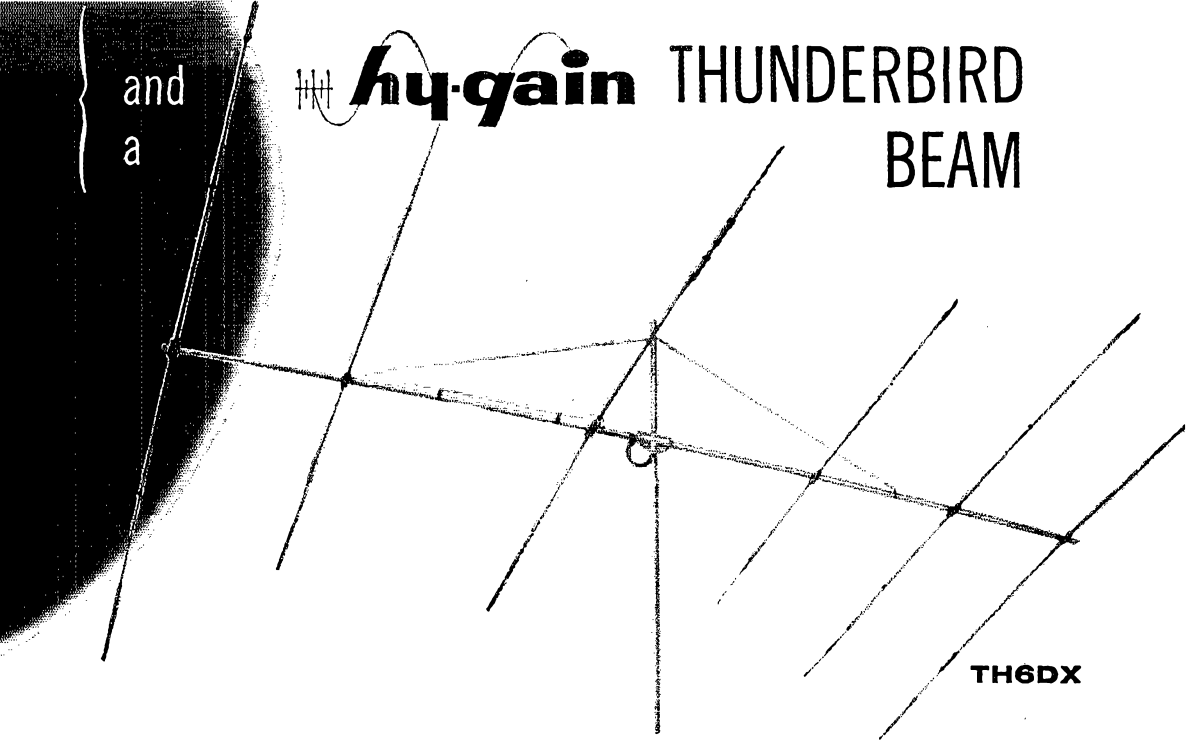
UNCLE GEORGE'S RADIO

a division of ELECTRONIC

Phone 949-2262 • 11324 FERN STREET.

and a

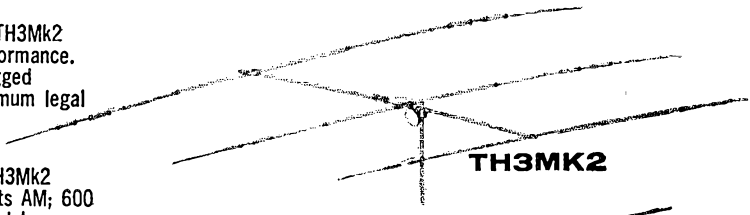
hy-gain THUNDERBIRD BEAM



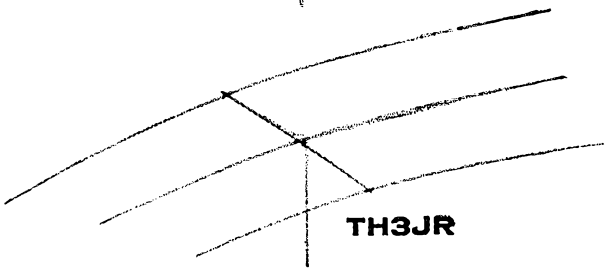
WHERE YOU WANT IT!

Hitch your Hurricane to a Hygain Thunderbird Tribander Beam . . . specifically, the ALL-NEW 6-element TH6DX for the ultimate in tribander performance and mechanical reliability on 10, 15 and 20 meters. Superb on DX and other long haul contacts. Separate Hy-Q traps, featuring large diameter coils developing exceptionally favorable L/C ratio and very high Q. Peak performance on each band—phone or CW. Takes maximum legal power. Model TH6DX, **$149.50**

The new, improved 3-element Model TH3Mk2 Thunderbird delivers outstanding performance. New "Hy-Q" traps for each band. Rugged construction throughout. Takes maximum legal power. **$114.95**



The fabulous Thunderbird Jr. Model TH3Mk2 3-element beam takes up to 300 watts AM; 600 watts PEP. For roof-top or light weight tower. Rotates with heavy duty TV rotator. Turning radius 14.3 ft. **$74.50**



The ruggedly constructed 2-element Thunderbird Model TH2Mk2 installs almost anywhere . . . delivers excellent performance. Features the new "Hy-Q" traps. Takes maximum legal power. **$74.50**

WE STOCK ALMOST EVERY ITEM IN THE HY-GAIN LINE — AVAILABLE FOR IMMEDIATE SHIPMENT

HAM SHACK
DISTRIBUTORS, INC.
WHEATON, MARYLAND, U.S.A.

c.w. net. The net could use a few more members, I am sure. TLCN reports (Nov.) QNI 86, QTC 6 in 24 sessions. Iowa 160-Meter Emergency Net reports QNI 860, QTC 11 in 31 sessions. The Iowa 75-Meter Phone Net reports QNI 1573, QTC 391 in 27 sessions. Traffic: (Dec.) WØLGG 1717, WØLCX 1324, WAØPNN 131, WØCZ 110, WØLJW 64, WAØDYV 49, WØYLS 43, WØDDW 31, KØEVC 30, KØTFT 30, WAØMIH 21, WAØAFY 20, WAØJUT 20, KØTDO 14, WAØOTE 13, WØJPJ 11, WAØDYG 9, WAØKWH 6, WAØMIT 6, WAØIYH 5, KØKAQ 5, WØKRU 4, WØBLH 3, WØNGS 3. (Nov.) WAØOTE 7.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RM: WAØMLE. V.H.F. PAMs: WAØCCW, WØHAJ, WAØKSK, WAØLSH. Wx Net Mgr.: WAØLLC. Our sympathy to WØVRZ, whose XYL passed away. Another Silent Key is WAØHGL. WØINH made the BPL on Dec. traffic. WAØMLE has been appointed RM. Club officers: Officers of the JARS are KØCZT pres.; WØWNX is vice-pres.; WAØHSK, secy.; WAØBJN, treas.; KØBXF, WØFEY, WAØEMQ and WAØHZS, directors. The CKARC's officers are WAØNTL, pres.; WAØIXY, vice-pres.; WAØJFC, secy.-treas.; WAØPSF, act.; KØAWR, hamfest chairman. The Wichita ARC elected KØAGW, pres.; WAØHUQ, vice-pres.; WAØOQC, secy.; KØSMV, treas.; WNØPQV, WAØMHV, KØAGM, WAØEFN, WAØMFO, directors. A new club has been organized in Salina, the Central Kansas Amateur Repeater Club, with KØMZZ, pres.; KØEQH, vice-pres.; WAØPSF, secy.-treas. This group was formed for the prime purpose of licensing the repeater station. WAØLSH reports quite a few openings on 6 meters. Donations for the Flower Fund, to be used for funerals of hams or their immediate families should be sent to Paul Graurer, WAØLLC, Box 199 Wilson, Kans. 67490. WØECD, editor, has announced *The Log*, bulletin of the Flint Hills Amateur Radio Club, is no more. The Flint Hills Amateur Radio Club elected WØLUI, pres.; WAØBXK, vice-pres.; WØMMR, secy.-treas.; WAØLTQ, act. mgr. The JARS in Kansas City, Kans., is planning a big hamfest in April. Salina has set June 7 as hamfest time. Zone 10 AREC, QNI 49, QTC 2, 3 sessions. Zone 11 AREC, QNI 88, 4 sessions. Zone 11 2 meters, QNI 61, 17 sessions. Zone 13, QNI 64, QTC 2, 4 sessions. Zone 15 AREC, QNI 44, QTC 8, 3 sessions; 6 meters, QNI 15, QTC 19, 3 sessions; c.w., QNI 6, QTC 0, discontinued as of Dec. 30.

	QNI	*QTC*	*Sess.*
Kansas EC Net	38	11	3
KWN	749	11	30
QKS	214	154	31
HBN	593	237	22
KPN	226	52	15
KSBN	621	174	24

Traffic: WØINH 774, WAØMLE 346, WAØLLC 166, KØMRI 154, KØJMF 142, WAØCCW 99, KØEMB 99, WØAVX 87, KØIFI 60, KØUVH 60, KØGZP 56, WAØJOG 37, KØLPE 36, KØGII 33, KØBXF 31, KØJDD 30, WØKSY 27, KØKED 11, WAØEMQ 10, WØFDJ 10, KØMZZ 10, WØFII 5, WAØLSH 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. Appointments renewed: WAØDGG as OPS, WAØEMS as OPS, KØFPC as OVS, WØOUD as ORS, WØRTO as EC/ORS/OPS and WØUCK as OPS. The 4th Annual Mo. QSO Party, sponsored by the NW St. Louis ARC (KØAXU) will be held the week end of Apr. 29. Two trophies for the top in-state and out-state scorers will be models of the 630-ft. Gateway Arch. KØLGZ is editor of the Mo. CHC #6 Newsletter. MON is temporarily moving to 3585 kc. to escape QRM from color-TV receiver sub-carrier generators on 3580 kc. WØOUD reports on the Mo. c.d. alert Nov. 30 and Dec. 1. The MOCD C.W. Net, with WØTGS as NCS, had 100% representation with WØAH, WØKY, WØOUD, KØVDT, WØBAZ, KØZAN and KØIOV operated by KØRPH. On 10 meters WØDE and WAØBZT were on in Joplin and WØADC and WØRBY in Carthage. A net certificate for MNN goes to WAØIHV. MOSSB Net certificates go to KØRPH, K7CBZ/Ø, W9GHW/Ø, WØAVX and KØRWG. MON certificates have been issued to WAØPYJ, WAØDKS and WAØJMV. WAØIQB worked 13 states in 1½ hours operating portable at Ellington during the Ø Dist. QSO Party. KØREV has a new kw. linear. KØGSV has finished assembling a new SB-200. Net reports:

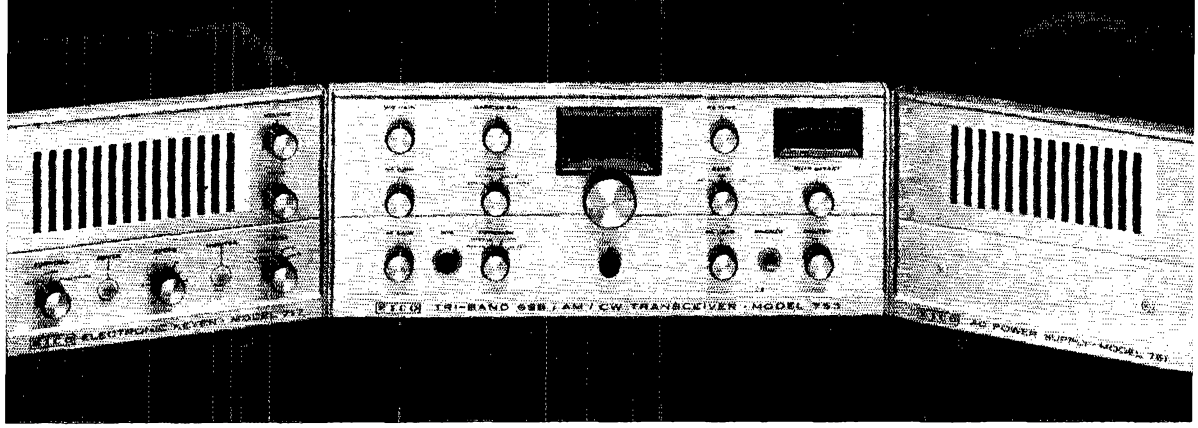
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2330Z	M-W-F	13	198	25	WØBUL
MON	3585	0100Z	Daily	31	243	312	WØTDR
MNN	7063	1900Z	M-Sat.	26	88	35	WØOUD
MOSSB	3963	2400Z	M-Sat.	27	606	204	KØTCB
MOPON	3810	2100Z	M-F	22	319	274	WØHVJ
MTTN	3940	2300Z	M-F	21	204	81	WAØELM
QMO	3580	2200Z	Sun.	4	11	—	WAØFKD

A 3-band SSB Transceiver Kit for $189.95

An Electronic Keyer Kit for $49.95

A Solid-State AC Power Supply Kit for $79.95

Who gives you ham gear so COMPLETE at prices so low?



Who else but EICO

***Pro* all the way, *from* concept to execution — that's what ham editors say about EICO. Critical customers agree, and like the low price, too. They've made the 753 kit, for example, the industry's hottest seller. And the new 717 Keyer seems headed for the same fate. Highlights of both give you some inkling why:**

The EICO 753 is a complete 3-band transceiver, offering SSB/AM/CW operation with conservatively rated 200 watts PEP on all modes (rated for maximum efficiency rather than maximum possible input power). A new Silicon Solid State VFO provides full coverage of the 80, 40, and 20 meter bands. Assembly is made faster and easier by VFO and IF circuit boards, plus pre-assembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The EICO 753 is at your dealer now, in kit form and factory-wired.

FEATURES: High level dynamic ALC prevents flat-topping even with extreme over-modulation. Automatic carrier level adjustment on CW & AM. Receiver offset tuning (10 kc bandspread) without altering transmit frequency. Front panel selected STANDBY, VOX, or P-T-T operation. Unique ball drive provides both 6:1 rapid band tuning and 30:1 vernier bandspread with single knob. The Model 753 is an outstanding value **factory wired at $299.95**

EICO Model 751 AC Supply/Speaker Console: Provides all necessary operating voltages for Model 753. Incorporates PM Speaker, conservatively rated components and silicon rectifiers for minimum heat and extended trouble-free life. Includes interconnecting plug-in cables. **Kit $79.95 Wired $109.95**

SPECIFICATIONS: Output Voltages: 750 volts DC at 300ma, 250 volts DC at 170ma — 100 volts DC at 5ma, 12.6 volts AC at 4 amps. INPUT VOLTAGE: 117VAC.

EICO Model 752 Solid State Mobile Power Supply: (Not Shown). For use with 12 volt positive or negative ground systems. Fully protected against polarity reversal or overload. Output voltages identical to Model 751. Input voltage 11-14 volts DC.

Kit $79.95 Wired $109.95

The ideal accessory for the CW ham—the **fully automatic 717 Electronic Keyer.** It provides self-completing clean-cut dots, dashes, and spaces accurately timed and proportioned from 3 to 65 WPM in four overlapping switch-selected ranges with vernier control of all speeds within each range. Matches EICO 753 in appearance to make it a perfect table-top companion unit.

FEATURES: Output Contacts — 25 volt-ampere dry-reed SPST relay. Built-in adjustable tone and volume oscillator with a 3 x 5 inch speaker for monitoring. Can be used as a code practice oscillator.

Kit $49.95 Wired $69.95

For FREE catalog and Amateur Radio brochure write to EICO 131-01 39th Ave., QST-3; Flushing, New York 11352 EICO

MSN	3715	0300Z	Daily	30	40	11	KØONK
PHD	50.4	0130	Tue.(GMT)	4	61	8	WAØFLL

Traffic: KØONK 11,391, WAØPYJ 597, WØTDR 534, KØAEM 435, WØEEE 407, KØRPH 185, WØHVJ 171, WØOUD 147, WØZLN 144, WAØFKD 142, KØVVH 116, KØJPS 92, WAØFMD 83, WAØJIH 79, KØENH 74, WØGQR 65, WAØKMJ 63, KØREV 48, KØYGR 36, KØTCB 34, WAØLYE 29, WAØDGT 24, KØORB 24, KØVXU 23, WØBAZ 22, WAØHQR 20, WAØPAN 19, WØRTO 16, WØBUL 15, WAØELM 10, KØDEQ 7, KØGOB/Ø 7, WAØITU 6, WAØIHV 4.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØOAL. Monthly net reports: Nebr. Morning Phone Net, WAØJUF, QNI 982, QTC 100. Nebr. AREC Phone Net, WØIRZ, QNI 153, QTC 6. Nebr. Storm Net, WAØKGD, 1st sessions QNI 1165, QTC 96; 2nd session, QNI 1282, QTC 77. West Nebr. Phone Net, WØNIK, QNI 638, QTC 88. Wx QTC 168. 160-Meter Wx Net, WAØCBJ, QNI 700, QTC 10. Dead End Net, WAØLLQ, QNI 485, QTC 212. Nebr. AREC C.W. Net, WAØEEI, QNI 12, QTC 7. Nebr. Emergency Phone Net, WAØGHZ, QNI 2046, QTC 131. Nebr. C.W. Net (NEB) WAØGHZ, 1st session QNI 63, QTC 146; 2nd sessions, QNI 71, KØODF was elected the Most Valuable Member of the Pine Ridge ARC. WAØGHZ was reelected net manager of the Noon Net. Arrangements are being made for a Nebraska Centennial amateur Radio Convention and Nationwide QSL Picnic and Barbeque to be held in North Platte June 24 and 25. Traffic: WAØGHZ 763, WAØNUK 168, WØNIK 159, KØUWK 159, WAØHWR 115, WAØLOY 91, WAØAES 81, WØLOD 81, WAØKGD 59, WØDDT 52, KØJFN 49, WAØIBL 47, KØRRL 43, WØGGP 42, WØBOK 40, WØVEA 39, KØPTK 29, KØOAL 26, WØHOP 23, WØBFV 22, KØFRU 21, KØIXY 21, WAØKHE 20, KØVTD 20, WØWKP 19, WØAGK 18, WAØKFP 18, KØQKW 17, WØGEQ 15, WØEWZ 14, WAØIBB 14, WAØCBJ 12, WAØDXY 12, WØFBY 12, WØYFR 12, WAØEEI 11, WØLJO 10, WAØGAT 9, WAØIXD 8, KØFJT 7, WAØLRQ 7, WAØLRQ 7, WAØIXF 6, WØLSI 6, KØHNT 5, KØODF 5, WØCXH 4, WAØGVJ 4, WAØOHO 4, WØPHA 4, WØVZJ 4, WAØDFS 3, WAØLRP 3, KØQVN 3, WØFHF 2, WAØIKG 2, WAØJUF 2, KØULQ 2, WØWZR 2, WØEGQ 1, WAØJES 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. Net reports for Dec.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	18:45	31	353	429
CPN	3880	M-S	18:00	30	449	190

High QNI: CN—W1KUO, WA1FNJ, W1CTI and W1RFJ, CPN—WA1EEJ 30, W1GVT 28, K1SRF 25, WA1GBA and W1YBH 22, WA1DEM and K1DGK 21, W1LUH 20, K1PPF 19, W1MPW 18, K1EIC and W1HBH 17, K1OQG 16. Ham-Quest 67 committees should have final reports ready now. Since this is helpful to all clubs you might consider a permanent Ham-Quest committee in your table of officers. The Conn. Council would consider an invitation from your club for its April meeting. Contact W1WHQ. The Tri-City ARA is promoting development of an Oscar station. All interested are invited to participate. Contact W1AIP for details. Southington ARC's new officers are W1GVZ, pres.; W1WHR, vice-pres.; W1IOB, treas.; W1EFW, secy.; K1EUW, exec. comm. Congratulations to W1EFW and K1RQO on making the BPL again and WN1GAQ on passing the General Class exam. W1BGD is leaving ARRL to return to college. W1BHV received the Michigan Wolverine Award. W1KAM is active with the Slo Speed Net on 3748 kc. at 2300Z. W1APA is DXing s.s.b. on 7.2 Mc. K1YON is active on 220 Mc. K1OOZ is planning a digital readout type frequency meter. K1SRF would appreciate contacts from all 10- and 2-meter mobile stations willing to assist in providing communications for a parade in Norwich on May 7. The new ARRL *Operating Manual* is a "must" for all amateurs. Order yours now! Our best wishes to W1BDI on his retirement from ARRL and our thanks for his many years of devoted service to amateur radio. We offer continued support to the new (and very well known) Communications Manager, W1NJM. Traffic: (Dec.) W1EFW 721, K1RQO 321, W1BGD 286, K1LMS 240, W1NJM 217, K1QPN 203, W1AW 176, K1SXF 170, WA1FNJ 145, WA1CYV 136, W1BDI 124, K1UDD 108, W1GVT 99, K1RWF 94, W1MPW 91, W1KUO 62, W1CTI 56, K1SRF 44, K1YBH 39, WA1ELA 36, W1KAM 28, WA1DEM 27, W1CUH 24, W1RFJ 23, W1YU 22, W1DUV 20, W1QV 18, W1FDO 15, WA1GBA 14, W1OBR 12, K1OQG 11, K1YON 10, W1APA 9, K1YGS 9, W1BNB 8, W1ZL 8, W1HAX 6, K1TKS 2, W1WHR 2. (Nov.) K1TKS 50, WA1DEM 12. (Oct.) WA1DEM 32.

1967 EDITION

The RADIO AMATEUR'S HANDBOOK

By A.R.R.L.

THE STANDARD reference work and text for everyone—hams, experimenters, students, engineers, lab men, technicians.

Distributors throughout the Nation have the 1967 Edition in stock. Better get your copy of this complete Handbook now. The demand is tremendous!

In the pages of this latest edition will be found, in addition to accumulated knowledge since the first Handbook was issued in 1926, up-to-date information invaluable to ham and engineer alike. Every field of ham radio is covered: transmitting, both c.w. and 'phone; single-sideband and a.m.; receiving; propagation; antennas; construction; theory; charts; diagrams; circuits; transistors; miscellaneous data; procedures; station operation, etc.

The 1967 Edition contains

- **Sections on Theory; Electrical Laws and Circuits, Vacuum Tube Principles, Semiconductor Devices, High Frequency Communication, Antennas, Transmission Lines, Modulation V.H.F. and U.H.F.**
- **Sections which include How-to-build-it articles dealing with Receivers, Transmitters, Power Supplies, Radiotelephony, V.H.F., U.H.F., Antennas, Mobile Equipment, radioteletype, transistorized equipment, etc.**
- **A separate section on test and measuring equipment**
- **Up to date information on vacuum tubes and semiconductor diodes, a great time-saver to both engineer and amateur. One of the most complete compilations of its kind available anywhere.**
- **Many valuable catalog pages listing manufacturers' and distributors' products and services . . . a useful supplement to the editorial section**
- **Plus thorough treatment of such subjects as assembling and operating a station, BCI and TVI, construction practices, etc. — *and fully indexed and completely illustrated throughout. You can locate in a jiffy what you want.***

$4.00 U.S.A. **$4.50** U.S. Possessions and Canada. Elsewhere, **$5.50.** Clothbound Edition, **$6.50** U.S.A., Possessions and Canada, **$7.00** Elsewhere. All prices postpaid.

The AMERICAN RADIO RELAY LEAGUE, INC.

Newington, Conn. 06111 • U.S.A.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from W1s YQF, LVK, K1s WVW, ERO, PNB, DZG. We need an EC for Concord. W1AOG wants an old Callbook, 1921 or 22. Anyone got one? W1ZLX took part in the Nov. FMT. W1HGJ is a Silent Key. Welcome to new YLs WA1s GCR, HDT, HDU. WA1EOT got an HD-10 keyer. K1LZV moved to a new QTH in Andover. WA1BFD worked VE2BUJ/SU in Egypt and received WAM No. 182. WA1GBT has 50 watts on 80. W1HIL worked ZC4JU on 10, his first one. W1AGA, on many bands, likes DX. EM2MN had 190 QNIs, 285 traffic, 26 sessions. W1AUQ, our busy OO, has sent out over 800 cards. W1AKN is active on c.w. and s.s.b. W1BGW is a member of the Morse Telegraph Club. WA1D1M got a new transmitter T-150 and a mike and will be on 10. The 6-Meter Crossband Net had 22 sessions, 291 QNIs, 61 traffic. The South Shore Club had a guest nite. W1MAR had two eye operations, so had fun with DX while at home. W1DVX has a daily sked with his father, W4KWO, in Ky. W1LMU is back on 6 and in with the Newton C.D. group, which is starting a transistor building program for 6. Our BPLers: W1PEX, W1DOM, K1ENS, K1ESG, K1PNB. EMNN had 57 QNIs, 53 traffic, 10 sessions. W1OJM is very active in net work. Santa brought K1WJD a v.t.v.m. WA1EUU is the new 1RN representative on EMN on Thurs. W1DAL has a homebrew electronic keyer. W1UIR, though retired still is working. WA1DPX has a Swan 250 and a Clegg 22er; also the call WA1HDQ for Vt. WA1EFN has a Swan 250. K1VOK and his XYL were both quite ill, but coming along now. W1ATX is on 160 phone and c.w. K1YUB had receiver trouble. K1CLM is feeling better. W1FJJ has a new two-element 7-Mc. beam, mobile with an SB-34. His mother has her General Class license, WA1FOJ, and is working 14-Mc. s.s.b. WA1DJC is visiting in Conn. Appointments endorsed: W1s HBB, PSG, BHD, SH, AR, MOJ, K1s QAM, WVW as ECs; W1s JYH, NJL, PEX, K1s ETT, ESG as ORSs; W1s JYH, NJL, K1CLM as OPSs; W1BHD as OVS and OBS. New appointments: WA1EYY as OPS; K1ZCU and WA1EJW as OVSs. WA1FOJ is now General and on 80. K1FWF has a 32-element beam for 2 and passed the General Class exam. K9AQP/1 has a 9-Mc. s.s.b. generator he built using transistors. K1FJM has a v.f.o. type rig on 6. K1OWM is working on a 420-Mc. transceiver along with W1s PYT, JBA and WNK. K1FFE lost his entire v.h.f. antenna array during a storm. K1ZCU is building a rig for 6. W9MIJ/1, in Brockton, is at MIT. WA1GUU is on 6. K1QAM is EC for Mansfield, Foxboro and Norton. Mr. Darlo Botha, communications engineer spoke at the Wellesley ARS meeting. WN1HEJ is the son of K1ZGH/W1DKD. The Middlesex ARC holds two meetings a month in the Waban Library. K1OGA is secy. Capeway Radio Club elected W1RGH, group mgr.; K1MAK, asst. mgr.; W1ZST, treas.; W1ZXG, rec. secy.; K1HGT, corr. secy. Meetings are held at K1LOE's. The Yankee Radio Club held its Annual Penny Auction. W1JOS now is retired from the B&MRR after 48 years. Quannapowitt RA holds regular meetings the 3rd Fri. of each month. W1BVP is operations officer on USCGC *Bibb*. W1MPT is in the hospital. W1AR had an operation. Traffic: (Dec.) W1PEX 2442, W1DOM 633, K1ESG 505, K1PNB 393, W1OJM 362, W1ZSS 243, K1ENS 166, WA1EYY 145, W1EMG 133, K1WJD 131, W1AOG 125, W1OFK 121, WA1EUU 102, W1DAL 93, W1UIR 90, WA1DPX 89, W1CTR 52, W1JDP 49, W1SIV 49, WA1EFN 45, WA1FSI 45, K1RCD 45, K1GKA 42, WA1EVY 36, K1ZGH 35, K1LCQ 24, WA1DEC 19, K1OKE 19, W1AEC 16, WA1DED 16, K1BGK 15, K1VOK 13, W1ATX 7, K1ETT 7, K1YUB 5, K1FJM 4, K1OWM 4, K1CLM 3, W1FJJ 2, WA1DJC 1. (Nov.) W1OJM 317, WA1EUU 47, K1WJD 15, K1LCQ 14, K1ETT 9, K1ZGH 8. (Oct.) K1WJD 25.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. PAMs: K1WQI, K1ZVN. RM: K1TZH. Traffic nets: Sea Gull Net at 1700 and 2000 on 3940 kcs. Mon. through Sat.; Pine Tree Net daily at 1900 on 3596-kc. c.w. The news from the great north country: K1CLF is teaching at Ricker College, also doing an FB job as Aroostock County C.D. & PS Radio Officer; W1GYJ is on RTTY and building a 500-watt amplifier in between flights; K1TCF has a Heath 420-watt s.s.b. rig; W1ACW has 700 watts on RTTY 20 and 80 meters, also is on 10-meter s.s.b. and waiting for his Navy MARS call. On v.h.f. there have been some nice openings. WN1FQW, of Millbridge, worked VE1AUC and VE1AUD in Nova Scotia. K1ZVN has been named to the A-1 Operators Club. The PAWA's new officers are K1VBG, pres.; K1RQE, vice-pres.; K1RSA, secy.; W1BTR, treas.; K1JKT, chief op.; K1TEV, asst. op. The club plans an open house with the works. W1JTT is on 2 meters from Limestone. There is a need of OPSs and ORSs to handle the traffic. Also needed are c.w. operators for the PTN. Traffic: K1TMK 168, W1NND 128, K1WQI 97, K1DYG 44.

DELUXE ADDITION TO THE SWAN LINE

5 BANDS—480 WATTS

HOME STATION—PORTABLE—MOBILE

It is with great pride that we announce the development and production of the newest addition to the Swan Line. The Swan 500 is a most fitting deluxe companion to the classic model 350. Improved circuit efficiency provides increased power ratings of 480 Watts P.E.P. on sideband; 360 Watts CW input and 125 Watts AM.

At the top of the Swan Line, the 500 offers many extra features: Selectable upper and lower sideband, 100 kc crystal calibrator, automatic noise limiter, provision for installation of an internal speaker (the best solution for the mobile installation), and a factory installed accessory socket for the addition of the model 410 external VFO.

As a receiver, the new 500 will satisfy the most critical operator. Sensitivity is better than .5 uv and the precision tuning mechanism is easily the smoothest you will find on any piece of amateur gear. Improved production techniques result in even better VFO stability. A new product detector circuit provides you with superior audio quality, and a new AGC system responds more smoothly to wide variations in signal strength.

The new 500 is equipped with the finest sideband filter used in any transceiver today. With a shape factor of 1.7, ultimate rejection better than 100 db, and a carefully selected bandwidth of 2.7 kc, this superior crystal filter combines good channel separation with the excellent audio quality for which Swan transceivers are so well known.

Frequency coverage of the five bands is complete: 3.5-4.0 mc, 7.0-7.5 mc, 13.85-14.35 mc, 21-21.5 mc, 28-29.7 mc. (In addition, the 500 covers Mars frequencies with the 405X accessory crystal oscillator.)

Along with higher power, improved styling and many deluxe features, the new 500 has the same high standards of performance, rugged reliability and craftsmanship that have become the trademark of the Swan Line. Backed up by a full year warranty and a service policy second to none, we feel that the Swan 500 will establish a new standard of value for the industry. Our new "Star" is now in production. **$495** amateur net.

ACCESSORIES:

MATCHING AC SUPPLY
With speaker and phone jack.
Model 117XC ..... **$ 95**

12 VOLT DC SUPPLY
For mobile or portable operation.
Model 14-117 ..... **$130**

MARS CRYSTAL OSCILLATOR
Five crystal-controlled channels with vernier freq. control.
Model 405X (less crystals) ..... **$ 45**

FULL COVERAGE EXTERNAL VFO
Model 410 ..... **$ 95**

DUAL VFO ADAPTOR
Provides for separate control of transmit and receive frequencies.
Model 22 ..... **$ 25**

PLUG-IN VOX UNIT Model VX-1 ..... **$ 35**

See your Swan dealer today.

Swan speaks your language.
Ask the ham who owns one.

SWAN
ELECTRONICS Oceanside California

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-SWX/K1DSA—SEC: K1YSD. PAM: K1APQ. RM: Open.

Net	*Freq.*	*Days*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
GSPN	3842	2300Z	M to F	26	806	158	K1APQ
GSPN	3842	1330Z	Sun.	—	—	—	K1APQ
VTNHN	3685	2230Z	M to F	22	82	48	K1UZG
NHPON	50.82	2400Z	M to F	22			K1BGI
MVAREC	50.82	0100Z	Mon.	4			K1DWK
NHEPN	3842	2230Z	Sat.	5	107	16	K1YSD

Endorsements: W1JB as OO and OPS. Appointments: W1NXP and K1SHC as ECs. New hams: WN1HCY Manchester, WA1HDJ Hudson, WN1HEA Dover, WA1-FHR Salem, WA1FUU Exeter and WA1GCU Gilford. WØDP operated near Hanover during the Thanksgiving Holidays. WA1DAO received his GSPN certificate. K1-APQ completed his 893rd consecutive GSPN Dec. 30 and is looking forward to 893 more. Not much news so no news is good news. Traffic: W1ALE 39, K1YSD 36, W1MHX 29, K1PQV 24, K1BGI 23, WA1DAO 19, K1-HFW 9, K1MKA 2.

RHODE ISLAND—SCM, John E. Johnson, K1AAV —SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. New appointments: K1ABR as OVS and WA1EEJ as OBS. The SEC would like to receive all certificates that need endorsement as soon as possible. The following officers were elected recently by the Newport County RC: WA1AUL, pres.; WA1BLC, vice-pres.; Norman Anderson, treas.; K1YQP, rec. secy.; WA1FFL, corr. secy. WN1HBG, of the club recently received his Novice ticket and is active on the 40-meter Novice band. The club plans to set up a rig to handle messages to servicemen in Viet Nam and other parts of the world. The Fidelity ARC, K1NQG, was active in the V.H.F. Sweepstakes and the Virginia QSO Party. WA1GGD, of the club, has received his General Class license. WA1EEJ was active in the New England QSO Party and now has a T-60 and a six-element 6-meter beam for 6-meter operation. There are several appointments open for qualified hams; simply drop the SCM a letter stating which appointment you desire. Traffic: W1TXL 566, W1YKQ 311, W1BTV 192, WA1EEJ 117, K1TPK 117, K1YEV 63, K1QZW 58, K1VYC 57, K1CPL 16.

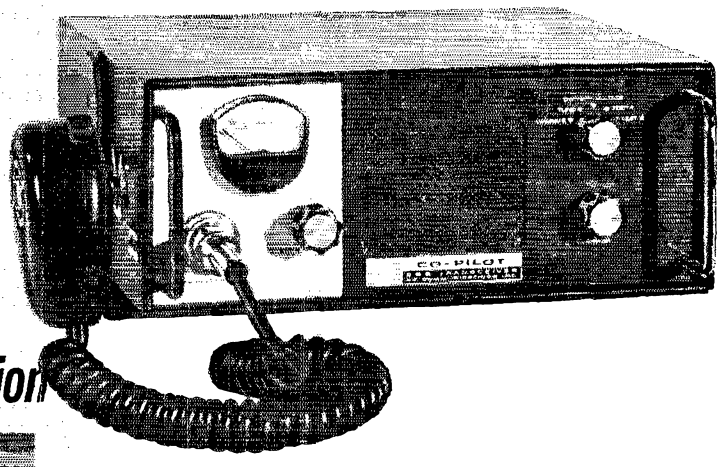
VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: K1UZG. Dec. net reports.

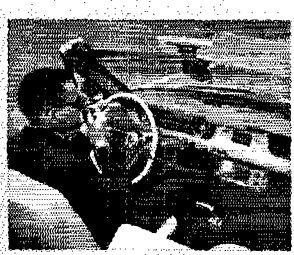
Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2230Z	D x S	581	45	W1VMC
Vt. Fone	3855	1400Z	Sun.	132	—	W1UCL
VTNH	3685	2330Z	M-F	82	48	K1UZG
VTCD	3990½	1500Z	Sun.	27	7	W1AD
VTSB	3909	2230Z	M-Sat.	742	50	W1CBW
		1330Z	Sun.			

Welcome to new amateurs WN1GOF (Bennington), WN1GKS (Rutland Ctr.), WA1GWR (Stowe), WA1GXA (Rochester), WA1GXI (Randolph Ctr.), WN1HCQ (St. Albans), WN1HCR (St. Albans), WN1HCS (St. Albans), WA1HDQ (Morrisville), WA1HDV (Winooski). We are sorry to report K1PQN and W1SEL as Silent Keys. W1CBW has a new tower and beam. The Vt. QSO Party will be held Feb. 25-26. Traffic: K1BQB 425, K1UZG 77, W1FRT 33, K1MPN 22, K1EQI 8, W1KJG 8, K1SLU 8.

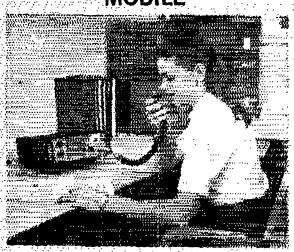
WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: K1IJU. C.W. RM: W1DWA. Ah, 'tis nice to know we have readers. Thanks to those of you who wrote. WMN report for Nov.: 72 messages handled by a total of 12 stations. WMN report for Dec., submitted by the new RM, W1DWA: 123 messages handled. Stations attending at least 10 sessions (in order of activity): W1DVW, K1IJV, W1DWA, WA1BXP, K1-PES, K1SSH and W1BVR. We need net activity in Worcester County. The RM will recommend net certificates and/or ORS certificates only after a minimum of 3 months activity on WMN (3560 kc. nightly at 7 P.M.). WN1HFY is a new Novice in Athol. W1GIV transmits taped code practice sessions on 10 meters each Mon. at 8:30 P.M. W1NY, W1JWV, W1TIX, W1GQP and W1IC are working some on 2. WN1GTH, of Williamstown, is working 15-meter DX. WB2SCD/1, at Westover, reports the activation of a 2-meter phone traffic and emergency net Mon. through Fri. on 145.8 Mc. at 2000. Check-ins from the Worcester and Greenfield areas are needed. Officers of the Cathedral High School Radio Club (Springfield) are K1ZOH, moderator; WA1GCC, pres.; ex-WN1DXT, vice-pres.; ex-WN1DXK, treas.; WA1-EDM, secy. WA1FVN, publicity; WA1BRU, exec. board member. New members of the VARC are K1KBQ and K1TKL. WA1CXD is a believer in homebrew gear and has a lot of it (all good, too). Traffic: (Dec.) W1DWA 254, K1SSH 70, W1BVR 60, W1DVW 28, W1MNG 9, K1WZY 7. (Nov.) K1IJV 79.

The Latest Advance in Long Range Radio Communication

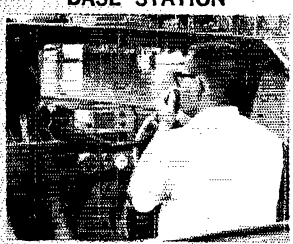




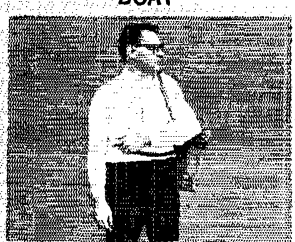
MOBILE



BASE STATION



BOAT



PORTABLE

LIST PRICE $385.00

THE NEW RF COMMUNICATIONS

Co-Pilot

Single Sideband Transceiver!

The RF Communications CO-PILOT SSB Transceiver was designed for long range communications in INDUSTRIAL, GOVERNMENT, POLICE, SEMI-MILITARY and PRIVATE applications.

HIGH PERFORMANCE—The Co-Pilot provides single channel operation. The channel can be specified anywhere between 2 to 12 Mc. Power output is 50 watts (can be reduced to 10 watts with rear panel switch for reduced battery consumption).

TRANSISTORIZED—All circuits except high power stages are transistorized. Instant heat tubes available for low battery consumption applications.

SIMPLE OPERATION—Only three front panel controls. An untrained operator can use the Co-Pilot with less than 5 minutes of instruction.

LOW POWER INPUT—The Co-Pilot operates from 12 volt D.C. power. Power consumption in receiver is about one watt (80 ma).

SMALL SIZE—The Co-Pilot measures 10x10x4 inches and weighs under 12 pounds.

QUALITY CONSTRUCTION—All materials and construction of highest commercial quality. Can be used in regions of high temperature and humidity, and under conditions of high shock and vibration.

FULL LINE OF ACCESSORIES—Including base station and mobile antennas, rechargable battery kit, transceiver carrying case, battery carrying case, direction finding antenna, and others.

High Performance Commercial Grade Communications. At a Reasonable Price!

Please write for details

R F COMMUNICATIONS, INC.
1680 UNIVERSITY AVENUE • ROCHESTER, NEW YORK 14610

NORTHWESTERN DIVISION

ALASKA—SCM, John P. Trent, KL7DG—The Northland Amateur Radio Club has petitioned FCC for use of KL7NR during the Alaska Centennial Year of 1967. WL7FNX made General, KL7FNX. KL7FDG expects to teach NARC's fifth amateur radio class Fri. nights starting Mar. 3. KL7FKO was home from Kotzebue for NARC's Christmas Dinner Jan. 7. KL7CUK is developing an idea for the Ham Centennial Jamboree in Alaska for 1967. The Anchorage Amateur Radio Club elected KL7EBK pres. KL7DG has run 279 miles of 1644 total mileage between Anchorage and Dawson Creek since Oct. 17. He has to finish the jaunt by the end of the Alaska Centennial Year. He runs 5 miles per day in the local area. His motto: "From the 49th at 49 (age of your SCM)." KL7CG wrote a fine *QST* article on Amateur Radio in Bush. Navy MARS started Alaska operation in early Feb. (6970 kc. and 148.410 mc.)

IDAHO—SCM, Donald A. Crisp, W7ZNN—The FARM Net convenes Mon. through Fri. on 3939 kc. at 0200 GMT. New officers of the Lewiston-Clarkston Club are WA7ETO, pres.; Bob Dickenson (waiting for license); W7AOO, W7VIO, W7VOU, W7HDT and W7UJA, directors. WA7CTS is a new ham in Orofino. K7CPC worked ZS2HI with a DX-60. K7THX is telephone relaying messages from Viet Nam on MARS frequency. W7ZNN has been appointed Assistant Director, replacing W7GMC, who is moving to Yakima. Justify your ham license by taking part in public service work through participation in traffic nets and through AREC and c.d. work. Please check in on the FARM Net whenever possible. Check-ins are needed from several Idaho cities. FARM Net report for Dec.: 20 sessions, 630 check-ins, 101 traffic handled. Traffic: W7GGV 28, K7OQZ 28, K7THX 12, WA7EWV 11, W7ZNN 6.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roylance, W7RZY. Nets active in Mont.:

Montana Traffic Net	3910 kc.	1800 MST	M-F
Montana PON	3885 kc.	0815 MST	Sun.
Montana RACES	3996.5 kc.	0900	1-3 Sun.
Great Falls AREC	3910 kc.	0930 MST	Sun.
Billings AREC	3895 kc.	0915 MST	Sun.
Missoula AREC	3890 kc.	0900 MST	Sun.

Endorsements: W7LBK as OO/ORS/EC. Appointments: W7VNE as Deer Lodge County EC, Montant PON reports 108 QNIs. The Yellowstone Amateur Radio Club has a code and theory class underway in Billings which meets in the Naval Marine Center. The 1967 officers of the Missoula Hellgate Radio Club are WA7AFQ, pres.; W7IBH, secy.-treas.; WA7AQZ, vice-pres. The Hellgate Radio Club's code and theory class is being held in the Central School. The Laurel Radio Club's new officers are W7IUN, pres.; W7AGJ, vice-pres.; W7LBK, secy.-treas.; K7FLW, act. mgr. K7MOW has a new transceiver. K7JAT has a new Swan 350. W7RZY and K7CHA are on from their new QTH in Harlowton. WA7AEW, K7SMT and K7OEK have new SB-100s. WA7BPY has a new Clegg 22er on 2 meters. WA7FCG has a new T-150. W7CRU has a new NCX-5. Your SCM has not been receiving reports from some of the appointees. If you hold an EC appointment send your report to W7RZY. The address for this year's sponsor of the Glacier-Waterton International Hamfest is P.O. Box 111, Columbia Falls, Mont. Traffic: K7PWY 76, K7EGJ 38, K7DCH 30, W7FL 20, W7WYG 16.

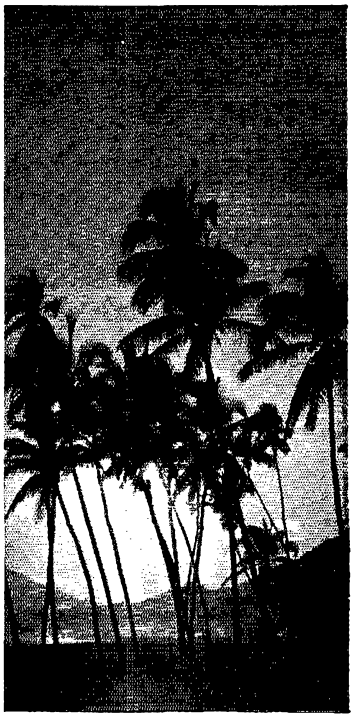
OREGON—SCM, Everett H. France, W7AJN—SEC: W7AJN. RM: W7ZFH. Section nets inviting your participation:

Net	*GMT*	*Freq.*	*Days*	*Mgr.*	
OSN	0200	3585	T-S	W7ZFH	NTS
BSN	2030-0130	3825	Daily	K7IFG	NTS
AREC	0300	3875	Daily	WA7AHW	NTS

W7ZFH reports for OSN, sessions 23, total attendance 130, traffic 112. K7IFG reports for BSN, sessions 61, total attendance 662, traffic 185, contacts 145. WA7AHW reports for AREC, sessions 31, maximum counties per session 14, attendance 345, traffic 1, QST 2, contacts 51. WA7BYP is active on OSN and RN7 and received an RN7 net certificate and OSN. WA7CPI reports the Radio Amateur Teenage Society (RATS) was created Dec. 25 on 3810 kc. Sun. at 2:30 P.M. K7WWR is participating in many QSO parties and contests. W7WHY is the new NCS for OSN and is also having a good time on two other nets. W7DEM reports for the Grants Pass area. K7YNO is on s.s.b. with a Swan 350. WA7FHX is on with a Heath SB-100. K7YEV is on 2 meters with a

CQ . . . CQ . . . CQ . . .

FIELD SERVICE ENGINEERS



The choice is yours at Raytheon

Choose your location from an extensive variety of solid growth assignments with one of America's foremost growing companies. Field engineers familiar with maintenance, installation, training, publication of handbooks and operating manuals, and engineering writing are needed in the following exciting fields:

- Sonar
- Communications
- Digital
- Heavy Ground Radar
- Microwave

Raytheon is a stable growing company whose broad-based operations provide unlimited opportunity. The Electronic Services Operation has immediate openings both in and out of the country on traveling or permanent assignments. Career positions exist at all levels of technical capability.

Raytheon's comprehensive benefits program includes hospitalization, surgical, major medical, life, disability, travel and accident insurances, company sponsored educational opportunities, and other allowances and benefits.

Total compensation includes attractive starting salaries, overseas and overtime bonus, and per diem as applicable.

This is your chance to become an important member of Raytheon's winning team. Write today to Daniel P. Mulkeen, Raytheon Company, Electronic Services Operation, Second Avenue, Burlington, Mass. 01804.

RAYTHEON

EXCELLENCE IN ELECTRONICS

An Equal Opportunity Employer M/F

home-brew 2E26. Traffic: (Dec.) W7ZB 300, K7IWD 224, W7WHY 128, WA7BYP 122, WA7CPI 119, W7ZFH 45, K7IFG 45, WA7EES 31, W7DEM 29, K7WWR 14. (Nov.) K7IWD 174, W7WHY 46.

WASHINGTON—SCM, Everett E. Young, W7HMQ—SEC: W7UWT. RM: W7OEB. PAM: W7LEC. Section nets NTS:

WSN	Daily	3535	0200Z	QNI	380	QTC 1049	Sess.31
WARTS	Ex.-Sun.	3970	0100Z	QNI	1284	QTC 279	Sess.27
NTN	Daily	3970	2130Z	QNI	1231	QTC 1052	Sess.31

The Northwest FAA Amateur Radio Club moved to Boeing Field FSS for its Jan. meeting and election of officers. The North Seattle ARC held its annual Banquet in Dec. with 41 attending. W7EVW has been hospitalized in Tacoma Gen. for some time. We all wish Art a speedy recovery. W7OEB reports a new member of WSN is W7UU with a sked to KL7-Land. Ev also thinks the 0200Z time will hold through the winter. W7HMA is the new assoc. mgr. of WSN and heads the traffic list, too. The Mt. Baker ARC auctioned off a complete radar station. New officers of the Radio Club of Tacoma, Inc., are W7AZI, pres.; W7BUN, vice-pres.; WA7AKW, treas.; WN7FUF, secy. K7CYZ reports 220 Mc. is looking better with more stations weekly. The Puget Sound Council of ARC is planning new and varied programs for the coming season. K7VVA and OM K7VUZ are back from Viet Nam and homing in ARAB country. W7ZIW, a new ORS received a new Mill for Christmas. WN7CJC is a new General in Bremerton. W7DZX again is active after visiting the hospital for a few weeks. K7SOM was home for a red carpet Richland welcome. New officers of the Richland ARC are K7VNV, pres.; W7OEB, vice-pres.; K7KSF, secy.; K7PVF, treas. K7-PWM joins the RCA in KL7-Land. WN7GCW is a new General. The eastern side of the section is showing a big jump in 2-meter activities. W7BTB is compiling data on boomless quads. Fifty persons enjoyed a Christmas dinner in ARABville, Chinese style. K7ZVA was appointed NCS WSN by AIB. This puts Bob in the 3-column figure. K7JHA reports new region certificates to RN7 members. It's that time, gang, are you missing a certificate? The Clallam County ARC enjoyed Christmas dinner with 40 attending. K7MGA had the gang stand by for a lost hunter, who was found OK. The VARC, Inc., of Puyallup is conducting its 17th annual code and theory classes in conjunction with the Adult Ed. program of the High School. Traffic: (Dec.) W7HMA 1975, W7BA 1926, K7TCY 1182, W7ZIW 1104, W7DZX 985, WA7DXI 964, W7JEY 622, W7OEB 566, W7PI 384, W7KZ 361, K7-CTP 328, W7BTB 251, W7YDZ 117, WA7CFN 111, W7-APS 86, W7MCW 79, K7ZVA 78, K7JHA 65, W7AIB 20, W7HMQ 19, W7AXT 4. (Nov.) W7DZX 542.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—W6-BYC is now KH6FKB and is aboard the *Ernest G. Small*. W6UB reports a busy month relaying traffic reports to the highway patrol. The Hayward Radio Club has K6SPP as pres.; WB6UXH, vice-pres.; WB6EUM, secy.; WB6HXD, treas.; WB6RUA, sgt. at arms. The HRC meets the 2nd and 4th Fri. of each month at the *Daily Transcript*, 116 W. Winton Ave., Hayward. W6-OJW got a 2&6-Meter v.f.o. from Santa. W6YKS has a new TTY machine. W6CBF reports hearing the signal from the new WWV and participated in the recent FMT. W6TYM is QRL with school but found time to help with the Chistmas rush on PAN and TCC. K6JZR says he is getting good results with the low horizontal antenna as suggested by W6UZX in the *NCN Bulletin*. WB6TTC and WB6RMX are new members of the HRC. WB6IBU continues his fine program on amateur radio on KPFA-F.M. Sat. at 1015 PST. Gene would appreciate any donations to help preserve some interviews he has on tape. The tapes belong to the station and they want to use them over again. The station operates on listener donations. Now that the *Operating Manual* is out and everyone has one, turn to the page on checking into a c.w. net, turn your receiver to 3635 kc. and have a go at it. Not many things are more interesting or fun than participating in a good c.w. net. NCN, Northern Calif. Net, meets on 0300Z on 3.635 every night. We could use more QNIs from all over; particularly Alameda and Solano Counties. If anyone should be interested in the post of SEC or any other appointments, drop me a line and I will give you the necessary information. WA6RRH reports plenty of 2-meter TTY action. Please send your Form 1s by the 3rd or 4th. Traffic: (Dec.) K6LRN 563, W6IPW 550, W6IDY 532, W6TYM 296, K6JZR 68, WA6-DOO 58. (Nov.) W6IDY 230, K6LRN 223, W6IPW 137, W6TYM 50, K6JZR 46, WA6DOO 2. (Oct.) WA6DOO 12.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SEC: KH6BZF. PAM: WØPAN/KH6. RM: Vacant. V.H.F. PAM: KH6EEM.

ANTENNA BREAKTHRU IN PERFORMANCE, VALUE, QUALITY, PRICE, AVAILABILITY

Answers to frequent questions on the 10-15-20 Cubical Quads: the shipping weight is 28 lbs; complete sets of wires are included (all Gotham antennas are complete); SWR is 1.1:1 or better at resonance; spreaders are high-strength aluminum alloy tubing—this is the strongest quad we have ever made; our 13 years plus in QST is your guarantee of integrity and value, so order with confidence.

ALL-BAND VERTICALS

QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION

Loading coil not required on 6, 10, 15 and 20 meters. For 40, 80, and 160 meters, loading coil taps are changed manually except if a wide-range pi-network output or an antenna tuner is used; in this case band changing can be done from the shack.

EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

"All band vertical?" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

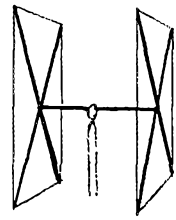
V40 vertical for 40, 20, 15, 10, 6 meters.....$14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters.....$16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters...$18.95

QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3AZR

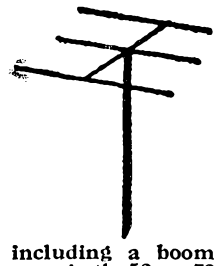


CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you! Now check these startling prices — note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD.....$35.00
10-15 CUBICAL QUAD..... 30.00
15-20 CUBICAL QUAD..... 32.00
TWENTY METER CUBICAL QUAD. 25.00
FIFTEEN METER CUBICAL QUAD. 24.00
TEN METER CUBICAL QUAD..... 23.00
(all use single coax feedline)

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS! WN4DYN



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new; full size (36′ of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20.....	$16	4 El 10.....	$18
3 El 20.....	22*	7 El 10.....	32*
4 El 20.....	32*	4 El 6.....	15
2 El 15.....	12	8 El 6.....	28*
3 El 15.....	16	12 El 2.....	25*
4 El 15.....	25*		
5 El 15.....	28*	*20′ boom	

HOW TO ORDER: SEND CHECK OR MONEY ORDER. WE SHIP IMMEDIATEY UPON RECEIPT OF ORDER BY RAILWAY EXPRESS, SHIPPING CHARGES COLLECT.

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

Net	*Freq. (Mc.)*	*Time (GMT)*	*Days*
League Appointees	7.290	0700Z	Wed.
Friendly Net	7.290	2030Z	M-F
No Ka Oi	7.290	2230Z	Sat.
50th State	3.895	0500Z	Tue.-Sat.

RACES Nets (40, 10, 6 and 2 meters). Coordinate with KH6GG. During a recent business trip throughout the Far East I had the pleasure of meeting several of my fellow amateurs. I left Honolulu Nov. 4th on PAA No. 819 for Tokyo and a fellow passenger was KH6BBD, now a staff engineer at TRW systems Redondo Beach, W6-Land. He and his XYL, KH6BIA, send their best wishes to all their Hawaii friends. Next, I called KA2-LL, news editor for *FEARLCM) News*, then JA1RJO, in Kawasaki City, Tokyo. Business at Fuchu Air Station put me in contact with KA2JG, ex-W9DXA, KA2PW; then with Mt. Sugiyama, ex-W6VT. While at Itazuke A.B., Japan, I met KA7AB, KA7RF and K4ZOU/KA7. In Kagoshima-Shi City I eavesdropped on JA6GBB while at the Shiroyama Kanko. Up in the Mt. Fuji/Hakone Troposcatter station I met W7OCI/KA2. In Toyomura Electronics store I met KA2RJ, ex-W9VCH, *FEARL's* v.h.f./technical coordinator W4DJY/KA2, JA1MKH and JA1WZB. While in Kawasaki City I was introduced to JA1BQR, ex-JA8AJ. On Taiwan I met with ex-W4RH/W5WH, now president of the Taiwan-American Radio Club. At one of my final stops in Taiwan I met W9LQY/BV1. On my last stop in Tokyo I stopped in at JARL Hq. During my return I met my old friend Tom Moore, ex-W9er, who was returning to Honolulu from a C-E survey in Bangkok. Traffic: (Dec.) WØPAN/KH6 14, KH6BZF 14. (Nov.) KG6AIG 121, WØPAN/KH6 1. (Oct.) KG6AIG 120.

HAWAII QSO PARTY

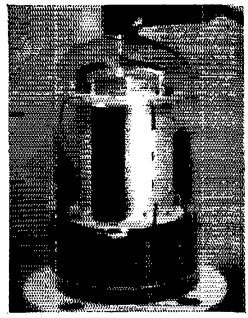
May 13-14, 1967

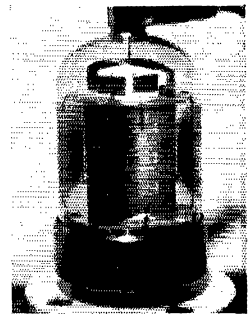
The contest will be held from 0000 GMT May 13 to 2400 GMT May 14, phone or c.w. The exchange will be just calls and signal reports. KH6 stations score one point per contact multiplied by the total countries worked multiplied by the number of bands utilized. All other stations count one point for each KH6 worked. The same KH6 may be worked once on each band. Multiply total points by the number of bands KH6 stations were contacted on for final score. Logs should include call, country, mode and bands; separate logs for each mode and show date/time of QSO, station contacted and reports exchanged. To be eligible for awards, logs must be received by the contest committee no later than Sept. 1, 1967 and sent to: Hawaii QSO Party, c/o the KH6 QSL Bureau, Box 101, Aiea, Hawaii 96701. Certificates will be awarded the top phone and c.w. in each W/VE call area and official ARRL country and to high scorers on each of the Hawaiian Islands. Second and third place certificates will also be awarded for Oahu contestants and a plaque to the top KH6.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. WA7BEU and WA7EPT have the Southern California Edisco Company section of Hoover Dam all shined and polished for the special SAROC tours which are conducted by them in connection with the SAROC convention, Hotal Sahara. W7PRM reports success on OVS projects. W7BIF has some new projects under cover. W7THH and the Reno gang are considering a ham convention in the Lake Tahoe area. WA7CFS has an FB net on 3852 kc. Mon. and Thurs. at 1900 PST but needs more representation from Nevada amateurs. W7YDX is active in Ely. K7LBQ received some very nice publicity for amateur radio in the Los Angeles *Herald Examiner*. K7RKH is commended for his outstanding work and activities in v.h.f. and u.h.f. homebrew projects. K7RBM was home for the holidays and did a lot of traffic-handling. W7KOI reports no activity from Elko. K7NYU, will be back on the air soon. Traffic: K7RBM 313, WA7-BEU 164, W7PBV 4.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6BWB. ECs: WB6MXD, K6RHW, W6SMU, WA6TQJ. RM: W6LNZ. ORSs: W6OFK, WB6-RSY, W6VUZ. OPSs: WB6EAG, K6IKV, WB6MAE, WA6TQJ, W6VUZ. OBSs: W6AF, W6NKR, WB6PHQ, WA6TQJ. OOs: W6GDO, WB6MPP, W6ZJW. OVSs: WA6CXB, WA6FWU, W6GDO. New appointees are W6-NKR, OBS Sacramento; WB6RSY, ORS Redding and W6VUZ OPS/ORS Orland. Those interested in becoming CD appointees, please apply to your SCM. W5ORH, Okla., and W9INW/5, Texas, are states 16 and 17 for W6GDO on 2 meters. WA6CXB has been spending more time repairing his station than operating. WA6FWU has

Unretouched photo of 6146B/8298A with conventional plate. Note pronounced hot spot.





Unretouched photo of Sylvania 6146B/8298A with Hi-Con plate. Note absence of any color.

The 6146B with a difference

Let's face it---it's an old amateur custom to push final amplifier tubes to the limits of their endurance.

As the originators of the popular 6146A, our reaction at Sylvania was to come up with a power amplifier tube that could be pushed beyond the limits of its predecessors. We did just that with our own version of the 6146B/8298A.

To begin with, the Sylvania 6146B has a dark-coated heater that just about eliminates failure due to wire embrittlement. Increased heat transfer at a lower operating temperature is effected by a dark-colored outer coating. These and other improvements aid in maintaining rated power output even at reduced heater voltage.

But the hot news is a cool-running plate. We call it the Hi-Con plate, and consider it a metallurgical breakthrough. Its construction provides far greater uniformity in heat conduction and greater efficiency in heat radiation. Naturally, this affords a higher dissipation safety factor.

How does it work out in practice? We loaded up the two tubes shown in the photos identically. You can easily see what happened. The one on the left, a 6146B with a conventional plate, got a beautiful hot spot. The one on the right, Sylvania's 6146B with Hi-Con plate, ran cool as a cucumber.

And Sylvania has rounded out a complete family with the popular 12 V and 24 V heater versions, the 6159A and 6883A respectively. These tubes offer the same advantageous design and construction features as the 6146B/8298A.

So there you have it. Whether you want to push your luck a bit or you're just interested in longer tube life with an improved safety factor, Sylvania 6146B's will keep you happy and out of trouble.

73,

The Gang at Sylvania

SYLVANIA

SUBSIDIARY OF
GENERAL TELEPHONE & ELECTRONICS GT&E

been working into Auburn on 6-meter i.m. via relay; Ed operates the ski lift at Soda Springs. W6ZJW was the only participant in the Nov. FMT with an average error of 6.2 parts per million. New officers of the Oroville ARS are WA6WRY, pres.; K6ZNL, vice-pres.; WB6FMI, treas.; W6BLW, secy. New officers of the McClellan ARS are K6EWE, pres.; WA6QVV, vice-pres.; WA6ECE, secy.; WA6YYS, treas. K6IKV is the new net mgr. for SCEN. W6NKR installed a drooping dipole for 3.5 Mc. which seems to work FB on 160 meters. The GEARS toured the Balloon Launching Site at Chico for its Dec. meeting. W6SMU gave a talk on oscillators to the NHRC in Dec. New officers of the RAMS are WA6IVI, pres.; WA6UNL, vice-pres.; WB6PHQ, secy.; WB6KZN, treas. Your SCM thanks the following clubs for being placed on the mailing list: GEARS., McClellan ARS, North Hills RC, RAMS and Sacramento ARC. Traffic: (Dec.) WB6EAG 124, WB6RSY 60, WA6JDT 27, WB6MAE 25, WB6QMT 20, WA6TQJ 8, W6NKR 3, K6IKV 2. (Nov.) WB6EAG 74, WB6QMT 14.

SAN FRANCISCO—SCM, High Cassidy, WA6AUD—Two BPL certificates were issued in Dec. with W6KVQ and W6JXK showing up with the plus-500 traffic totals. Traffic handled in this section was up over 100% in 1966 over 1965. W6GQA made all five FMTs in 1966 and continues to have the longest unbroken string of FMTs going in the ARRL. New officers of the Humboldt Radio Club are WB6DGJ, pres.; WA6JYB, vice-pres.; WB6FAJ, secy.-treas.; W6EAJ hopes to be back on the air after completing the building of a new b.c. station on the north coast. WB6JQP slipped out in mid-Dec. and the Northern California Net lost an outlet in Sonoma County. WB6TBC is a new Conditional in Eureka. W6PZE has a Swan 350 and is back active on the traffic nets. WN6TZY is a new AREC member in San Francisco. The San Francisco Section Net continues to meet Mon. and Fri. at 1830 on 3900 kc. The Northern California Net still needs more check-ins from Marin, Sonoma, Mendocino and Humboldt Counties on 3635 kc. at 0300Z and will be glad to hear you check in. The Marin County Red Cross installed a new SB-34 for emergency work WB6UJO was in the Caribbean during the winter months and operated from 6Y5-, VP2-, 9YR-, PZ1-Lands. Wes reported meeting many amateurs on his trips to these countries. W6IFO is back from portable operation in KH6-Land; he maintained schedules with the home base while there. W6JEU is away from AT&T's rhombic farm at Pt. Reyes and now operates from San Francisco. W6CYO broke down and bought a new supply of QSL cards. The last bunch lasted 17 years. K6TZN operates as net control on the Mission Trail Net. WB6PQE located a new meeting place for the Marin Radio Club. Traffic: (Dec.) W6JXK 879, W6KVQ 722, W6WLV 104, WB6JQP 54, W6BWV 29, WA6AUD 23, W6BIP 18, W6CYO 10, W6PZE 5, WB6FZH 2, WB6GVI 2, WB6JOX 2. (Nov.) W6JXK 408, WB6GVI 20.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—Congratulations to WB6PCQ on making the BPL for the third time. WB6HVA made BPL for the second time. WB6GIT is net control station for the Central California Single-Sideband Association. W6AAN is on 75 with a Galaxy. W6OHT has a Galaxy station using a vertical and is active on 75 and 20 s.s.b. W6JUK is on 75 s.s.b. with a KWM-2. W6TZN is active on 20 s.s.b. W6IGJ is on 20 s.s.b. W6PXP is heard on 40 handling traffic for overseas stations. W6TRP has a KWM-2 at his home station with a Swan 350 mobile. WB6ETQ is mobiling in Mexico with a KWM-2. W6UHN is on 75 s.s.b. WB6HIL is on 6 meters from Meadow Lakes. The new officers for the Delta Amateur Radio Club are W6COP, pres.; WA6AUF, vice-pres.; KS6FDZ/6, secy.; K6AXV, treas. K6BGK has an SB33. W6LOC is using a vertical antenna. W6HVW is building a kw. final. W6BUT is heard on 75 s.s.b. K6CPQ is working on a 6-meter kw. WA6ZLP lost his 2-meter antenna and tower. W6RUJ is on 75 phone a.m. K6QPE is back on the air with a complete Swan station. WA6ZBI is with the First Marine Air Wing and is active with the MARS station over there in DaNang. Traffic: (Dec.) WB6PCQ 812, WB6HVA 718, W6ADB 478, WA6SCE 7. (Nov.) WA6SCE 7.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: W6VZE. RM: W6QMO. Congratulations to W6RSY, K6DYX, W6EMS tnd W6YBV on making the BPL. W6EMS is a new ORS who lives in San Jose. Steve is active on the National Traffic System Nets. W6DEF reports that the new pres. of SCARS is K6IEE and the new pres. of PAARA is W6UOK. New pres. of the Santa Cruz Club is WB6MVK. The club enjoyed its Annual Dinner Meeting Dec. 2. W6OII is getting ready for the next few CD Parties which he enjoys. K6YKG is active regularly on NCN. W6AUC, OO, has been watching on the DX bands for stations working others on the "banned" list. W6SAW is very QRL with personal activities, but still finds time for most of his amateur operations. Herb now sports more power on v.h.f. so his RTTY sig is getting

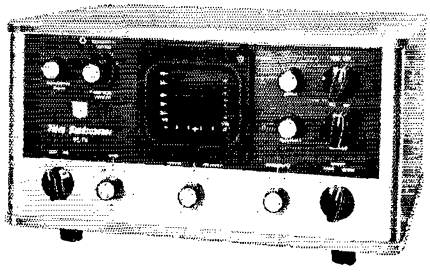
FOR EXCELLENCE IN SHORT WAVE RECEPTION

SS-IBS

High Performance Communications Receiver explicitly designed for operation on the International Broadcast Bands

The SS-IBS International Broadcast Receiver is a completely new high performance communications receiver explicitly designed for use on the high frequency broadcast bands between 3.5 and 26.1 megacycles. The SS-IBS receiver is *unique* in its ability to receive weak signals located only a few kilocycles away from powerful broadcasts. The SS-IBS features unusual simplicity of operation, allowing relatively unskilled individuals to achieve results of professional quality; yet it provides performance characteristics and operating controls which will improve reception at the hand of an experienced operator. SS-IBS may be used with accessory speaker or headphones for monitoring and has suitable output connection for recording, direct rebroadcast, and visual band monitoring with the SS-IV Video Bandscanner. The SS-IBS is designed for use with an optional noise silencer (SS-IS) of extreme effectiveness on impulse noise.

SPECIAL FEATURES: Extreme Freedom from Cross Modulation and Overload • Unusual Frequency Precision with Digital Readout in Kilocycles • Rapid and Exact Tuning Mechanism with Motor Drive for Fast Traverse • 8.0, 5.0 and 2.5 kc. Selectivity with Sharp Crystal Lattice Filter • Choice of AM, USB, LSB or CW Modes • Provision for Exalted Carrier Reception



SS-1V, Video Bandscanner. This unique oscilloscope display unit, when used with the SS-IBS, shows all signals in the band in use, or any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. 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. Provision is made for transmitter monitor or analysis.

PRICE: SS-IBS $1200, SS-1S $135, SS-1V $445

Squires-Sanders, Inc.

MARTINSVILLE ROAD / LIBERTY CORNER • MILLINGTON, N. J. 07946

out better. W6YBV is busy working on a T-5A/FRC. WA6CVU is active on PAN and RN6 as liaison and NCS. W6ZRJ took the last week of Dec. for vacation and visited NCN manager WB6HVA. The SCCARA enjoyed a fine Christmas Dinner with many of the old-timers present. Among the honored guests was Terry Hansen, ex-W6KG. Terry was first on the air in 1906. WB6NXK is busy with MARS but still finds time for NCN. Jim received 1st-place certificate for SCV for the QRP QSO Party. W6PLS again is active as EC for Half Moon Bay. Gene now sports all S/Line. K6GK is busy on NCN and PCN and does much volunteer work for the Red Cross. WB6IZF reports working WA7BJF in Mesa, Ariz. on 6 meters but not much activity on 2. Ed monitors 7225 in the daytime. WA6JSA now has a new RTTY demondulator installed. Frank made a visit to Dalla amateurs interested in Oscar. He is now working with the Santa Clara County Communications Dept. in charge of the electronics division. W6RSY also is handling much traffic on the MARS frequencies besides his regular amateur operations. K6DYX has been trying to set up traffic schedules between c.w. and RTTY, but is having some difficulty. WA6TZN, now in the Navy, was home on leave during Dec. and worked the nets as much as possible. W6ASH is busy as OO as well as working on EC problems. W6VZE is trying to organize regular EC meetings in the section. W6UMI is active as OO in the San Jose area, monitoring mostly on the ham bands. Traffic: (Dec.) W6RSY 1464, K6DYX 858, W6EMS 791, W6YBV 574, W6DEF 163, WA6CVU 126, W6ZRJ 90, W6PLS 63, WB6NXK 56, K6GK 50, W6OII 30, K6YKG 25, W6AUC 20, WB6IZF 8, W6SAW 8. (Nov.) WA6CVU 153, W6SAW 20, WA6JSA 3, WA6TZN 3.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—SEC: W4MFK. RMs: WA4ANH and K4CWZ. PAMs: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. WB4BGL, who was honored with the "Rookie of the Year" award last summer at the NCN Picnic for his traffic handling, has scored again. He received his A-1 Operator certificate and made BPL for the first time during December. W4NAP received a new SB-100, mike and all-band antenna as a Christmas present. W4VON, who is putting the finishing touches on his new homebrew receiver, *The HB-65*, as per the ARRL *Handbook*, has joined the Texas Gulf Sulphur Company in New Bern as senior chemist, and is commuting week ends to Durham until the family gets located in New Bern. WA4KWC has his antenna, which blew down, up again and is back on the air.

Net	*Time*	*Freq.*	*Days*	*QTC*	*Mgr.*
NCN(E):	2330Z	3573 kc.	Daily	205	K4CWZ
THEN	0030Z	3865 kc.	Daily	157	K4ODX
NCN(L)	0300Z	3573 kc.	Daily	96	WA4ANH
SSBN	0030Z	3938 kc.	Daily	60	WA4LWE

Traffic: (Dec.) WB4BGL 526, W4LWZ 432, W4HJS 373, W4EVN 276, W4IRE 154, W4OTE 122, K4CWZ 70, K4EOF 53, WA4UFQ 51, W4RWL 47, WA4VNV 41, WA4FJM 37, WA4VTV 34, W4BNU 30, WA4ZLK 30, K4EO 29, WA4NUO 22, K4TTN 21, WA4ANH 20, W4NAP 14, W4AJT 12, K4ZKQ 12, WA4ICU 9, W4VWS/4 4, W4ACY 3, K4CVJ 3, WA4KWC 3. (Nov.) WA4CFN 7, W4VWS/4 7.

SOUTH CAROLINA—SCM, Clark M. Hubbard, K4LNJ—SEC: WA4ECJ. Asst. SECs: W4WQM, WA4EFP. RM: K4LND. PAM: WA4RUB. SCN, 3795 kc. daily 0000Z/0300Z Dec. traffic 153. SCSSBN, 3915 kc. daily 0000Z Dec. traffic 233. LPV made the dean's list at Georgia Tech. Congratulations to WB4DXX on passing the General Class exam. He already is handling traffic on SCN. K4HDX has rebuilt his frequency meter to challenge W4NTO's accuracy of .1%. WA4APD is shooting for BPL and doing an outstanding ORS job. It's good to see s.s.b. stations WA4VZQ and W4VFO checking into the SCN. WA4LTS is back from school in N.Y. The Greenville V.H.F. Society's *Beam* is published by K4GWY. Interest in v.h.f. in Columbia is indicated on 2 and 6 meters. RM K4LND has the C.W. Net really moving again. NCSs now are W4s NTO, PED, JA, K4s LND, OCU, VVE, WA4s APO, OWY, HFA, AKN and WB4DXX. The SCM Emergency Net met 4 times in Dec. Traffic: WA4APD 323, K4LND 176, W4NTO 82, W4WQM 71, K4LNJ 57, W4JA 47, WB4BZA 41, K4OCU 29, WB4CUF 26, W4PED 21, WA4ICF 19, WB4DXX 17, WA4QKQ 15, WA4HFA 13.

VIRGINIA—SCM: H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: K4LJK and WA4EUL. PAM: W4OKN. A new club in the Richmond area is the Virginia Amateur Radio Association, with K4MLY, pres.; WA4WFQ, vice-pres.; K4MUW, secy.; and WN4DPU, treas. Any member interested in a career in amateur radio, contact W1-

The improved full coverage SIDEBAND TRANSCEIVER

DRAKE TR-4

TR-4 **$599.95** Amateur Net

All features of Drake TR-3 PLUS ...

★ **Solid State VFO** with linear permeability tuning for maximum stability

★ **Automatic Transmit/Receive Switching on CW** (semi break-in)

★ **CW Sidetone Oscillator** built-in

★ **VOX or PTT on AM**

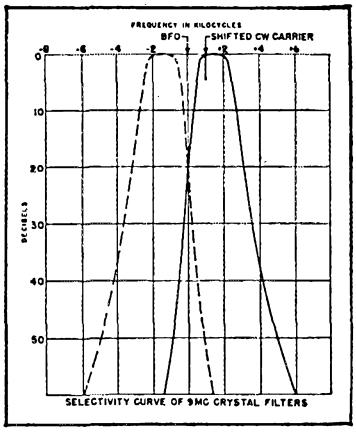
★ **Connections for External Receiver**

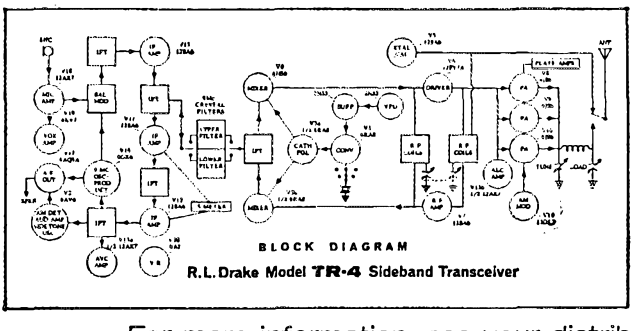
★ **Diode Detector on AM**

★ **Relative RF Output Indication**

Features of TR-4 and TR-3

- **Full Frequency Coverage** on all amateur bands 10 through 80 meters. No additional crystals required.
- **Upper and Lower Sideband** on all bands.
- **VOX or PTT** built-in.
- **Output Impedance Adjustable** with pi-network.
- **Separate Receiver S-Meter and Transmitter Plate Ammeter.**
- **300 Watts PEP input on SSB.**
- **Controlled-Carrier Screen Modulator** for AM built-in.
- **Shifted-Carrier CW** 260 watts input.
- **Two Special 9 Mc Crystal Filters** for sideband selection.
- **Separate RF and AF Gain Controls.**
- **1 Kc Dial Accuracy.**
- **100 Kc Crystal Calibrator** built-in.





BLOCK DIAGRAM

R.L. Drake Model **TR-4** Sideband Transceiver

ACCESSORIES

for either TR-4 or TR-3

REMOTE VFO
Model RV-3 . . . $79.95

MATCHING SPEAKER
Model MS-4 . . . $19.95

MOBILE MOUNTING KIT
Model MMK-3. . . $6.95

POWER SUPPLIES
AC Power Supply Model AC-3 $79.95
DC Power Supply Model DC-3 $129.95

For more information, see your distributor or write:

R. L. DRAKE COMPANY MIAMISBURG, OHIO, 45342

NJM at ARRL Headquarters. There were three positions available in January and you may still find one open. W4EXI and W4SHJ made a lightning trip mobiling through 10 rare counties during the Va. QSO Party and managed to average about 30 contacts per county on limited time. Activity in this year's party appears to have been tremendous with well over 100 Virginia stations active. Watch for published results direct from the sponsoring club. Apologies to the appointees and members who may not have received the usual prompt response when inquiring to the SCM office. The urgencies of business and other amateur organizational matters have backlogged the SCM office somewhat. We hope this situation will improve. Traffic: (Dec.) W4SZT 438, W4RHA 315, K4LJK 299, W4DVT 270, K4CG 255, W4ZM 208, WA4EUL 141, K4KNP 112, WA2UFI/4 93, WA4DAI 84, K4ITV 80, W4BWF 65, K4FSS 60, W4OKN 51, W4SQQ 47, W4SHJ 42, WB4DHT 41, W4IA 30, K4VCY 29, K4LMB 24, W5SQH/4 23, WA4PBG 22, W4MK 20, W4TE 19, WB4EAE 16, WA4UMX 16, W4KFC 12, WA4QIT 10, K4ASU 8, W4KX 6, WA4QOC 6, W4ZMT 5, WB4DQF 3, W4OP 3, W4PTR 2, W4YZC 2. (Nov.) WA2UFI/4 213, K4MLC 27, WA4QOC 6. (Oct.) W4OWE 199.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. PAMs: K8CHW, W8IYD. RMs: K8TPF, W8LMF. Phone Mgr.: WA8RQB. C.W. Net Mgr.: W8HZA. Kanawha Radio Club officers for '67 are WA8LAL, pres.; WA8HGA, vice-pres.; WA8QCO, secy.; WA8OUM, treas.; Harold Benton, act. mgr. My sympathies to the family and friends of W8TAP, who passed away in Dec. The West Va. Phone Net held 22 sessions with 585 stations and 163 messages. New Opequon Radio Society officers are K8UXP, pres.; WA3EFD, vice-pres.; WA3EDZ, secy.-treas.; WA8MMZ, act. mgr. K8WMX and WA8OKG are now residing in Charleston. Congratulations to K8MYU, c.w. winner of the West Va. QSO Party. W8HZA worked Montana on 160. The WVN C.W. Net handled 181 messages in 31 sessions. W8ESQ and WA8QND are pushing 29.6-Mc. f.m. in Elkins and Buckhannon. W8KWL again is active on 28-Mc. mobile. WA8BUM renewed as OPS. The West Va. State Radio Convention will be held at Jacksons Mill July 1 and 2. Traffic: K8TPF 428, WA8POS 170, W8HZA 112, WA8IMY 112, W8CKX 83, WA8QND 76, W8AY 70, WA8PXF 57, K8BIT 55, WA8RQB 42, W8SQQ 42, K8MQB 38, W8IMX 21, K8MYU 19, W8GUL 11, W8JM 10, K8MDI 10, WA8QZO 10, K8ELH 5, K8OQL 5, WA8RHT 5, WA8BUM 2, W8CZT 2, WA8VKN 2, WA8EN 1, WA8AYB 1, W8EEO 1, W8FCF 1, W8HZH 1, W8MIS 1, WA8NDY 1, WA8PWM 1, K8QYG 1, K8SOR 1.

ROCKY MOUNTAIN DIVISION

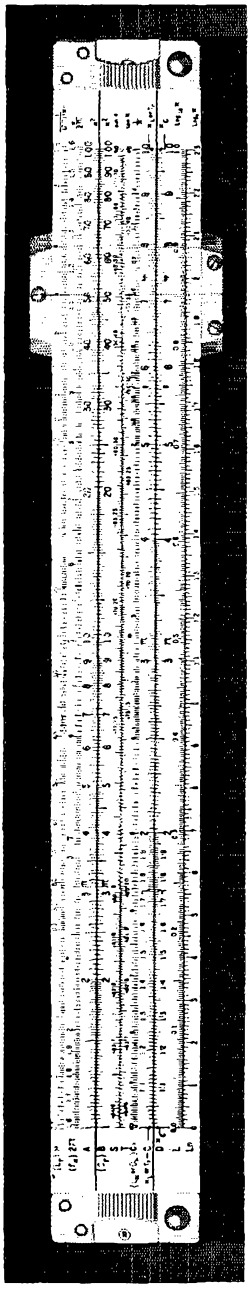
COLORADO—SCM, Richard Hoppe, KØFDH—Asst. SCM: A. E. Hankinson, WAØNQL. SEC: WØSIN. CCN RM: WAØLCM. Major traffic nets, times and frequencies follow:

High Noon Net 1200 3895 kc. Mon. through Sat.
Columbine Net 1900 MST 3989 kc. Mon. through Sat.
Colorado Emergency Phone Net 1500Z 3890 kc. Sun.
Colorado Code Net 0130Z 3780 kc. Daily

Please note that Colorado has a new SCM. The mail address is Lawson, Colo. WAØNQL has been reappointed Asst. SCM. WAØLCM, Trinidad, is RM for CCN. Columbine and High Noon Net members are requested to send traffic reports to WAØNQL. Columbine can send reports via WØHEP or KØCNV, High Noon through KØDCW and KØZSQ. CCN welcomes WAØMNL to the net. CCN members report through KØZIJ, KØFDH or WAØNQL. WØETT has returned from Peace Corps duty in South America and is active again in CCN, TWN and PAN. The Denver RC still sends code practice Mon., Wed. and Fri. on 28.7 Mc. and 3970 kc. All CD appointees should send KØFDH their certificates for endorsement. Stations wanting appointments can write KØFDH or WAØNQL. Traffic: KØFDH 430, KØZSQ 132, WØFPT 128, WAØJEV 107, WØETT 94, KØZIJ 58, WAØNQL 47, KØDCW 45, WAØGLP 39, WØSIN 39, WAØKFO 33, WAØHZB 28, KØCNV 20, KØIGA 18, KØSPR 15, WAØNBZ 8, WØLEK 5, KØTIV 3.

NEW MEXICO—SCM, Bill Farley, WA5FLG—K5HTT, in Los Alamos, received an SWL report from Misawa AFB, Japan, of his signal at 4 hy 6 on 3.838 Mc. How's that for a long-haul report? The time was around 6:30 MST. WA5FFL is working the bands with use of only one hand these days. Seems he broke one of his arms. K5ONE has changed his call to W5PTQ. This came about when he passed the General Class test. Wayne also has added something new to the big city of Weed (population 8). He and Janie finally tied the knot. W5ALL entertained the hams from Texas up there in the snow of Cloudcroft over the Christmas holidays. WA5MCX and WA5FLG visited for a little while but the cold was too much for them. WA5FJK collects old call books. Send him any you might have. W5HDR reports a

Now, for men in electronics —"a whole new era of quick calculations"



thanks to this specially designed electronics slide rule

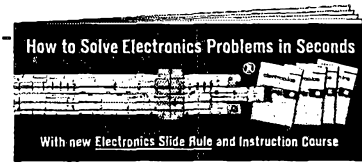
"THERE MUST BE THOUSANDS OF PEOPLE in electronics who have never had the marvelous adventure of calculating problems with a single slide rule; other thousands have had to content themselves with a slide rule not specifically designed for electronics. For both groups, the new slide rule designed and marketed by Cleveland Institute of Electronics and built for them by Pickett will open a whole new era of quick calculations.

"Even if you have never had a slide rule in your hands before, the four-lesson instruction course that is included takes you by the hand and leads you from simple calculations right through resonance and reactance problems with hardly a hitch. If you already use a slide rule, you'll find the lessons a first-rate refresher course. And it explains in detail the shortcuts built into this new rule."

From an article in Radio Electronics Magazine

Want complete details about this time-saving new Electronics Slide Rule? Just mail coupon below... or write Cleveland Institute of Electronics, Dept. QT-115, 1776 East 17th St., Cleveland, Ohio 44114.

Mail this coupon for **FREE BOOKLET**



CIE **Cleveland Institute of Electronics**
1776 E. 17th St., Cleveland, Ohio 44114

Please send me without charge or obligation your booklet describing the CIE Electronics Slide Rule and Instruction Course. Also FREE if I act at once: a handy pocket-size Electronics Data Guide.

Name_____
(please print)

Address_____

City_____ State_____ Zip_____

Accredited Member National Home Study Council
A Leader in Electronics Training... Since 1934

QT-115

very interesting mobile expedition using 2 meters. He was rather vague about the circumstances but it seems that the other cars never really found him, or was it that he never really found them? Traffic: W8BZY/5 88, WA5RBU 71, W5PTQ 70, WA5FJK 47, W5PNY 43, K5VXJ 31, W5WZK 20, WA5LFX 18, W5DMG 11, WA5JNC 7, K5HTS 6, WA5MCX 2.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF. RM: W7OCX. Section nets: BUN, daily, 7272 kc., 1930Z. UARN, Sat.-Sun., 3987.5 kc., 1500Z. The Utah ARC had a fine turnout at its Annual Banquet in Dec. New officers of the Ogden ARC are W7WQC, pres.; K7MPP, vice-pres.; K7HEN, secy.-treas.; W7LKM and W7NPU, directors. County hunters take note, WA7ADK has announced plans to operate portable in rare Summit County early in 1967; KØIDJ/7 and K4FST/7 will help. W7OCX reports heavy seasonal traffic for another BPL. The Ogden ARC handled holiday traffic for the Clearfield Job Corps Center during Dec. The Utah c.d. communications bus at the Clearfield Center was used on the 17th and 18th. Appointments still are opened for OBS, OVS, OO, ORS, OPS and EC. For details, contact your SCM. Traffic: W7OCX 270, WA7BME 105, K7AHD 13, WA7ADK 11, W7VSS 8, KØIDJ/7 2.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: WA7CLF. PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM, K7ZHT. Nets: Pony Express, Sun. at 0830 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 3920. WA7DNZ has a new transceiver on the air and, since he has fully recovered from his accident, is doing a nice job of breaking it in. The Cheyenne group is getting some very nice publicity for hams—a nice job of public relations by POX. K7TWK has moved to Evanston. The Wyoming Hamfest is to be held this spring. No date has been set as yet but start making plans to attend. I appreciate your reports and would like more information on activities for the column. Traffic: WA7CLF 155, W7DXV 60, W7TZK 47, K7SLM 42, K7QJW 39, K7ITH 28, W7GSQ 16, W7HLA 15, WA7DNZ 11, W7NKR 9, W7BHH 8, WA7BPO 8, WA7EWC 8, K7POX 7, W7CQP 5, K7VWA 5, W7YWW 2, WA7GCG 1.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—Asst. SCM/PAM: Sybil Holley, WA4EEC. SEC: W4FPI. RM: WA4EXA. V.H.F. PAM: WA4EEE. Dec. net report (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Ave. QNI*
AENB	3575	0100 0400	Daily	50	4.2	4
AEND	3725	2400	Daily	23	2.56	5.3
AENH	50.7	0200	Sun./Tue.	8	4.5	17.
AENM-SSB	3965	0030	Daily	31	9.29	50.4
AENO	50.55	0115	T/T/Sat.	13	.23	14.
AENR	50.52	0115	Wed./Fri.	8	.125	13.6
AENT	3970	22.30	Daily	36	4.1	9.7

W4FVY has all new tower and antennas on top of a mountain at a new QTH. WA4WLD made the BPL. K4EAO, WA4WZF and WA5MYA/4 have new 6-meter s.s.b. rigs. W4CTG lost all antennas in a freak storm and is rebuilding for moon bounce skeds. Traffic: K4BSK 200, W4FVY 187, WA4UXC 154, WA4GGD 135, WB4ACJ 120, WB4DIN 119, WA4WLD 110, WA4EXA 107, K4HJX 98, W4USM 83, K4AOZ 76, WA4MTG 68, WA4PIZ 64, K4WHW 64, K4NUW 58, WB4DCR 56, K4WOP 55, K4KJD 47, WA4EEC 44, WB4EKK 39, WB4BLX 37, K4HJM 26, W4YPC 24, WA4QNI 19, WA4VUG 17, VA4FYO 11, WA4GNG 11, WA4VEK 9, WA4DBQ 8, W4DGH 8, WA4OCL 8, WA4ROP 6, K4DJJ 5, WA4GNK 5, K4UUC 5, W4NML 3, W4HON/5 2.

CANAL ZONE—SCM, Mrs. Lillian C. Smith, KZ5TT—Asst. SCM: Russell Oberholtzer, KZ5OB. SEC: KZ5MV. New club officers for 1967: CZARA—KZ5AG, pres. (2nd term); KZ5JC, vice-pres.; KZ5WI, treas. (3rd term); KZ5EW, secy.; KZ5MR, act. mgr. USAFSO MARS Club—KZ5RJ, pres.; KZ5BI, vice-pres.; KZ5JF, secy. New KZ5s: Generals—KZ5CG, KZ5DB, KZ5GM, KZ5TB. Novices—KZ5AJN and KZ5GUN. KZ5DR has left for Fort Gordon, Ga., where he will be operating as K4PSW. 2-meter activity continues to increase, with a total of ten stations now active. KZ5SS and KZ5SN are moving to the Pacific-side and have transferred from the Crossroads Club to the CZARA. KZ5AG reports 2 DX contacts for KW6EM. The C.Z. Net is struggling to survive with only 2 regulars and 2 part-time check-ins. Traffic: KZ5AG 192, KZ5RJ 126, KZ5FX 48, KZ5JF 26.

NEW

Poly Quad

ANOTHER GLASDRAMATICS EPOXY-FIBERGLASS PRODUCT

STRONGER...MORE EFFICIENT... MORE ECONOMICAL!

2 el . . . tri-band (20-15-10)

POLY tri QUAD KIT

$59.95

F.O.B. Walkerton or include $3.50

- 8 Zip-Glas Spreaders (13')
- 2 Universal Starmounts
- 1 Boom-to-Mast Adapter
- 1 Instruction Manual

...this great new kit offers you power gain comparable to a 3 el beam, yet so lightweight you can rotate it with a TV rotor...all the superior efficiency of the quad . . . lower angle of radiation...greater capture area...reduced QRN and QSB . . . plus rugged Poly Quad quality construction . . . and all at an amazingly low price . . .

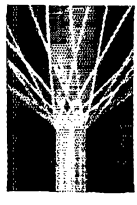
3 el Kit . . . . . **$ 89.95**
4 el Kit **$119.95**

Not Ready For Tri-Band?

...you get the same quality with POLY duo QUAD Kits (15-10) starting low as $54.95 and 10 meter POLY mono QUAD Kits...for further information about kits or individual components write directly to Polygon Plastic Co.

EXCLUSIVE ZIP GLAS TELESCOPIC FIBERGLASS SPREADERS

action engineered with compressional and tensional strength superior to anything else on the market . . . prestressed . . . lightweight . . . epoxy impregnated, epoxy painted so they're corrosion resistant . . . won't shrink, split or splinter . . . jam open in seconds . . . tested for winds in excess of 80 mph . . . sky-blue color to reduce neighbor and XYL objections . . .

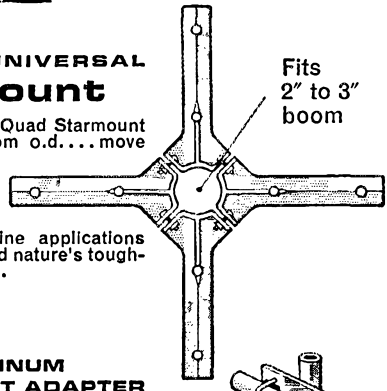


What Makes Poly Quad So Different?

Glasdramatics — Polygon's exclusive, patented process of weaving, winding and drawing continuous strands of fiberglass filaments before permanently bonding with resins.

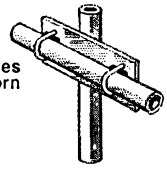
EXCLUSIVE UNIVERSAL Starmount

you save . . . the Poly Quad Starmount accepts 2" to 3" boom o.d. . . . move up to multi-el array without discarding this hardware . . . rigidly die-cast of 360 aluminum alloy . . . tested in many marine applications . . . proved to withstand nature's toughest test—salt water . . .



RUGGED ALUMINUM BOOM-TO-MAST ADAPTER

brawny 5052-H34 aluminum alloy plate . . . combines the best of mechanical strength with stubborn corrosion resistance . . . hardware included.



POLYGON PLASTIC COMPANY, *Division of Plas-Steel Products, Inc.*
7 Industrial Park • Walkerton, Indiana 46574 • Phone 586-3122.

FLORIDA QSO PARTY

April 1-2, 1967

Florida Skip, the all-Florida amateur radio publication announces the Florida QSO Party, April 1-2, 1967. Participation is open to all. Florida amateurs are urged to work as many out of state stations as possible, as well as those within the state.

Times: 1500-2000, 0000-0500, 1400-2400, GMT.

Frequencies: 1815 3530 7030 14,030 21,030; 3930 7230 14,230 21,330 28,830. Phone and c.w. count as separate contests.

Exchange: Serial number, RST, county for Florida stations, all others state, province or country.

Scoring: Florida stations count 1 point per QSO times the number of states, provinces and countries. Other stations in Florida may be worked, but only for contact points. Outside stations count one point per QSO times the number of Florida counties worked. Bonus points will be given for working Florida counties as follows: first 15, 100 points; second 15, 200 points; third 15, 500 points; all 67 counties 1500 points.

Power: No restrictions.

Awards: Certificates will be awarded to the highest scoring station in each state, province and foreign country (with 5 or more contacts) and each entry from Florida county.

Logs: All logs must be postmarked no later than April 30, 1967 and mailed to *Florida Skip*, Contest Chairman, P. O. Box 501, Miami Springs, Florida 33166. A four-cent stamp will bring the *Florida Skip* issue with results.

EASTERN FLORIDA—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT. RM C.W.: W4ILE. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAMs: W4SDR (hosp.), W4AKB (temp.), W4TUB. V.H.F. PAM: W4ABMC. All you good reporting guys and gals might please note that W4MVB of Jacksonville Beach, assumed SCM duties as of Feb. 15, 1967, and everything should be addresed to him. K4BNE soon will have a BIG voice with that new linear. We would appreciate it if W4SMK would give us a rundown on Barry Goldwaters' remarks at his club. WA4TWD reports that the Carol City-Opa Locka Amateur Radio Club has been formed. The first meeting was held Jan. 7. K4IEX's XYL is now WN4EPC. Just a word to *some* holders of OO appointments. We don't expect you to *kill* yourself with big reports, but we *do* expect sufficient results to make the appointment worth while. How about it, gang? Traffic: (Dec.) WA4SCK 977, W4TUB 552, WA4BMC 454, WA4NEV 450, K4YSN 420, W4ILE 400, W4FPC 362, WA4YIH 361, WA4TWD 333, WA4NBE 325, WB4AJV 290, WB4AIW 234, WA4IZZ 212, W4BJD 190, WA4DEL 181, WA4ZEV 163, W4FP 160, K4BNE 151, W4VDC 142, WA4FGH 137, WA4LRW 122, WA4HDH 119, K4SJH 116, W4AKB 113, W4OGX 102, WB4CAP 101, WA4BGW 98, K4KDN 95, W4IAD 78, W4NGR 73, W4SMK 73, K4DAX 72, W4IYT 64, WA4OHO 56, W4KRC 51, W4VPQ 47, W4EHW 42, W4YPX 42, WA4CIQ 39, WA4MRK 37, W4QBY 37, WA4WNE 34, K8LNE/4 33, W4IE 31, K4ILB 31, WA4WOW 31, W4TJM 30, W4DFU 27, WA4WZZ 21, K4LPS 20, W4BKC 19, WA4KJF 18, W4MVB 18, K4ENW 17, K4MTP 15, K4DSN 13, W4GM 13, W4SCY 13, W4VWL 13, K4EBE 12, K4IEX 12, WA4YRU 12, W4DVO 9, WN4DDO 6, WA4LIW 3, K4MZR 3, K4YOQ 2. (Nov.) WA4RIH 179, W4DFU 35, WA4VZD 23, WA4PWF 16, WA4WZZ 16, WA4ZBI 14, W4MVB 12, WA4FZV 11, K4MZR/4 6, W4BAV 3.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4DDY. RM: W4CZN. PAMs: K4PKK, WA4WDE. W4LRR is going 2-meter s.s.b. with a high power final and new tower. W4GXU wants more 160-meter activity and privileges. My thanks to the friends who pointed out my error in listing a net operating on NCEF. Net managers, please report your schedules and activities for listing in the column.

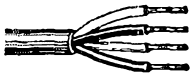
Net	*Freq.*	*Time*	*Sess.*	*QNI*	*QTC*
GSN	3595	0000 & 0300 Dy.	62	548	267
GTN	3718	2200 Dy.	31	179	56
GTAN	3855	1600 Sat. 2130 Wed.		63	17

High check-in on GSN: W4FDN 49, W4CZN 47, WA4NMU 41. K4AHO is busy as net manager of GTN. K4-

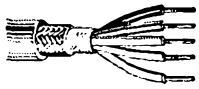
better sent... better received

with Belden wire and cable

...easy to use packaged lengths.

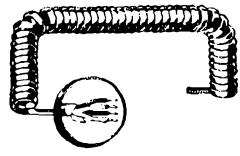


Antenna Rotor Cables
Sturdy, flexible, plastic insulated cable for rotor applications. Color coded. Chrome, vinyl plastic jacket resists sun and aging.



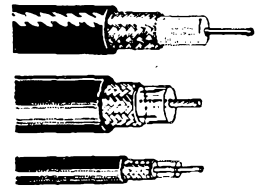
Power Supply Cables
Excellent mechanical and electrical characteristics for long service life. Special jacket offers maximum resistance to abrasion and ozone. Use as power supply cords and interconnecting cables. Ideal for remote control circuits, special press-to-talk microphone circuits, and other applications.

Shielded Hook-Up and Grid Wire
Provide most effective TVI suppression. Vinyl insulated with tinned copper braid shield. Available from 24 AWG to 12 AWG.

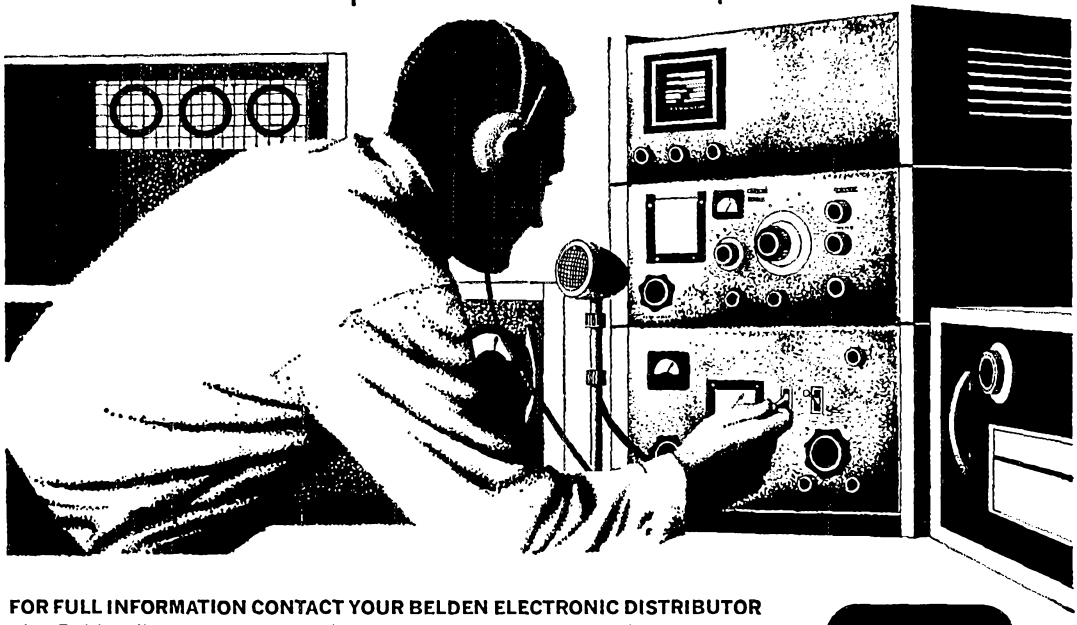


Coiled Microphone Cable
Provides low impedance for mobile microphone applications. Neoprene jacket remains flexible at low temperatures. Available with or without shielded conductors.

Ham Transmission Lines—Parallel Type
Uniform quality control provides uniform impedance. Brown polyethylene for best weather resistance and lowest losses.



Ham Transmission Lines—RG/U Type
Designed for lowest losses, longer service life, and maximum dependability. Cables are essentially flat with no peaks in attenuation to reduce signal on either high or low frequencies.



FOR FULL INFORMATION CONTACT YOUR BELDEN ELECTRONIC DISTRIBUTOR

The Belden line gives you maximum efficiency with lowest losses under all conditions of operation. There's a Belden wire or cable to meet every ham transmitting and receiving need. Shown here is only a small portion of this complete line.

8-7-6

Belden

BELDEN MANUFACTURING COMPANY • P. O. BOX 5070-A, CHICAGO, ILLINOIS 60680

YZE has a new kw. on 2 meters with 4CX250s. K4BAI was TDY Virginia for the month of January. K4NFP is QRL school. W4HYW was active in the New England, Zero Dist., N.H. and Ohio QSO Parties. WB4AYP holds the record for a consecutive QNI on GTN. WA4LLI continues active with Navy MARS. WB4EOQ is active v.h.f. mobile. W4HBS is off for duty in Viet Nam. W4YE is busy reinstalling mobile in the new station wagon. WN4EIT applied for AF MARS. WA4BVD moved to Cochran. Traffic: W4FOE 394, W4CZN 228, WA4RAV 161, W4PIM 157, K4MCL 105, WA4NMU 104, WB4BDG 73, K4AHO 72, K4YZE 62, K4BAI 58, K4NFP 50, W4HYW 38, W4FDN 32, W4DDY 31, WA4WQU 25, WB4AYP 24, WA4JES 24, WA4WDE 24, WB4AYP 14, WA4LLI 14, W4FQX 12, WB4EOQ 11, W4HBS 9, W4RZL 6, W4YE 6, WN4EIT 5, WA4BVD 4, WA4OVS 4, WA4VVF 4.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: W4IKB. RM: W4BVE. Section net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3950 kc.	2300Z	Daily	31	577	153
QFN	3651 kc.	2330/0300Z	"	62	—	831

Tallahassee: The 10-meter emergency net, reactivated by WA4EAO, meets Mon. and Thurs., 8 P.M. EST on 28.8 Mc. W4MLE, while monitoring the 145.35-Mc. intercom frequency, picked up an aero mobile and worked him for 500 miles. Chipley: W4IKB, net mgr. of WFPN and PAM, needs volunteers for NCS, ANCS and liaison to other nets. W4IKB also has the h.f. beam at 95 feet and 2-meter beam at 110 feet now. Panama City: WA4-ZGI is mobile on 2 meters. WA4IMC handled an urgent welfare message to Ohio when landlines were blocked with Christmas traffic. W4FOX is installing 2-meter f.m. gear. Fort Walton/Eglin AFB: W4RKH now runs 120 watts on 2 meters with a Clegg Zeus. W4IWF is new on 6 meters. WB4CNK is a radio D.J. when not hamming on 80-2 meters! W4ZGS is back at work on 432-Mc. gear. The EARS has moved to larger quarters in Bldg. 809 at Eglin. WA3BVI, EARS vice-pres.; was transferred; the new vice-pres. is WB4CNS. Pensacola: W4UUF and K4NMZ have put up vertical beams for 2 meters. WA4-IZM is mobile with a Twoer for the 100-mile round-trip to work daily. Traffic: (Dec.) K4VFY 489, W4BVE 390, K4BSS/4 264, WA4IMC 246, WA4EOQ 58, WA4FIJ 46, WA4JIM 37, K4NMZ 36, W4IKB 22, WA4GHE 2. (Nov.) K4NMZ 20.

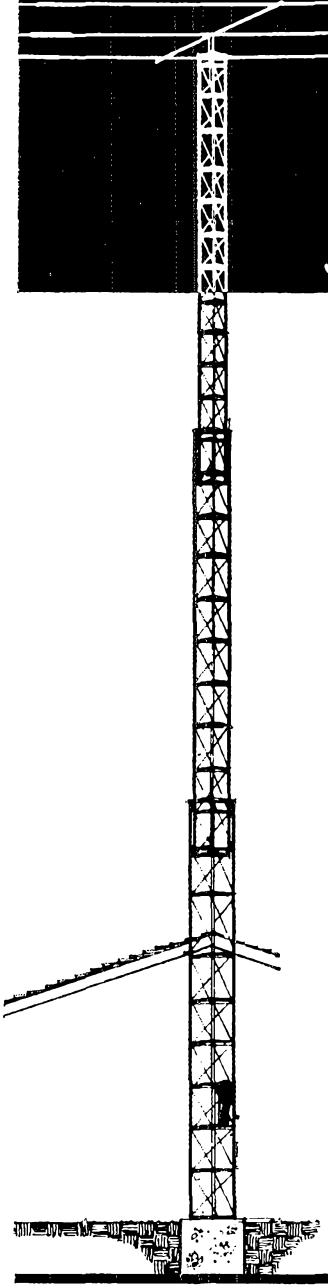
SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7NHL. K7NHL has again made BPL. WA7BVN is active in Navy MARS. W2TPV/7 has been transferred to Florida. W5EZQ/7 has a new Drake R4A-T4X in addition to his other equipment. WN7FQY is a new Novice in Prescott. Appointments renewed: K7RUR as OO and OPS. K7RUR's OPS appointment dates back to 1939. This must be a Southwestern Division record. Edward O. Neppel, WØ-CVG formerly of Colorado Springs, Colo., has retired (1400-20th St., Douglas, Ariz.) and his new call is W7-JMQ, same one "Nipper" had in Arizona years ago. Traffic: K7NHL 678, WA7BVN 83, K7PLO 32, W7FKK 29, W2TPV/7 23, K7RUR/W6BUK 4.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: W. R. Calkins, W1KUX/6. RMs: W6BHG, W6QAE, WB6BBO. PAMs: K6MDD, W6MLZ, W6ORS. BPLers for Dec.: K6EPT, K6IOV, W6BHG, W6DCS, W6GYH, W6MLF, W6TXJ, W6WPF, WA6AGQ, WB6BBO, WB6KGK, WB6KIL, WB6QXY, W6GYH is keeping a schedule with W3CUL for traffic. WB6QXY now is asst. net manager of SCS. W6WPF is operating amateur and Navy military traffic nets. K6CDW reports the new outdoor 80-meter antenna is a big help. WA6-TWS is building a $1,000 hamshack separated from the house to reduce QRM (12' x 20'). WB6QMF has been appointed Asst. EC for the Long Beach area. K6EA/Ø has returned to Long Beach. WB6AEL has an input of 100 watts on 80 meters. WB6OUD took 1st place in the QRP ARC QSO Party held last Aug. K6UMV reports the San Fernando Valley RC's new officers are K6PXD, pres.; WB6BXJ, vice-pres.; W6UEI, secy.; WA6KOE, treas.; WA6AYM, programs; WB6INL, technical; WB6GFD membership. W6CXC is teaching a radio class. W6ORS has finished the shop (radioshack), fired up the RTTY, copied W6BHG Official Bulletins and is looking for an antenna rotor and a 14AVS/Q. K6QPH reports new officers of the SoCalif V.H.F. RC are WA6JOK, pres.; WB6IMV, vice-pres.; WA6ARC, treas. WB6KVA reports W6OZ is out of town indefinitely and plans to transfer code practice equipment to another station so code practice may be resumed. WA6OKZ and W6CJB have been retained as pres. and vice-pres. of the Inglewood RC. W6RCV dug a 3' x 3' x 5½ hole for foundation of the

Henry Radio presents

An Exciting New Beam Antenna Program!



For the average amateur located on a small city lot, the problem of an adequate low-cost beam antenna system has never been properly solved. Now Henry Radio has exercised its unique experience and buying capacity to break the antenna barrier. Here is a complete antenna program pre-engineered, pre-matched and pre-packaged to suit the average QTH and the average pocket-book.

Package No. HR-1
Tristao CZ337 New concept 40 ft. crank-up tower
100 ft. RG-58U Coax
CDR TR-44 Rotator
Hornet TB-500-B Three element tri-band beam
100 ft. control cable
The perfect answer for the station using a transceiver barefoot. Regularly $325 plus approx. $15 freight, a $340 value. Our package price **$290.00** (freight prepaid to your door).

Package No. HR-2
Tristao CZ454 New concept crank-up tower
CDR TR-44 Rotator
Hornet TB-500-B Three element tri-band beam
100 ft. RG-58U Coax
100 ft. control cable
For the medium power DX'er who wants to work them barefoot. Regularly $500 plus approx. $25 freight, a $525 value. Our package price **$425.00** (freight prepaid to your door).

Package No. HR-3 ▪ **Tristao CZ 454 New concept 60 ft. crank-up tower ▪ 100 ft. RG-8U Coax ▪ CDR Ham-M Heavy duty rotator ▪ Hornet TB-1000-4 Four element tri-band beam ▪ 100 ft. control cable** ▪ Here is our masterpiece. The right combination of antenna and tower for full legal power and extreme DX. Regularly $600 plus approx. $30 freight, a $630 value. Our package price $495.00 (freight prepaid to your door).

Remember! You can buy on time. You can trade your used transmitter or receiver. You can rely on Henry Radio to supply the finest equipment and the best value.

Henry Radio Stores

CALL DIRECT . . . USE AREA CODE

Butler 1, Missouri, 64730	816 679-3127
11240 W. Olympic, Los Angeles, Calif., 90064	213 477-6701
931 N. Euclid, Anaheim, Calif., 92801	714 772-9200
6116 N. 27th Ave., Phoenix, Ariz., 85017	602 AM 4-3895

"Worlds Largest Distributors of Short Wave Receivers"

new 54-ft. self-supporting tower. *Support your section level nets*: EBN, Mon. through Fri. 1616Z and Tue. through Sat. at 0230Z on 50,500 kc.; SCS, daily at 0230Z and 2000Z on 50,400 kc.; SCN, daily at 0300Z on 3600 kc. Traffic: (Dec.) K6EPT 2666, W6GYH 1992, WB6BBO 1299, K9IOV 910, WB6QXY 908, W6WPF 803, W6MLF 511, W6QAE 387, W6BHG 347, W6DSC 332, K6MDD 304, WB6KIL 299, WA6KZI 272, K6CDW 242. K6ASK 212, WA6TWS 193, W6TXJ 173, WA6AGQ 136, K6KA 136, W6BTV 118, WB6KGK 118, WA6TYR 100, W6FD 89, WB6TMC 87, WB6QGM 81, WA6WKF 75, W6OEO 49, WB6QMF 46, W6DQX 45, WB6GGL 41, W6HUJ 40, W6USY 40, K6EA/O 31, W6MLZ 28, WB6AEL 26, W6AM 22, W6DGH 19, WB6OUD 19, WA6UCR 18, W6PCP 14, WA6WJT 11, W6TYT 8, K6UMV 7, W1KUX/6 4, WB6OFG 4, W6CXC 3, W6ORS 2, WB6SLG 2, K6BPC 1, W6SRE 1. (Nov.) W6FD 115, WA6KWV 74, WB6RWF 2, WA6KHK 1.

ORANGE—SCM, Roy R. Maxson, W6DEY—W6FB is back from a P.I. visit and advises that WB6PDC is the new Desert Rats treas. and NCS of the local RACES Net. The SAROC saw many OS hams. Some noted were WA6TAG and Eloise, W6WRJ, WA6WZQ, K6BIG and Lila, WA6UBP and Bernice, W6TON and Marge, W6EIF and Margaret, W6DEY and Mildred, W6PJU. A nice report was received from WA6GQJ, Olancha, on the aftermath of the recent flood. K6IQ was very active handling traffic during the holiday season. K6GMA will be back on 80 shortly. K3LBX advises K6MCA is no longer on the air having been squeezed out by what he considers the greatest threat to amateur radio in some time, the MARS system. Traffic: K6MCA 1256, WB6JFO 1078, WA6ROF 248, WA6GQJ 147, K6IQ 120, K6IME 94, KØYVN/6 63, WB6RJX 44, W6WRJ 38, WA6TAG 13, K8GMA 5, WB6NGE 5, WA6OQM 1. (Nov.) WB6JFO 618, WA6OQM 8.

SAN DIEGO—SCM, Don Stansifer, W6LRU/WA6VUI—New officers of the North Shores Amateur Radio Club are K6CAG, pres.; WB6MNF, vice-pres.; WB6IKW, secy.; W6SK, treas. Meetings are held the first Tue. of each month at the North Claremont Recreation Center. Visitors are welcome. The San Diego V.H.F. Club meeting of January featured W6GAC, who showed pictures and told of tracking used on a Solar Eclipse trip to South America. OVS WB6NMT reports many scatter contacts during Dec. The traffic gang was extra busy during Dec. with the usual seasonal rush. BPL awards were earned by K6BPI, W6EOT, W6VNQ, W6BGF and WB6RGS. W6CAE, son WB6POD and XYL, enjoyed a vacation at their cabin in the mountains after Christmas. The daughter of DXer W6BZE recently was married. RM and ORS W6VNQ has a new R4A receiver plus a 20- and 40-meter ground plane antenna for his TCC skeds. WA6OSB reports an average of nine checkins on the San Diego 2-Meter F.M. Net each month. Club secretaries: Are your club representatives to the San Diego Council attending the council meetings? Traffic: K6BPI 11,066, W6EOT 1148, W6VNQ 1031, W6BGF 614, WB6RGS 505, W6LRU 81, W6ECP 54, WB6NMT 18, K6YRF 13.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—SEC: WB6DPV. The Simi Valley ARC's emergency communications center is progressing nicely. Power is in, antennas are up and equipment is being installed. K6EVQ, our regular check-in with the Mission Trail net, has added a new SB-200, 70-ft. tower and beam. WB6JQL has a new, and free, 88-ft. tower. WA6THG has his TH6DX at 65 feet and reports great results. K6LFQ was all set to buy new Drake equipment but couldn't get the W6JPP bus into L.A. The Santa Barbara area f.m. guys have received their 2-meter repeater license and are presumably on the air. New appointment: K6EVQ as Asst. EC for the Simi Valley. Traffic: K6EVQ 17.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. The Arlington ARC held its Annual Christmas Party Dec. 9 with 66 amateurs attending, including the Mayor of Arlington. Mayor Vandergriff pledged the full support of the city to the amateur club and complimented it very highly on the successful West Gulf Division Convention. The Ft. Worth KC Club held its Annual Christmas Party Dec. 20 at which 53 amateurs and their XYLs attended and enjoyed a very fine meeting. WA5QAO and WN5PPF are starting a Novice frequency net on 40 meters Sat. on 7175 and Tue. on 7167 at 4:30 P.M. CST and 7:00 P.M. Note to WN5RAI, you might check on these frequencies. W5HNG has retired from the Air Force and is back in Ft. Worth after a 2-year hitch in Puerto Rico. WA5CMC reports four finished out of six starters in a code and theory class for Explorer Troop 82 held in rooms furnished by the Bell Telephone Co. K2GKK/5 has been transferred to a new

WRL gives you a FREE 2-week trial

ON THE *Great NEW* GALAXY V MARK 2

5 BAND TRANSCEIVER NOW—even Better than Ever!

6 NEW Features:

- New 400 Watt Power
- New Precise Vernier Logging Scale
- New Solid State VFO
- New CW Sidetone Audio
- New CW Break-In Option
- New CW Filter Option

6 WAYS BETTER—

Yet Still Only $420.00

Satisfaction Guaranteed! (Serving Amateurs over 31 years!)

■ We have the great new Galaxy V Mark 2 in stock, and we're so confident you'll like it that we're going to make it easy for you to step up to this powerful 80 through 10 meter transceiver on a "no risk" two-week FREE trial! Just mail the coupon in for details. Remember, we give the highest trade-in on your present equipment...offer an easy monthly payment plan *(no finance company—you deal directly with us).*

Send in the coupon today, just check off your interests and mail.

"The House the HAMS Built!"

Leo I. Meyerson
WØGFQ
President

Dept. QST-15S

WORLD RADIO LABORATORIES
3415 West Broadway, Council Bluffs, Iowa Zip 51501

Please send me the following: (F.O.B. Council Bluffs, Iowa)

- ☐ Information on 2-week trial
- ☐ Galaxy V Mark 2 Brochure
- ☐ A.C. SUPPLY—$79.95
- ☐ GALAXY V Mark 2—$420.00
- ☐ Quote me a trade
- ☐ Fixed Station Package—$597.55
- ☐ Mobile Package—$606.50
- ☐ FREE WRL 1967 Catalog
- ☐ Enclosed is my Money Order ☐ Check ☐ Charge it

Name_____ Call_____

Address_____

City_____ State_____ Zip_____

base in Mississippi. The NTTN reports 31 sessions, 1309 check-ins and 718 pieces of traffic handled. WA5RAN made the BPL in Dec. W5PBN got his feet wet as net control for the 7290 net. The Dallas ARC has voted to hold another famous Ham-bo-ree some time in August. WN5QZI is a new Novice in Big Spring and is a pilot for the USAF. Traffic: K5DBJ 305, WA5AGH 174, WA5RAN 156, K2EIU/5 139, W5PBN 62, WA5JIJ 21, W5LR 8.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX. SEC: K5ZCJ. RM: W5QMJ. PAM-75; WA5BTQ. PAM-6 Meters: K5VFR. PAM 2 Meters: WA5LBI. W5PML has agreed to take the net manager job of the Oklahoma Sooner Traffic Net, which meets Mon. through Sat. at 1745 CST. We want to thank K5ZEP for his help throughout the years as NCS on STFN: also WA5CUJ and the many others who helped throughout the past year. New officers of the Tulsa Amateur Radio Club are W5NOO, pres.; W5FU, first vice-pres.; WA5KWH, second vice-pres: W5IPT, secy.; and W5ZBI, treas. W5ERM is on 2 meters. W5EJK has a new Drake 2-C. Officers of the Aeronautical Center Amateur Club are W5UZX, pres.; W5NTL, vice-pres.; K5VWQ, asst. pres.; and W5EHC, secy.-treas. W5GIQ, operating under the call 7Q7EC, can be heard on 21.260 Mc. at 1800Z about every day. W5UNR is using a Drake L-4 now. Sooner Traffic Net: QNI 555, QTC 272. Oklahoma Phone Emergency Net: QNI 178, QTC 40. Traffic: W5NBI 587, WA5NTI 365, WA5KZA 128, WA5IMO 52, WA5BTQ 36, W5FKL 24, K5WPP 23, W5PML 22, WA5LWD 19, W5UYQ 13, WA5DZP 8, W5EHC 8, WA5LBI 8, WA5CHD 6, W5OCX 5, WA5MDN 4, WA5OUD 2, WA5OHX 1.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. The new RM for Southern Texas is W5EZY, in San Antonio, an old-timer and well known among the traffic nets. The San Jacinto Amateur Radio Club's new quarters will be the Admiral's quarters aboard the Battleship *Texas*. EC W5TFW reports the new officers of the Port Arthur ARC, are W5TFW, pres. WA5JTZ, vice-pres.; WA5DUG, secy.-treas. EC W5DAA reports the new officers of the Kingsville ARC are K5ZZU, pres.; K5HXF, vice-pres.; W5ZMK, secy-treas. The Houston Amateur Radio Club will formally dedicate its new building at 2 P.M. Mar. 13. All amateurs are most welcome to attend the ceremony. Best of luck and success to W5VPQ in reactivating the San Antonio ARC Paper, the *Exciter*. PAM W5KLV was off the air for a general overhaul of the station during Dec. W7LQE/5, ex-SCM Utah, now is at Lackland AFB, San Antonio and is active on 15 meters and in some c.w. traffic nets with a TR4. W5NGW, El Paso, received an NCX-3 mobile unit from the XYL for Christmas. K5HZR, Bexar County EC, reports the 7290 Traffic Net held 44 sessions with 1556 check-ins and 960 traffic count. Project Santa Claus by the San Antonio ARC enabled the youngsters to talk to Santa during three Saturdays before Christmas. K5WYN has been busy with phone nets on 2 and 75 meters. W5AC is getting a new tower and KW Matchbox. Activity is increasing at Texas A & M Univ., says K5WIC. Congrats to WA5MXY, who made the BPL in Dec. with 512. K5GJQ reports 1½ hours daily operating on three Eye Bank nets. 48 corneas were transferred for transplant in U.S. during Dec. Harvey also is ANCS for STEN and WGEN. Traffic: WA5MXY 512, K5HZR 435, W5BGE 186, W5AC 183, W5ONR 82, W5ABQ 63, WA5BEU 49, W7LQE/5 46, W5HWY 42, W5AIR 32, W5AQN 28, W5TFW 18, K5HMF 8, W5KLV 4.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM-APN: VE6ADS. PAM-ASBN: VE6ALQ. ECs: VE6SA, VE6SS, VE6XC, VE6AFQ, VE6PL. ORSs: VE6BR, VE6ATH, VE6ATG. OPSs: VE6HM, VE6SS, VE6ADS. OOs: VE6HM, VE6TY, VE6AKV. OBSs: VE6HM, VE6AIF. We now have an EC in Edmonton and any of you fellows interested in the AREC should get in touch with Gerald W. Linton, VE6PL, 11424-50 Ave., Edmonton. For the centennial year D.O.T. has granted the privilege of all amateurs to use the phonetics of 3C in place of the VE for the year 1967. (Example: VE6TG will be 3C6TG). We hope that all amateurs will take advantage of this. To all Canadian members of ARRL I would like to point out that we do have Canadian legal counsel when required, which will come through the Canadian Director. The 16th National ARRL Convention will be held in Montreal June 30, July 1 and 2, which will give you a chance to visit Expo 67. VE6AKV (OO) is doing a very good job. To all appointees: Check your certificates and send them in for endorsement. It is very encouraging to find that traffic is on the upward trend in this section. Traffic: VE6FK 86, VE6HM 46, VE6XC 45, VE6TG 13, VE6AKV 11, VE6QK

NOW INSTANT CREDIT, INSTANT SHIPMENT on OPEN ACCOUNT or TIME PAYMENTS

Trigger has cut the red tape of time-consuming credit investigations and interminable delays! If you are the holder of any *major* credit card such as:

Town & Country **American Express** **Carte Blanche** **Diner's Club, Etc.**

we will grant you *instant credit* on Open Account or Time Payments—on either brand new equipment, or like-new equipment. Just pick up the phone and call us (no collect calls, please) or write and your goodies will be on their way the very same day. If you live in the Chicago area, drop in and take the merchandise home with you. What's more, there is no carrying charge, up to 25 days, on Open Account. Or you can take advantage of Trigger's easy budget terms at a *very* low interest rate. Merely give us the name of your credit card, and its number, and tell us what you want. You can also get a substantial trade-in on your present gear.

For a real eye-opener, visit Trigger, located near the junction of Routes 64 and 42A, where there's plenty of free parking.

No company processes foreign orders and inquiries with greater dispatch than Trigger.

NEW EQUIPMENT ON LOW BUDGET TERMS

SWAN	DRAKE	SBE
HALLICRAFTERS	HY-GAIN	NATIONAL
JOHNSON	REGENCY	WELLER
AMECO	WATERS	SHURE
ASTATIC	NUMECHRON	DOW-KEY
FINCO	CDR	B & W
HAMMARLUND	UNGAR	EICO

and other major brands

LIKE-NEW EQUIPMENT ON LOW BUDGET TERMS

Ten-Day Trial **30-Day Guarantee** **Trades Accepted**

Tops in performance and appearance, thoroughly reconditioned, clean-as-a-pin; alignment, calibration as good as new. Write for complete listing and prices.

another important TRIGGER service:

WE BUY USED HAM GEAR FOR CA$H

PROMPT SERVICE
PROMPT CASH!

SPECIALS OF THE MONTH FOR MARCH

75S1 W/500 CY. & WAT. Q MULT	$289	SX130	$129	HP23	$ 37
32S1	369	SX140	77	HP13	57
516F2 AC	77	HT40	57	MP1 SUPPLY	24
DRAKE TR3	359	SR46	129	RANGER XMTR	109
DRAKE TR4	519	SR42	139	JOHNSON VFO	12
DRAKE R4	269	HA26 VFO	39	SUPER 12 CONV.	27
DRAKE R4A	349	HQ100A	127	SWR BRIDGE	12
DRAKE T4X	319	HQ170AC & NB	299	KNIGHT T60	47
SWAN 240	159	NC155	99	EICO 723	37
SWAN 350	349	NCX5 LATE MOD.	495	24 HOUR CLOCK	7
SBE 34	339	HRO50T1R, W/4CLS	127	100KC XTAL CAL.	9
SB2LA LINEAR	209	NCL2000	549	HEATH STERO A11	27
CLEGG 22ER	169	VX501 VFO	179	FISHER FM90X	47
S85	67	DX60	59		
S120	37	HX11	37	*TRIGGER HAS LATEST NEW MODELS IN STOCK FOR IMMEDIATE SHIPMENT TO YOU.*	
SX110	87	HW12	87		
SX111	157	HW32	87		
		SB200 LINEAR	187		

TRIGGER Attn: W9IVJ Q367
7361 North Avenue
River Forest, Illinois Amount
RUSH THE FOLLOWING: Enclosed

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____

ORDER BLANK TO: trade ur present gear, order equipment, sell ur gear for cash.

A SMALL DEPOSIT WILL HOLD ANY UNIT ON LAY-AWAY.

STORE HOURS Weekdays 11:00 A.M.—8:00 P.M.
Saturdays 9:00 A.M.—3:00 P.M.

TELEPHONE (312) 771-8616

TRIGGER Electronics

7361 NORTH AVE. • RIVER FOREST, ILLINOIS 60305
(WEST SUBURBAN CHICAGO)

SUNDAY TELEPHONE SERVICE
11 A.M.—3 P.M.

9, VE6SS 9, VE6ALQ 8, VE6AKA 7, VE6AOO 6, VE6FS 6, VE6AFQ 4, VE6FV 4, VE6WN 4, VE6AAI 3, VE6UK 3, VE6XX 2, VE6AQF 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —Sam, sixty-nine years young, passed the exam and is VE7BFW. Officers of the Royal City ARC are VE7AKW, pres.; VE7AAA, vice-pres.; VE7NW, secy. VE7SE, off for two months, is now active with the S/Line. The Nanaimo Club is trying to get activities going again. VE7AKU has moved, now for antennas. VE7AMW also is cleaning junk preparing to move. VE7ZQ did some research as follows: Amateurs located in Vancouver City, 455, 26%; lower mainland, 443, 25.3%; Victoria City, 218, 12.4%; Vancouver Island, 196, 11.3%; Okanagan Area, 165, 9.3%; Kootenay Area, 146, 8.5%; Caribou Area, 129, 7.0%. This gives us 1752 as of June 30, 1966. The BCEN is looking for new members and more activity is expected on 3650 kc. Our RM VE7QQ is requesting to be relieved of this duty. His new job is too time-consuming to do justice to the RM requirements. Kamloops new Emergency Coordinator is VE7BPG. VE7BHR got married. The BCARPSC Net has been averaging 45 check-ins per night. We still are hoping for a net manager for 1967. Even DCS or NCS volunteers should help things greatly during 1967. Many of us will be signing 3C7 calls as Canada enters into its centennial year. Let's make amateur radio greater in 1967. The B.C. Motor Vehicle Branch removed its five-dollar surcharge on call plates. Traffic: VE7FO 43, VE7AC 20, VE7BQA 20, VE7AMW 13, VE7DH 9, VE7BLS 8, VE7BOQ 2.

MANITOBA—SCM, John Thomas Stacey, VE4JT— V.h.f. activity is on the upswing with VE4CV, VE4KF, VE4TC, VE4HK, VE4HI and VE4RE on 2 meters. VE4-EF did some 6-meter work and VE4SC is building for the same band and taking an interest in RTTY. The Brandon ARC has found premises for the club station. VE4XN is QSL Manager for 6Y5GG. VE4GC is a new one on from Portage La Prairie and active in MTN. VE4RW has a Viking 1 and is looking for 10-meter openings. Had an eyeball with VE4LE at Melita. Winston has a DX-40 ready to go but is hunting around for an antenna. VE4DQ is back from a 6Y5 vacation. VE4-AO keeps G5CP and daughter in contact with a once-a-week sked. Of all things VE4NE complains of QRM from Christmas tree lights. VE4LK takes over the editorship of *QUA*. The support for the traffic nets has been excellent. The phone net reports QNI 549, QTC 16 and sessions 30. MTN reports QNI 195, QTC 245 and sessions 31. VE4LG made the BPL. My thanks to VE4EX and VE4EI for the traffic net reports. Traffic: VE4LG 225, VE4JT 177, VE4EI 118, VE4NE 102, VE4RW 47, VE4SC 31, VE4DL 16, VE4EF 15, VE4XN 12, VE4GN 9, VE4-NW 4, VE4QJ 4, VE4QK 4, VE4JQ 3, VE4MK 3, VE4AO 2, VE4DQ 2, VE4JA 2.

MARITIME—SCM, J. Harley Grimmer, VE1MX— Asst. SCM: R. P. Thorne, VO1EI. SEC: VE1HJ. VE1-MZ was involved in a hunting accident but is progressing favorably in the hospital. VE1EK and VE1YL were ill recently but are on the mend now. VE1ABS is now using a DX-40 and S77 on 20 meters. VO1AW received an SB-200 in his stocking for Christmas and is chasing DX. New hams in the Yarmouth area are VE1ATY, VE1AUC, VE1AUD, VE1AUE (ex-GM3DSF), VE1-AUF, VE1AJP, VE1AUK and VE1AKQ, who is radio operator aboard the Ferry *Bluenose II*. The Yarmouth County 2-Meter Net has been formed and meets on 145.05 Mc. at 2200Z daily. VE1SS has a new Swan 350. The Yarmouth Club held its Second Annual Lobster Supper, which was very successful. Congratulations to VE1ASN and his XYL on the arrival of a new jr. operator. VE1AUD has a new Eico 753 on the air. VE1-AUE has been DXing on 3.5 and 21 Mc. VE1AI and VE1AMC have new towers up. The attendance on APN has been very gratifying. Anyone who wishes to gain experience in traffic-handling and net procedure is invited to call in on 3653 at 0000Z daily. Traffic: VE1RT 306, VE1AMR 64, VE1DB 43, VE1OM 18, VO1AW 14, VE0MD 8, VE1ABS 5, VE1AAX 4.

ONTARIO—SCM, Richard W. Roberts, VE3NG— This is *our* Centennial year and to those of you have been here only a few years, take a good look at the Canadians who upheld the hobby in this country for the last fifty-two years and of that total fifty-two are with the ARRL Canadian Division. It is to be hoped that all of our brother hams who were under the weather with the flu are better by now and good health will be with them and theirs for the coming year. We regret to announce the passing of VE3CXS, of Windsor. We extend our condolences to his family; many of us will miss him. The new Teletype Net got off to a fine inauguration on New Year's Eve. Congratulations to all the Green Key boys on the fine effort. The Belleville & District election resulted as follows: VE3CWW, pres.;

VE3BPR, vice-pres.; VE3BBQ, secy.; VE3DLB, treas. Many clubs are participating in the Centennial celebrations. What is your group doing? The Skywide ARC of Toronto will operate the booth at the Toronto Hunters & Anglers show in March as its effort for Canada's one-hundredth birthday. Canadians are advised that they are permitted to use the prefix 3C3 in the U.S.A. as fixed, portable or mobile as long as they get the usual permit to operate in that country. Get lots of QSLs printed; they will be in demand. VE3AJA is going s.s.b. in North Bay. The Cooksville ARC will grant a certificate to any station contacting three club members. Traffic: VE3BII 545, VE3CYR 195, VE3DPO 181, VE3BZB 147, VE3DBG 127, VE3ATI 123, VE3GCE 111, VE3FHV 95, VE3AWE 77, VE3AUU 59, VE3GI 49, VE3BUR 46, VE3EHL 45, VE3ETM 42, VE3NG 42, VE3BLZ 37, VE3DGB 35, VE3WW 30, VE3EBC 29, VE3FGV 25, VE3EUM 21, VE3DU 17, VE3BIE 12, VE3DH 3.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. *RM: VE2DR.* After an absence of fifteen years VE2BSS is back on the air. Another old-timer, VE2EK, is heard on 75 meters again. VE2BBY has taken over the duties of EC in Sherbrooke, Compton, Wolfe and Richmond Counties. Sherbrooke Club has been reactivated. VE2-BRO, EC for Terrebonne, Montcalm, L'Assomption and Joliette Counties, is trying for another local SET with the help of two capable assistants. During a rebuilding layoff, VE2BRD came up with a very nice-sounding home-brew rig. AREC got a good publicity boost when news releases of the appointment of VE2BU, EC for the west island counties, and VE2KM, EC for Montreal/Laval, were published in two local newspapers. VE2AT has departed to take up residence in VE7-Land. VE2-ADE and VE2BBL are very active in the Valleyfield area and will fill a much needed outlet for traffic to that well-known spot. VE2ANK has taken a renewed interest as OO. We are pleased to note that an RTTY net with Ontario has been established and includes VE2BYZ. March brings us to within short weeks of the ARRL National Convention to be held in Montreal, June 30, July 1 and July 2. Traffic: (Dec.) VE2DR 221, VE2OJ 74, VE2BGJ 56, VE2BWL 56, VE2BRD 49, VE2-AJD 44, VE2AGQ 41, VE2DCW 37, VE2BVY 33, VE2-ALE 11, VE2EC 11, VE2WM 9, VE2CP 8, VE2BUP 7. (Nov.) VE2BZH 45, VE2BWL 41, VE2BWU 6, VE2-BRO 3, VE2ALE 2.

World Above 50 Mc.

(Continued from page 93)

the 10th and 20th and stations in Colorado on the 28th. WA4FJO and WA4STJ in Florida seemed to "have it made" from that area. Fred, WA4FJO, said that openings occured daily from December 16 through the 30th with contacts into Puerto Rico and Cuba numerous on the 29th and 30th. Jim, WA4STJ, worked into all call areas except 1 and 2 lands during the month, plus Puerto Rico, and VP7 land. From Tennessee K4KYL had a couple of openings into Texas during December but on January 1 he caught one into Wisconsin, Minnesota, New Jersey, Maryland, Nebraska, Colorado and VO1 land. Skip into California seems to be on the upswing also. WA6WKF observes that the 50-Mc. band has been open to all parts of 5, 8, 9 and 0 lands and to Washington and Oregon on the order of two or three times per week. W7BYF/6 writes of a contact with K7EBW in Tuscon on the 15th and K6MQF tells of an opening into Arizona and Nevada on January 4, 1967. Bill sez: "The period of skip lasted one hour and forty minutes with several short (one minute) openings. Even low-power stations were quite successful with solid copy on both ends. I am vertically polarized, which conflicted with the Arizona stations, but the mismatch seemed non existant." That's 50 Mc. for ya, Bill. Michigan stations seem to have the openings well in hand. WA8KRH heard 4s and 5s on December 12 and 13; K8AQA sez there were some traces of skip throughout the entire month but that the 19th was the only day good enough to be worked on f.m. QST

A Four-Band Rotatable Dipole

(Continued from page 37)

of those shown in *The Radio Amateur's Handbook*, is required. The open-wire transmission line may be homemade, or TV ladder line may be employed.

(Continued on page 154)

If ladder line is used 450-ohm line is recommended, rather than the 300-ohm type that has very close spacing between the wires. It is recommended that the line be transposed by twisting it as much as possible without shorting the two wires or appreciably distorting the spacing between the wires.

A flexible section of line will be required between the feed point of the antennas and the end of the transmission line on the tower or mast. This section can be made of insulated, stranded hook-up wire with plastic spreaders spaced about three inches apart, or a short length of heavy-duty, transmitting-type 300-ohm Twin-Lead could be employed. Since a dipole is bidirectional, only 180-degree rotation is necessary, and the flexible section of line does not have to be very long. The exact length will depend on the individual installation.

If the antenna is to be used only on 40 and 20 meters and fed with coax, it will be necessary to adjust the length of the aluminum elements for resonance on 20 meters. The end-loading sections seem to have little effect on 20-meter operation, presenting a high series impedance at these frequencies. The method of feeding the antenna with coax is the same as with any dipole, and several techniques are possible. The feed-point impedance appears to be about 70 ohms on both bands.

Operating Experience

If there are several other antennas in the vicinity, or other large structures or objects, they will cause a change in the tuning or v.s.w.r. as the antenna is rotated. This effect does not seem to be too severe, with the v.s.w.r. remaining well below 2:1 in the present installation. Other antennas close to the rotatable dipole should be grounded when using this antenna.

The basic antenna also works well as a vertical dipole. It should be mounted as high as possible, above surrounding objects such as trees and power lines, or at least as far away from these obstructions as possible. Initial tune-up is the same as previously described, with the antenna in a horizontal position, but after installation in the vertical position, the lower end section must be retuned to restore resonance on 40 meters. When installed as a vertical dipole, this antenna usually out-performed a full-sized inverted "V" at distances beyond 1800 miles. The center of the vertical dipole and the apex of the "V" were both at a height of about 50 feet. QST

Ninety Feet for One Hundred Dollars

(Continued from page 31)

is the added hazard of ozone toxicity, especially if an electric welder is used. Years ago it was popularly thought that ozone was an "air purifier," and ozone-generating machines were actually sold on the commercial market. Recently, however, there has been overwhelming evidence

that this is a toxic gas if inhaled, even in low concentration, and it is generated in copious amounts by an electric arc. A good rule to go by is this: "If you can smell it the concentration is too high." The U. S. Public Health Service says "*There is no exposure to ozone without some risk to health.*" [1] Another precaution that should be taken is to make sure that any helpers or bystanders wear safety goggles to protect their eyes from possibly serious burns, especially those resulting from the intense radiation of the electric arc. Ultraviolet rays from an arc welder can cause retinal damage to unprotected eyes of persons hundreds of feet away. Protective clothing must be worn to prevent skin burns.

6. It is essential that this tower be well grounded! Mine has a 9-foot long by 1-inch diameter solid-copper rod driven straight down under the concrete base. In addition, six radials of No. 10 copper wire 60 feet long were laid in a spoke-like fashion about 6 inches under the ground, and each of these was clamped firmly to the copper rod. From this point, two No. 8 copper wires come up through the concrete base and are tightly clamped to a leg of the tower. All paint or other insulating material should be removed at the point of contact, to ensure the lowest electrical resistance possible. As an added caution, the coaxial feed line or lines should be disconnected and grounded when not in use.

7. *Don't* try to squeeze out the last foot of height. This can be disastrous, because there is a point at which an upper section will simply topple out of the one below it. An absolute minimum of 6 or 7 feet of overlap between sections should be allowed for, even if the sections are guyed. It would be far better to add more sections if more height is desired than to overextend two or three.

There may be additional cautions to be exercised at your particular location. For example, the soil might not be stable enough to support a heavy tower, or the neighbors might bring legal action to forbid its erection in the neighborhood.

On the other hand, if you are willing to observe all safety precautions, are in need of a good tall steel tower, have access to welding equipment, and are willing to devote several months of spare time to its construction, you can build one like this for about $100. It should serve you well for many years with a minimum of upkeep, and will provide you with a great deal of personal satisfaction. You may, of course, not need or want a tower this high. If you wish to stop at 30 or 50 feet your expenditure in time and effort will be considerably reduced. For more ambitious projects it is recommended that the advice of a professional engineer be sought, owing to the potential hazards involved. If you have questions concerning the technique of welding, ask a professional welder. QST

[1] Public Health Service publication No. 1526. U. S. Dept. of Health, Education and Welfare, USPHS, Division of Occupational Health, 1966.

Silent Keys

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

K1DJK, Alva K. Eldridge, North Andover, Mass.
ex-W1GQV, George H. Lamott, Hampton Beach, N. H.
W1HGJ, Paul A. Richmond, Wollaston, Mass.
W1IYY, Harold V. Wyman, Worcester, Mass.
K1PQN, Leslie B. Hooper, East Monteplier, Vt.
K1RRK, Daniel G. Manchester, Riverside, R. I.
W1SEL, Lawrence E. J. White, Colchester, Vt.
W1WDM, Robert F. Leander, Mansfield Center, Conn.
W2ADA, C. J. Davis, Palmyra, N. J.
W2AQL, Henry T. Watteyne, Locust Valley, N. Y.
W2BDA, John G. Junginger, Jackson Heights, N. Y.
W2CVB, Charles C. Wright, Arcade, N. Y.
W2DMU, William A. Cline, Haddenfield, N. J.
WA2JIA, Emil J. Meyer, Bayville, N. J.
W2LKY, James Stanley, Bronx, N. Y.
W2QBI, John D. Maxwell, Sr., Magnolia, N. J.
W2RG, Edward M. Washburn, Merchantville, N. J.
ex-W2SGN, Walter S. Keen, Lowville, N. Y.
K2UCY, William G. Hunt, Bel'eville, N. J.
K2YQG, Ambrose J. Blehl, Brooklyn, N. Y.
W4GZX, William K. Collett, Cleveland, Tenn.
W4MT, Thomas G. Williams, Newport News, Va.
W4MZO, Walter J. Hopton, Atlanta, Ga.
W4OEX, Harry P. Pittman, Sr., Winston-Salem, N. C.
W4SYR, John S. Reed, Pompano Beach, Fla.
W4ZVE, Roland R. Williams, Richmond, Va.
W5AUL, Glenn E. Talbutt, Cotulla, Tex.
K6DHR, Russell J. Mishler, Morongo Valley, Calif.
K6OPT, William M. Pennington, North Highlands, Calif.
WN6RHS, Kathleen Dawson, Simi, Calif.
W6YIO, Louis Karabinus, Somerset, Calif.
ex-W7CCF, Roy A. Avey, Redding, Calif.
K8KDP, Gordon T. Stewart, Cincinnati, Ohio
ex-W8SFP, C. M. Dunlap, Dayton, Ohio
W9DJG, Harold H. Jansen, Alton, Illinois
WA9HQS, Don Peter, Oak Pk. Ill.
K9JKP, Berton J. Sterling, Ft. Wayne, Ind.
WA9LBK, Neal E. Dickerhoof, Harvey, Ill.
W9MUZ, Charles F. Reberg, Chesterton, Ind.
W9OG, Raymond G. Miller, Evansville, Ind.
W9ZSZ, John W. Ahlgren, Batavia, Ill.
WØCWT, Rolla Brown, Appleton City, Mo.
WØFLP, Lester D. Price, Hermosa, S. D.
WØHBD, Joseph C. Hiss, Kansas City, Kan.
WAØKAL, Charles S. Puffer, Pacific, Mo.
WØQFG, Wyman L. Pigg, Eureka, Mo.
WØYWS, W. C. "Tommy" Thompson, Springfield, Mo.
VE2BE, Alex Reid, St. Lambert, P. Q.

The 1966 SET

(Continued from page 83)

intent of correcting these as rapidly as possible. — *W4MFK, SEC N. C.* I suggest we either have less time for SET, or spread it out over two weekends to give us more traffic. — *WA9GUM, Mgr. ILN.* Noticed much QNO, especially in the higher level nets, without anyone saying anything to the NCS. Other than that, we had a ball. — *W4CZN, Mgr. GSN.* We had total state-coverage with total emergency power, complete intercounty coverage on v.h.f., complete state and county c.d. liaison, representatives from the NTS, Red Cross and more. — *K3NYG, SEC Del.* The 1966 SET was even better than the 1965 test in Ohio. — *W8HNP, SEC Ohio.* This was the best SET we've had in our county in the past six years. — *W2LVW, EC Gloucester Co., N.J.* How about getting the Red Cross to put phone numbers on their messages? — *W7CAF, Mgr. CSN.* For the first time, it was decided to combine the membership of our two c.w. nets, EPA and PTTN. This seemed to work to our advantage and members of both nets participated in large numbers. — *K3YVG, Mgr. EPA.* WVN's score will not be impressive compared to other nets, but we did our

best with a limited staff. — *W8HZA, Mgr. WVN.* Club station K2DEL served as emergency control center until they had an emergency of their own — the power supply burned up. — *K2KDQ, EC Passaic, N. J.* We have a list of all AREC members and leaders on file at the Red Cross office so we can be called in case of an emergency. — *K2DNN, EC Chemung Co., N. Y.* Traffic flowed nicely and most of those who participated who weren't too sure of themselves in handling traffic sure picked up the experience and confidence they needed. — *K2AVQ, EC Glens Falls, N. Y.* Is the time ripe yet for each SEC to set up a Section-wide SET with liaison to adjoining Sections? — *K2SJN, EC Westchester Co., N. Y.* Many stations failed to report to the net frequency at the appropriate time, thus leaving a few stations overloaded with work. — *WA4EUL, Mgr. VN.* The traffic net performance during the SET was very good. — *VE6FK, SEC Alta.* It was the same old story, not enough horses to pull the wagon when the load gets heavy. Reps. on half hour cycle from Regions impossible to get cleared in time to go back to Region net when only one station from each Region was there. — *W9DYG, Mgr. CAN.* This exercise, if nothing else, should serve to point up the scarcity of people available to handle quantities of traffic at a decent rate. — *W6VNQ, Mgr. PAN.* We discovered what level of training is needed for an operator assigned to set up and operate a station when traffic is being handled. — *W8NDM, EC Monroe Co., Mich.* Traffic moved smoothly, but we could have used more mobiles. — *W8MPD, EC Wayne Co., Mich.* Unknown to our participants, a tape recorder was going full blast all the time. This gave us a good basis for a critical analysis of our operation. — *W8GUL, EC/RO Monongalia Co., W. Va.* Weak spots showed up in a hurry but generally speaking, the test was quite successful considering that we are just getting organized. — *KQUVH, EC Kansas Zone 15.* The new system may have helped EAN, but the Section reps got stuck with plenty when we shut down as per schedule. — *K3MVO, Mgr. 3RN.* Some of my top men were either out of town or involved at higher levels, so I had a bit of a scramble, but we finally managed to get things organized "on the fly" and things worked out, too. — *WA2GQZ, Mgr. 2RN.* This year, plenty of traffic but not enough stations. The SET has given TWN a much needed shot of energy. — *K7NHL, Mgr. TWN.* Next year, please consider giving added credit to those NTS stations who are emergency powered. — *W8CHT, Mgr. 8RN.* It is getting increasingly difficult to "dream up" net ideas in order to keep up the interest of the long-time participants in these exercises. — *VE6SA, EC Calgary, Alta.* We used the "sealed envelope" system for handing out instructions. — *VE1AI, EC Halifax, Dartmouth Area, N. S.* Many things which should have been done were not and maybe next year will see the inauguration of a community plan and a joint exercise with EMO personnel. — *VE3ATI, EC Ontario Co., Ont.* I was just appointed EC the weekend before the SET, so didn't have too much time for organization. — *VE3GCE, EC Norfolk Co., Ont.* All participants had a good time in the SET and more important, we proved to the agencies we served that we are ready! — *K5HXR, EC/RO Harris Co., Tex.* For the second time in three years, this area was under "Hurricane Watch" during the SET. — *W5OBC, RO Houston, Tex.* We highly recommend that future SETs be held at least 2 weeks later in the year due to the hurricane season and the World Series. — *K5HZR, EC Bexar Co., Tex.* An interesting sidelight to this SET is the fact that this is the fourth time the SET has been turned into either a declared or impending emergency operation. — *W5AQK, EC Nueces Co., Tex.* Some of the mobile operators checking around for hand pumps at gas stations had made some of the station owners realize that without electricity, they are out of business. This year, we found more stations that could pump gas without commercial power. — *W6VNM, EC San Diego Co., Cal.* Last year we were young and eager; this year we had an eager young Air Force shavetail to create situations for us. — *WB6IZF, EC Southern Monterey Co., Cal.* Over half the amateurs in this county participated in the SET. — *W7DEM, EC Josephine Co., Ore.* Red Cross and c.d. officials made a tour of the communications facilities with me while we were mobile. As we drove, they were able to hear everything that was going on the air. — *K7UPH, EC Billings, Mont.* The test this year was held with no prior announcement as to time and date. Considering past turnouts, when this information was available, participation was excellent. — *W4TYV, EC Sullivan Co., Tenn.* It was concluded that 2 meter operation is ideally

suited to an operation of this kind. All members are being urged to obtain simple equipment for that band that can be operated either mobile or portable. — *W4IGQ, EC Gibson Co., Tenn.* We used emergency power for our fixed station which proved to be very profitable as the commercial power was off for over 75% of the test. — *WA4WLD, EC Limestone Co., Ala.* This is one time when the Section stations get up enough courage to act as liaison to the higher level nets and find that it isn't half as tough as they imagined. — *WB6BBO, Mgr. RN6.* Because many of the regular NYS members were busy at the Region, Area and TCC levels, others had to work twice as hard on NYS to keep things going. — *W2RUF, Mgr. NYS.* The new system, although at first a little complicated to understand, seems well fitted for this type of activity. I suggest it be used again. — *W5QMJ, Mgr. OLZ.* This was the first SET operation for most of our stations and we all are looking forward to next year. — *WB6JFO, Mgr. So Cal Six.* As part of the test, NCS and liaison schedules were handed out two days before the SET. They were all met. — *WA2UPC, RM, S N.J.* Lousy conditions on Sunday evening made it an excellent test. — *W9HRY, Mgr. QIN.* The Arlington County (Va.) Police Department showed unusual cooperation with the local SET. — *WA4TDQ, EC Arlington Co., Va.* QST

I.A.R.U. News

(Continued from page 87)

regular international communications facilities — may be handled by U. S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes are: CE CM CO CP CX EL HC HH HI HK HP HR OA PY TI VE VO XE XP YN YS YV ZP 4X and 4Z. Canadian radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U. S. and Venezuela. Permissible prefixes are: CE CP HR HK K OA TI W XE YS YV, 4X and 4Z.

DX Restrictions

United States amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the International Telecommunication Union under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Indonesia (including West New Guinea), Thailand and Viet Nam[1] forbid radio communication between their amateur stations and amateur stations in other countries. U. S. amateurs should not work HS XU 3W8 or 8F.

Canadian amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Viet Nam and Jordan. Prefixes to be avoided are HS JY XU XW8 3W8 and 8F. QST

[1] K1YPE/XV5 has permission for international communications from U. S. and Vietnamese administrations and is authorized to handle third-party messages with U. S. amateurs.

Project Oscar — A Progress Report

(Continued from page 67)

Translator — two meters in, two meters out, as in Oscar 3. This unit is being developed in Germany by DJ4ZC. The development appears to be making good progress and prototypes have been flown several times in balloons over Europe.

(Continued on page 164)

Beacon/Telemetry system. This package, called Australis/Oscar, is being built in Australia by a group at Melbourne University. It will have two and ten meter outputs (authorities willing) with a seven-channel tone-modulated telemetry system. Excellent progress is reported with delivery planned by the time this report appears in print.

Translator — two meters in, ten meters out. This unit is being developed in the San Francisco Bay Area but has been delayed due to the lack of available time. There are recent indications that the development activity is resuming and that significant progress will be seen in the near future.

Telemetry module. This is a sub-system which is available at Oscar headquarters. It was developed and built by a group at Rochester, Minnesota and will provide Oscar satellites with an effective and unique telemetry system. The available unit is rather large and draws considerable power, but the developers are at work adapting it to the use of integrated circuit modules.

Translator — two meters in, 432 Mc. out. A unit is being developed which is comparable to the Oscar 4 package and which is intended for launch into a near-synchronous orbit. This is being worked on by a coalition of California amateurs.

In addition to the specific packages mentioned above, there are several other amateur satellite systems at various stages of planning and development.

Oscar Support, Membership and Participation

The activities of Project Oscar, Inc. are handled entirely on a voluntary basis by individuals interested in the program. Similarly, its support and financing is by way of dues, gifts, grants and donations. Oscar gratefully acknowledges the financial support by ARRL in supplementing the operating funds of Project Oscar, Inc. There have been many contributions of money and materials by many individuals and companies that wish to support the Oscar activities. In many cases, individuals that "volunteer" to handle a task for Oscar stand the associated expenses from their own pockets.

To help broaden the base of Oscar operations and to make direct participation available to all interested persons, Project Oscar, Inc. is making memberships available to applicants regardless of location. The terms of membership and application forms may be obtained by writing to Project Oscar, Inc., Foothill College, Los Altos Hills, California, 94022. It should be made clear that membership in the Oscar organization is purely a matter of expressing support for the goals of the organization and that membership is in no way necessary for participation in any of the Oscar activities. QST

1966 Sweepstakes

(Continued from page 72)

Utah

K7RAJ	110,056-517-71-A-23
K7AQB	78,000-400-65-A-21
W7GXC	23,958-224-45-A-17
WA7BMP	18,696-162-38-A-15
WA7EBR/7	3262- 45-26-B- 7

Wyoming

W7QPV	53,200-380-70-B-19
W7ASD	26,220-233-57-B-12
W7TSM	21,750-221-50-B-17
WA7EHB/7 (WA7EHB, WAØJEK)	58,064-283-69-A-24

SOUTHEASTERN DIVISION

Alabama

W4USM	78,319-366-71-A-19
K4FHR	49,245-336-40-A-14
W4DS	18,216-132-69-B-17
W4CBG	10,143- 74-46-A-14
WA4PVK	9312- 97-48-B-16
W4YFN	1890- 30-21-A- 6

Canal Zone

KZ5FX	15,548-173-46-B- 9

Eastern Florida

W4PZV (WA4SVO, opr.)	113,529-536-71-A-24
W4ETO	109,917-535-69-A-15
W4VPM	69,156-339-68-A-17
WA4UFW	34,638-252-46-A-23
W4MVB	29,190-210-70-B-11
W4ILE	27,010-172-51-A-15
WA4HXY	21,735-158-46-A-10
K4FQU	20,224-128-36-A-14
W4HCA	14,476-155-47-B-11
W4UGD	2928- 61-24-B-18
W4JQU	1008- 2- 2-B- 1

Georgia

K4BAI	106,624-489-72-A-23
WA4TWQ	57,536-452-64-B-22
W4FQX	27,968-221-64-B-10
K4EZ	26,555-141-63-A- 8
W4HBS	18,603-117-53-A- 9
WB4AYP	18,081-126-49-A-14
K4HAV	14,283-104-46-A-10
K4SES	32- 4- 4-B- 2
K4YSB (K4s NVN Y8B)	70,119-373-61-A-24
K4CRS (K4CRS, WA4AIH)	58,800-353-56-A-24
WB4CPV (4 oprs.)	21,060-106-45-A-20

Western Florida

W4POY (WA4YPM, opr.)	31,892-236-68-B-13
WA4ZAZ (WA4s WNB ZAZ)	29,238-227-44-A-20

SOUTHWESTERN DIVISION

Arizona

K7PXI	77,544-360-72-A-22
K7ZZH	31,236-278-57-A-16
K7UHE	13,860-109-44-A- 7
W7CCQ/7	10,598- 84-45-A- –
WA7BNA	7800- 65-40-A-11
W7FCD	6847- 85-41-B- 6
WØHNF/7	1682- 30-19-A- 2

Los Angeles

W6KPM	89,900-430-73-A-18
K6VFF	69,550-538-65-B-18
W6AMJ	49,104-265-62-A-16
K6YFZ	20,436-132-52-A-14
W6OEO	16,996-125-43-A-15
WB6FRP	14,960-136-55-B-11
W6RCV	13,624-131-52-B-11
WB6IQI	11,880-120-33-A- 5
W6LS (W6DDB, opr.)	6165-137-40-A- –
WB6SST	2205- 52-21-A-12
WA6KHK	1368- 30-16-A- –
WB6NPR	1196- 46-13-B- 3
WB6DHG	270- 10- 9-A- 1
K6BPC (K6QPH, W6FNE)	88,760-634-70-B-24
WA6URY (5 oprs.)	85,697-618-71-B-24
WB6CPE (WB6s GZM JAT JJT)	62,377-468-67-B-21

Orange

W6EIF	140,860-657-72-A-24
KØGJD/6	125,325-557-75-A-24
WB6LMN	15,525-116-45-A-11
WA6WFW	7224- 86-42-B-18

San Diego

WA6TBY (WA8KHP, opr.)	85,980-625-70-B-24
W6LWM	59,271-284-69-A-24
W6NAT	44,826-241-62-A- –
WB6QMM	43,998-228-63-A-20
WB6BKB	23,850-150-53-A- 6
WB6IEX	23,769-139-57-A-20

Santa Barbara

WB6LIV	40,800-214-64-A-15
W6GEB	120- 8- 5-A- 1
WB6ULR (W6GEB, WB6ULR)	69,440-498-70-B-24
WB6DXY/6 (WB6s DPV DXY)	7728- 82-32-A-12

WEST GULF DIVISION

Northern Texas

WA5HID	146,880-680-72-A-24
K2EIU/5	130,101-591-73-A-19
WA5ALB	85,224-432-67-A-16
WA5LCF	45,927-250-61-A-20
K5SGH	18,424-106-47-B-15
K5BVM	15,696-109-48-A-12
WA5DAF	10,148-104-33-A-15
W5OPV	1008- 25-14-A- 3

Oklahoma

K5JIT	38,055-217-59-A-21
K5JKG	16,708-155-51-B-21
K5HWO	3816- 54-36-A-14
WA5NTI	1741- 19-13-A- 2
K5VTA (K5VTA, W5EHY, WA5EQA)	73,146-505-73-B-22

Southern Texas

K5LZO	180,113-808-75-A-24
W5ULN	1008- 21-16-A- 2

CANADIAN DIVISION

Maritime

VE1NV	41,126-242-57-A-23

Ontario

VE3ECI	37,783-201-61-A-21
VE3ES	23,700-158-50-A-11
VE3FBY	20,577-182-38-A-23
VE3CCB	8085- 77-35-A- 7
VE3CKW	5472- 76-36-B- 7
VE3DPG	2184- 42-26-B- –
VE3VX (5 oprs.)	22,589-204-37-A-24

Manitoba

VE4SD	64,837-336-65-A-18
VE4SC	35,122-262-66-B-22

Saskatchewan

VE5US (VE5UF, opr.)	65,076-481-68-B-19

Alberta

VE6NE	46,477-245-62-A-21
VE6AKV	24,168-212-57-B-12
VE6VV	19,656-126-52-A- 7
VE6MA	17,974-123-46-A-13
VE6AKV	1170- 26-15-A- 3

British Columbia

VE7FO	33,310-184-60-A-13
VE7ANP	3924- 55-24-A- 5
VE7BRV	113- 13- 3-A- 3

Yukon-N. W. T.

VE8BB	31,040-246-64-B-16

In case you missed the score above, our picture "guess who" candidate is VE8BB!

ARRL thanks the following amateurs for submitting their logs for checking purposes: *C.W.:* WB4BXQ W4JUK K4VGI WA5LCF WA7AFQ W7WHY W9YAC WØIZV VE7RZ; *Phone:* W2BLL WB2THL W5BUK K6AM WA6RXB/6 W8VUV W9EWC (W9AQW, opr.) VE6AAV VE7AXJ. QST

I would like the following League publications shipped to me postpaid. I am enclosing payment of $_____. (These prices apply only to the USA.)

Ship to this address:

NAME ..... CALL .....

STREET .....

CITY ..... STATE ..... ZIP .....

- ☐ **ARRL HANDBOOK** $4.00 — The standard comprehensive manual of amateur radiocommunication
- ☐ **UNDERSTANDING AMATEUR RADIO** $2.00 — Written for the beginner—theory and how-to-build it.
- ☐ **VHF MANUAL** $2.00 — A new and thorough treatment of the amateur v.h.f. field
- ☐ **LICENSE MANUAL** 50¢ — Complete text of amateur regs, plus Q&A for amateur exams
- ☐ **HOW TO BECOME A RADIO AMATEUR** $1.00 — All about amateur radio and how to get started
- ☐ **A COURSE IN RADIO FUNDAMENTALS** $1.00 — Use this in conjunction with the Handbook
- ☐ **ANTENNA BOOK** $2.00 — Theory and construction of antennas
- ☐ **SINGLE SIDEBAND FOR THE RADIO AMATEUR** $2.50 — The best s.s.b. articles from **QST**
- ☐ **THE MOBILE MANUAL** $2.50 — The best mobile articles from **QST**
- ☐ **HINTS AND KINKS** $1.00 — 300 practical ideas for your hamshack
- ☐ **OPERATING MANUAL** $1.00 — The techniques of operating your amateur station—DXing, ragchewing, traffic, emergencies, etc.

(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously 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, except there is no charge for zipcode when you furnish it. **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 advertisement, nor more than one ad in one issue.**

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

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.

DAYTON Hamvention April 15, 1967. Dayton Amateur Radio Association's 16th Annual Hamvention, Wampler Arena Center, Dayton, Ohio. Participate in the technical sessions, forums, banquet, hidden transmitter hunt. Bring XYL for best in women's activities. For information write Dayton Hamvention, Department B, Box 44, Dayton, Ohio 45401.

INVITATION: New York Radio Club cordially invites New York City area hams and SWLs to its regular monthly meetings. Second Monday of each month at George Washington Hotel, 23rd St. and Lexington Ave., promptly at 8 P.M. All are welcome. W2ATT, New York Radio Club.

HUDSON Amateur Radio Council announces visitors to K2US at New York's World Fair 1964-1965 may send self-addressed stamped envelope to K2US QSL Manager Ernest Bressette, WA2TEK, 33 Roosevelt St., Pequannock, New Jersey for K2US souvenir QSL card and log sheet.

AUCTION: Steals and Bargains galore! Bring your used and discarded parts and equipment down and turn it into cash. New York Radio Club, George Washington Hotel, 23rd St., Lexington Ave., NYC, Friday March 11, 1967 at 8:00 P.M.

ROCHESTER, N.Y. is Headquarters for Western New York Hamfest and East Coast Spring VHF Conference, Saturday, May 13. Top programming plus huge "flea market." For more information write: Rochester Amateur Radio Assn., P.O. Box 1388, Rochester, N.Y. 14603.

AUCTIONFEST: Hollywood, Florida, Chaminade High School, 500 North 51st Ave., March 11th. Doors open at 8:00 AM. Auction begins at 10. This is a new location for the popular Broward ARC Auctionfest. Chairman: Jack Wainwright, W4IEH.

HAMFEST: Sunday June 4. Save this date for Annual Starved Rock Radio Club Hamfest at Ottawa, Illinois. Write G. E. Keith, RFD 1, Hamfest Calendar in May QST.

GRAND RAPIDS Amateur Radio Association presents their 19th annual Amateur Radio Convention Friday and Saturday, April 21-22, in the Civic Auditorium, Pantlind Hotel, Grand Rapids, Michigan. Write: G.R.A.R.A., Box 1333, Grand Rapids, Michigan 49501.

OLD Old Timers Club now over 650 members with verified 2-way contacts before 1926. Life membership $15.00. Bi-monthly "Spark Gap Times" $2.50 annually. Roster free to members. Write Secretary, W5VA, Box 840, Corpus Christi, Texas 78403.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 813B No. Federal Hiway, Fort Lauderdale, Florida.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA, Wayne Nelson, Concord, N.C. 28025.

WANTED: all types of aircraft or ground radios. 17L, 618F or S388, 390, GRC, PRC, 51 JRVX, Collins Linear amplifier, Type 294; 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.

SEE, swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

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 prices u want to pay.

QSLS's, samples 20¢. QSL Press, Box 281, Oak Park, Ill. 60303.

QSLS "Brownie" W3CJI. 311 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.

C. FRITZ—QSLs that you're proud to send, bring greater returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Illinois).

QSLS: Moyers Printing, 846 Rising Sun, Telford, Penna. Samples, stamped envelope.

QSLS-SMS Samples 10¢. Malgo Press, Box 373, M.O., Toledo 1, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXK, 1944 N.M. 18, Gladwin, Mich.

10¢ Brings free samples. Harry R. Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois 60639.

SUPERIOR QSLS, samples 10¢. Hamsco, Box 773, Hobbs, New Mexico.

QSLS, finest, YLRL's, OMs, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

RUBBER Stamps. 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS, SWLS, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (refundable). 3-D QSL Co., Monson 2, Mass.

QSL, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS 300 for $4.35. Samples 10¢ W9SKR, George Vesely Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS, Radio Press, Box 17112, San Diego, Calif.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J.

BLUE On white glossy QSL's, 100: $3.00. Don. W1LMS. Sheehan Press, 23 West St., Stoneham, Mass. 02180

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City Mo. 64116.

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

RUBBER Stamps $1.15 includes tax and postage. Clint's radio W2UDO, 32 Cumberland Ave., Verona, N.J.

COLORFUL QSLS. Samples 10¢ or SASE. K8LNL Print, 510 Riddle Rd., Cincinnati, Ohio 45220.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4MNT, Box 198T, Gallatin, Tenn. 37066.

QSLS Glossy coated, 3 and 4 colors, 100-$2.00. Samples dime. Bob Garra, Lehighton, Penna.

QSL's: Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y. 14450

PICTURE QSL Cards for your shack, etc. Made from your photograph. 1000, $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLS. Fast one day service. Free samples. Bolles, W5OWC. Box 9363, Austin, Texas.

QSLS, 30 sharp samples, Catalog, 10¢. Filmcrafters, Box 304X, Martins Ferry, Ohio 43935.

BEST Quality rubber stamp or 1000 address labels. $1.25 postpaid. Joe Harms, 905 Fernald, Edgewater, Fla. 32032.

QSL's. Free samples, attractive designs. Fast return. W7HZ Press, Box 2387, Eugene, Ore. 97402.

QSLS. Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors. 100—$3.00 up. Samples 15¢. Agent for Call-D-Cals, K2VOB Press, 31 Argyle Terrace, Irvington, New Jersey 07111.

QSLS. Your personal combination from large selection, glossy reds, blacks, Calypso, Pinecraft, etc. Silver, Gold, Rainbow, etc. inks. Many card styles, types, cuts, photos. Fast service. Samples 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

HUNDRED QSLS, $1.00. Samples, dime. Holland, R 3, Box 649, Duluth, Minn. 55803.

CREATIVE QSL Cards. 25¢ for catalog, samples, 50¢ coupon. Personal attention. Imaginative new designs. Wilkins Printing, Box 787-1, Atascadero, California 93422.

QSL Cards. Free samples. Send stamped envelope to George, WA4OKD, P.O. Box 282, Valparaiso, Florida 32580.

QSLS Glossy coated, 100 $2.00. 3&4 colors, samples dime. Bob Garra, Lehighton, Penna. 18235.

QSLS? "World's Finest" Samples 25¢. Deluxe 35¢ (refunded). Sakkers, W8DED, Holland, Michigan.

WANTED: MD7/ARC-5 modulation transformer for July 1961 QST, p. 22 rig. VE3GEO, 1443 Morley, Ottawa 5, Ont., Canada.

TUBES Wanted. All types, higher prices paid. Write or phone Ceco Communications, 120 West 18th St., N.Y. 11, N.Y. Tel: 242-7359.

DUMMY Loads, 1 KW, all-band, kit, $7.95; wired, $12.95. Ham Kits, P.O. Box 175, Cranford, N.J.

WANTED: 2 to 12 304TL tubes. Callanan. W9AU, 118 S. Clinton, Chicago 6, Ill.

TOPPING All offers for any piece of aircraft or ground radios, tubes or test equipment. In a hurry? Cash-in-advance arranged. Turn those unused units into money. Air Ground Electronics, 64 Grand Place, Kearny, N.J.

MANUALS for surplus electronics. List 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Collins Parts, BC-610, GRC-2, Antodyne, Bethpage, L.I., N.Y.

TELETYPE: Buy 28s, sell parts. W4NYF, Schmidt.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 37 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime international Co., Box 516, Hempstead, N.Y.

HW12,22,32 owner convert your rig to three bands for a total cost of $28.50. This price includes new front panel and dial. DRC Kit, 215-28 Spencer Ave., Queens Village, N.Y. 11427. Complete assembly manual only 50¢ or send for free brochure.

RTTY Gear for sale. List issued monthly, 88 or 44 mhy toroids, five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mancana Blvd., Oakland, Calif. 94610.

TOOOOBES: 6146B, $4.00; 6CW4, $1.40; 417A, $3.95; 6360, $3.45; 6146, $2.55; 5894; $15.50. All new, boxed guaranteed. No pulls, seconds or JAN. Catalog of many other types, free. Vanbar Distr., Box 444Z, Stirling, N.J. 07980.

WANTED: Military, Commercial, Surplus, Airborn, Ground, Transmitters, Receivers, Testsets Accessories. Especially Collins. We pay cash and freight. Ritco Electronics, Box 156, Annandale, Virginia. Tel (703)-560-5480 Collect.

CASH Paid for your unused Tubes, and good Ham and Commercial Equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NYC 10012. Call 212-WAlker 5-7000.

WANTED: Tubes, all types, write or phone Bill Salerno, W2ONV, 243 Harrison Avenue, Garfield, N.J., Tel: GArfield Area code 201-471-2020.

NOVICE Crystals 80-40M, $1.30 each. Also other freqs. Free list Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

WANTED: For personal collection; QST, May 1916; How to Become a Radio Amateur, Edition 10; The Radio Amateur's License Manual, Edition 7, 11, 12, 15 and 16. WICUT, 18 Mohawk Dr., Unionville, Conn. 06085.

SELL: Eimac 4X250B tubes. Guaranteed gud condx. $6.50 each, $10,000 paid repair in U.S.A. Send check or m.o. Everett Stidham, Jr., W5LQ, 722 So. 30th, Muskogee, Okla.

HAM Discount House Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

STAINLESS Steel Hardware. Small quantities. Send SASE for list. Arlington Stainless, Section B, Box 2641, Baltimore, Md. 21215.

ESTATE Liquidation offers. Big list. Paradd Engineering Service, 284 Rte. 10, Dover, N.J. 07801.

FOR Sale: In excellent condition: Drake Model 2-B receiver Drake Model 2-BQ "Q" Multiplier; Johnson Viking Adventurer transmitter with key and 40M-80M crystals. All for $350.00. Will sell separately. Write Wayne Banks, 1207 Loch Lomand, Ct., Richmond, Va. 23221.

WANTED: Model #28 Teletype equipment. R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101

FB Condition SX101 MK 3, GSB-100, GSB-101, plus other ham needs. All $475. WA2QEK. RN3-0591.

WANTED: Electronics Instructor. Generally indispensable. Theory and workshops. Science Camp, Lake Placid, New York. Write Eppstein, 440 West End Ave., N.Y. 24.

RTTY Channel filters. $5.95 pair, 88 mh toroids, 5/$2.50; FSK units for 32S-3, complete, variable shift, easy installation, $14.95. Herman Zachry, WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

TV Cameras, Vidicon-Orthicon, Industrial, new and used lenses. Vidicons, Pan, Tilts, Zooms, Industrial Suppliers camera reconditioning and repair. Closed circuit T.V. Center, Inc., Rte. 46, Little Falls, N.J. Tel: 201-256-7379.

HA-14 and HP-24, assembled, tested, in mint condx, with all necessities, $175.00 or you make offer. WA3CBL, 900 Stony Lane, Gladwyne, Penna. Tel: (215) LA 5-7581.

CINE special, other professional 16 or 35mm cameras or lenses, video recorders wanted for cash or trade. Ted, W2KUW, 64 Grand Place, Arlington, New Jersey.

WANTED: Collins VFOs, Richard Mann, 430 Wilmot Road, Deerfield, Ill. 60015.

ESTATE Sale: Complete, ham rig: NC-303 receiver, Johnson Viking Invader 2000 transmitter; Knight P2 SWR meter; GMT Numechron Tymeter, CDR rotor TR-44; Vibroplex Key, T234 Tri-Ex Tower; DB24 Hy-Gain beam antenna: DK-60 Dow-Key relay; all cables and misc. equipment to complete hook-up and manuals. All equipment purchased new and in excellent condition, very little use. Will ship anywhere in USA. $1100.00 or reasonable offer. Marc Maury, Phone 714-626-0441 or write to 1679 Sumner Ave., Claremont, Calif.

SELL: RTTY Model 14 typing reperf, $22.50 polar relays & sockets, $2.00. Distortion test set TS-383 B/GG, $15.00. Facsimile transceivers $130/fr. Bob Friebertshauser, WB2PLY, Box 207, Princeton Jct., N.J. 08550.

SELL: 253 QSTs: 38 COs, 5 QST Binders, from 1933 to 1960: $50.00. A. Urquhart, W2KWM, 198-26 Epsom Course, Hollis, N.Y. 11423.

WANTED: Johnson Viking desk Kilowatt amplifier. Joseph Johnson, K9YNG, 300 North Walnut, Clinton, Illinois. Phone: a.c. (217) 935-5507.

SELL: CQ, QST, Handbooks, old radio magazines, any quantity. Buy: Old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

WANTED H.R.O. or H.R.O.5. Must be in good condition. Harold Parsons, 1646 Aline Dr., Grosse Pointe, Michigan 48236.

SELLING Out: Large collection of AM and FM gear. Going SSB. Send stamped envelope for list. Warren Waterman, W2-JRX, 55 Lake Ave., Middletown, N.Y. 10940.

COLLINS: For the very best in servicing done with the personal touch, it's W2VCZ. 75-A-4 front end mods. $69.95. 75-S series front end mods. $34.95. VCZ Sales, W2VCZ, 5 Pinetree Road, Ramsey, N.J. Tel.: 201-327-9494.

SELL: HQ-110A with speaker, $140.00. WA8RXL. Stephen G. Hurtuk, 27 N. Bridge St., Struthers, Ohio 44471.

BILL Ogg, WA9RMO, at Evansville Amateur Radio Supply, 1306 Division, Evansville, Indiana 47715, will save you 15% plus on ham supplies. We stock Drake TR-4, T4-X, R4-A, Galaxy 2000, Galaxy V, Swan 350, complete Hy-Gain line, Ham-Ms, Waters, and many more. Send us a stamped envelope for the deal you have been looking for. Freight prepaid on large orders.

SELLING: Valiant, HQ-170C, all accessories. Also transformers, chokes, filter condensers, tubes, meters, test gear, other items. SASE for list. Benson, W1RUJ, 14 Reservoir, Westwood, Mass. 02090.

EICO 720 factory-wired with ten crystals for 80, 40, and 15 meters. $75.00 RME-4350 receiver, $115.00. Both are in mint condition with manuals. Will ship. Ira Deutsch, WA1FNS, 1575 Tremont St., Boston, Mass. 02120. Tel: (a.c. 617) 277-0729.

NATIONAL NCL-2000 2 KW linear amplifier, in mint cond $400. W9HOG, Alan Kogerup, 324 Crestwood Dr., Roselle, Illinois. Phone a.c. 312-894-1328.

DRAKE TR-4 transceiver, $450.00; Hammarlund HQ-180C, $250.00; Eico 720 transmitter, $60.00; Espey receiver, $20.00; Lafayette multitester SWR and field strength meter, Turner SSB microphone. Mosley V-4-6 antennae. Lafayette bug. Stereo headset. Goldberg. Tel: 516-WE-8-4814, 49 Felice Crescent, Hicksville, L.I., N.Y.

TOROIDS. 88 mh uncased. 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

HAVE Complete following QST years: 1928, 1929, 1931, 1932, 1935, 1936, 1938, 1939, 1940, 1952, 1953 and 1956. $75.00. A. Winslow, 381 Cornwall, Hartford, Conn.

DRAKE 2A receiver with Drake "Q-Xer". Q-multiplier in good condition, $125.00. John Sailer, K6PZL, 2 School Way, Watsonville, California 95076.

FOR Sale: SB-100, SB-200, SB-300. Wanted: Any kit to wire and repair, preferably Heathkit. Most Heathkits in stock. Business ref. on request. Lan Richter, 131 Florence Dr., Harrisburg, Penna. 17112.

DEFERMENT Up: Selling HW-12 with HP-20 AC and HP-10 DC supplies, $160.00. Twoer and DC supply, $35.00; T-60 transmitter and VF-1 VFO, $35.00. WAØCRJ/Ø. Box 403, Lake Preston, South Dakota.

SR-160 and matching Hallicrafters PS-150-120 AC power supply. Manual included. I have gotten many superlative signal reports with this outet. $350.00 or your best offer. Bill Gay, Box 507, Tarkington Hall, West Lafayette, Ind.

GONSET G-76 transceiver with AC supply. Covers 80 through 6 meters, 120 watts c.w., 90 watts AM, crystal or separate VFO control, $165.00. Will ship. WN7ETN, Midn. Robin Bushore '70, 2nd Co., Room 1212, U.S. Naval Academy, Annapolis, Md. 21412.

CLEANING Out shack: Electronics and Proceedings IRE and IEEE January 1947 through December 1966. Best offer. W8-CBM. 19176 Forrer, Detroit, Michigan 48235.

SELL Collins 75S-1 receiver in new condition, $275.00; BC-221J frequency meter, original book and crystal, AC power supply, good condition, $45.00. Prices F.o.b. W6IV, Box 773, Los Altos, California 94022.

TRADE Or sell: Heath DC pwr. supply HP-13, cables and manual. Excellent condx. Want Heath AC supply HP-23 with cables and manual in excellent condx. or will sell $40.00. N. Denison, W1VCU, 133 Preston Drive, Manor Heights, Port Deposit, Maryland.

75 foot heavy duty self-supporting crank-up tower with electric winch. Made by Tristao Tower Co. $850.00 with winch, $750.00 without winch. WA61UM, Box 155, Fort Jones, Calif. 96032. Tel: (916)-468-5126.

FOR Sale: DX-100B modified for SSB. Good condition. Also SB-10 which needs some work. Best offer over $120.00 takes both DX-100 and SB-10. Manuals with both. Will ship express c.o.d. R. C. Colburn, WA6NGL, 17036 S. Clark, Bellflower, Cal. 90706

TESTER 950-K R-C bridge, $20.00. KZ5BC Box 45, Margarita, C.Z.

WANTED: 2 meter transverter, Hallicrafters HA-2. Please state transportation, prepaid price and condition. Bruce Mull, WAØBGZ, 117 Suffolk, Hoyt Lares, Minn.

RANGER I, in perfect condition, plus extras. Would prefer a short delivery around L.A. $100.00. Call or write Jim Musselman, 22213 Burbank Blvd., Woodland Hills, Calif. 91364 .

WANTED: Pilot A.C. Superwasp rcvr, complete with power supply and coils. Also National SW-3 complete. W8QZF, Leininger, 16412 Marquis Ave., Cleveland 11, Ohio.

TRADE 50 wax encased 88 mp. Toroid ocils for 4 new 811As. Harold Schmidt, K6ENQ, P.O. Box 192, Yosemite N.P., Calif. 95389.

FOR Sale: For college expenses—Apache TX-1, in excellent condx. $150.00. Also a near perfect NC-155 receiver, $160.00. K4VBS, W. R. Chitwood, Jr., Box 238, Hampden-Sydney, Va.

DRAKE TR-4, AC3, MS4; perfect, used 10 hours as home station only. Warranty cards included. Prefer local sale at $520.00. Marc Felt, W2GYO, 50 Prince Lane, Westbury, L.I., New York, 11590. Phone (a.c.: (516)-334-5135.

SWAN 400, 406 and 420 VFOs. 11/B AC and 412 DC power supplies; RC-1 (without cables), $560.00. Radio Industries *Loudenboomer MKIIA* KW amplifier, matching power supply, $270.00. All equipment hardly used, in excellent condition. Joe Locascio, K5CIT/6. Apt. C-2, 1485 North Beale, Marysville, Calif. 95901.

WANTED: BC-348, BC-224, BC-375. Please state condition and price. Charles Lee, 69 Madison St., New York, N.Y. 10002.

HEATH Apache, $85.00, and SB-300, $250.00. Both are in excellent condition. WN2YRM, 134 Concord Road, Yonkers, New York 10710. Tel: 914-337-2266.

SELL: Heath, HX-10 Marauder, SSB xmtr, mint. Professionally aligned and guaranteed by W2IOC. $275.00. Write Bob Hamilton, 136 Land Lane, Westbury, L.I., N.Y., 11590.

FOR Sale: SX-122 receiver, $150.00; HT-37 in mint condition $200.00. You pay shipping. First certified check takes. K7-MGM, Elmer E. Dixon. Rt. 2, Newcastle, Wyoming. 83701.

HEATH SB-300 receiver. Built, but never used. Impeccable construction. AM-CW filters. See to appreciate. $275.00 in Livonia, Michigan. Write William Birkett, 104 S. Case, M.S.U., East Lansing, Michigan 48823.

NOVICES Or new Generals: DX-100 in perfect operating condition, with all factory suggested modifications at OTH in Lakeland, Florida. $65.00. Alan Biddle, WA4SCA, S.P.O. Box 53, Sewanee, Tennessee 37375.

SELL: TR-3 with AC-3, in like-new condition: $425.00. Hy-Gain 204BA 4-element 20-meter beam $50.00. You pay shipping. Dwight Kalita, K8VYY, Carpenter Road, Defiance, Ohio. Tel: (419)-782-0891.

RCA CMC 30A2 6/12V. 2-meter 30-watt FM transceiver, 4 channel transmit. Complete with head, cables, manual, and crystals for 146.940 Mc. Fully tuned, ready to go. $70.00. K2JMU, 7135 Kilbourne Rd., Rome, N.Y. 13440.

SELLING: KWM-2, $650.00; SX-62A 550 Kc-108 Mc complete coverage, $195.00; LM-14 frequency meter, $50.00; BC-453B modified, P/S, 190/550 Kcs., $29.50; BT/TV amplifier, eight receiver outputs $20.00. Wanted: Waters dummy load, 200 cycle filter 75S-3B, Gommo, 37-20 75th Jackson Heights, N.Y. 11372.

600 Piv at 750 Ma. Tophats, includes by-pass capacitors and resistors, 10 for $3.00. Postpaid U.S.A. Fully guaranteed. Over 5000 sold. East Coast Electronics, 123 St. Boniface Rd., Buffalo, N.Y. 14225.

COLLINS 75A-4 receiver, $350.00; Viking II transmitter, $35.00; old radio tubes; cleaning out ham shack. Send for free list. K9AFU, 1825 S. Muskego Ave., Milwaukee, Wisconsin 53204.

QSTS Jan. '45 complete thru Dec. '65 and some '66. Single lot sale only. $110.00. W6GHU, 933 Third St., Hermosa Beach, Calif. 90254. Fone (213)-374-2070.

WANT Drake DC-3 power supply; mobile antenna. Will trade or sell perfect late RV-3 remote VFO. WA5ERC/Ø. Box 29, Columbia, Missouri.

VIKING Valiant with coaxial relay for sale: $150.00. WB2-VBT, Westbury, L.I. Call a.c. (516)-334-7746 after 6 PM. Jerry Hermel.

SELL: SB-400, $300.00; SB-301, $250.00. Going transceive. First certified check takes. KØTYY, Ray Backes, Sentinel Butte, N.D. 58654.

SWAN 250, purchased new in December 1966, $250.00; RME VHF126 converter, $75.00; Clegg 99er, $75.00. Ameco Nuvistor converters for 6 and 2, $20.00 each; Johnson Viking II, $50.00. Hammarlund HC-10, $60.00; Heathkit Cheyenne, $35.00. All are in good condition. Philip Schwebler, W9GCG, 4536N 50 St., Milwaukee, Wis. 53218.

HEATHKIT 80-meter single-bander transceiver HW-12 and HP-23 a.c. power supply wired and tested, excellent condition. $100.00. W1CIE, 18 Mohawk Drive, Unionville, Conn. 06085.

HEATH Twoer es mobile supply, Turner mike with stand. All in excint condx. Sell all, WA7ECY, 495 N.E. Beech, Gresham, Ore. 97030.

KW Linear using two 813s in relay rack for sale. $210.00. Write for more information and sked. Malcolm Montgomery, WA8CFJ, 3414 Telford St., Apt. 1, Cincinnati, Ohio 45220.

HX-30 Heath 6 meter transmitter, excellent condition, with manuals. Trade even for Ameco TX-62 and VFO-621 or $150.00. K3ZIB/1. Pal Littleton, 54-C Nob Hill Rd., New London, Conn.

BEST Buy of the season: Johnson Valiant II, perfect, like new, $200.00; National NCL-2000, like new, $400.00; Eico 720, used, perfect operating condition, $50.00; Johnson Challenger, new, never used, factory-wired, $40.00; Hallicrafters HT-40, used, works perfectly, $25.00. Can be seen and used at my QTH. Sry, will not ship. Manuals for all. Will deliver Valiant and National to within 125 miles. Donald L. Farrell, WA2-WEE, 207 Seneca St., Chittenango, N.Y. 13037.

NCX-5 with NCX-A AC supply, factory installed diode balanced modulator, thoroughly checked, beautiful condition, both for $495.00. Brown Electronics, Inc. Box 323, Fort Wayne, Indiana 46801. tel: (219)-742-7331.

EICO 753, 751, factory-aligned, "solid" VFO, $280; Webcor "Compact" deluxe tape recorder, $65.00. Turner dynamic mike, stand, $14.00; Mosley "El Toro", $11.00; Command 80 mtr. xmtr, $14.00. WA5JVL, 8704 Belfast, New Orleans, Louisiana 70118.

BEST Used gear list in Canada, Free. Etco, VE2ANN (Marv), Box 744, Montreal 3.

B&W 5100 transmitter, now on air, all bands fone & c.w. Pr. 6146Bs final. 210 countries with dipole. Set spare tubes incl. 4-6146s. Astatic D-104 mike. Professionally de-TVI (suppressed). Original owner, instruction manual, 90-day guarantee, spotless condition. All for $139.00 certified check, or cash & carry. Got 14X for Christmas only reason. George Clark, W2JBL, 123 Davis Ave., Hackensack, N.J.

FOR Sale: SB-100, excellent, 3 months old, factory-aligned: $395.00 firm. Matching AC supply, $39.00. Ernie Dake, WAØ-NVE, Lester Prairie, Minn. 55354.

WRL's used gear saves money! Reconditioned-guaranteed-trial. Free list. Special! My personal antenna "farm". One package, $1,000. 2 Aeromotor 70 ft. towers, leach Telrex 10,15,20 beam, 6 element and 1 Hy-Gain 3-element 40, 2 rotors. Write for details. Leo, GØGFQ, Box 919, Council Bluffs, Iowa 51501.

SALE: Collins KWM-1 transceiver, $275.00; 516F-1 supply, $75.00, both for $325.00. Collins noise-blanker, 136A-1, never installed, $50.00; Heath DX-35, $15.00; VF-1, $15.00, both for $25.00; RME DB-23 Preselector, $15.00; B&W 5100 transmitter, $100.00. Want: KWS-1, Gordon Kittel, K3AIG, 16 Jacqueline Dr., Paoli, Penna. 19301.

GONSET Communicator II, 2 meter 12V, $120.00; Heath Mohican transistor receiver, $55.00; Hallicrafters SX-100 receiver, $130.00; Apache $130.00; Cheyenne, $40.00; Comanche $40.00. Wanted: 4CX1000 and socket. Linear amplifier, Matchbox, Vibroplex, John Kakstys, W2FNT, 18 Hillcrest Terr., Linden, N.J. 07036.

HALLICRAFTERS SX-101 MK III, $140.00; HT-40, $35.00; homebrew six meter kilowatt amplifier using pair of 4-125As, rack-mounting with three meters, $40.00. Will ship REA collect. Andrew Borsa, WA1FRJ, 977 Westford St., Lowell, Mass. 01851.

SELL: New GPR-90 rcvr, $225.00 cash and carry. Bruno. ST9-4170. NYC.

NOVICE Transmitter wanted. 75 watts plus, preferred. Will trade even, a Yashica LM-44 twin lens (3.5) (500 TH) reflex. More features than Rolleicord. Field case and flash. Original cartons, can't be told from new. B&W color and 2 x 2 slides, $100.00 value. Offer me something as good. B. T. Scharbach, 502 Scheurmann, Essexville, Michigan 48732.

WANTED: HK-254, new or used. Gud condx, give price. Antique radios; Grebes, RORK, RORD, RORN, CR18, CR12, Grebe Syncrophase, Magnavox horns, drivers, many types and models, audio amps. Western Electrics, Radiola X, Jewett Parkay, Westinghouse Type, T.F. 10W phone, 20W c.w., etc., etc. Write Al Tatrault, 139 Maine, Northport, L.I., N.Y.

FOR Sale: FR-100 rcvr, FL-200 xmtr, FL-1000 linear amp, all in mint condx, $500 or best offer takes all three. Also, Lafayette KT-200 rcvr w/Heath Q-mult., Heath AT-1 xmtr and VF-1 FVO, all gud condx, make offer. Franklin 6013 28th Ave., S.E. Apt. 103, Wash., D.C. 20031.

VACUUM Variable capacitors, Jennings UCS. 10-300 mmfd., 7.5 Kv., complete with gear drive train, mounting bracket, brand new, $27.50 postpaid insured. Supply limited, satisfactory guaranteed. Bill Slep Co. Drawer 178Q, Ellenton, Florida 33532. Phone a.c. (813)-722-1843.

HALLICRAFTERS SX-101A, $200.00. HT-32 Mark I, $330.00, both in excint condx with manuals. K1OKQ, Dick Roznoy, 141 North Ave., Westport, Conn. Tel: a.c. (203)227-4721.

WANTED: SB-10 Heath Sideband adapter. Must be in good condx. Will pay top price. Rex W. Eagle, 241 E. Harvard, Anchorage, Alaska 99501.

STARTING School station. Need transmitter and receiver. Mr. Crawley, Chicago Tech College, 2000 S. Michigan, Chicago, Ill. 60616.

GALAXY V, A.C. power supply, remote VFO, all in perfect working order. Will accept best offer over $350.00. Will ship. Write or phone Ronald J. Gorski, 641 29th St., S.E., Cedar Rapids, Iowa 52403. Tel: (319)-366-2569.

TELETYPE Station: 15 printer, typing reperf., TD, including manuals, spare part, paper. Perfect condition, now on the air. $150.00. Another $50 buys the TT/L converter. K2YXB, 464 Dutchess Turnpike, Poughkeepsie, N.Y. 12603.

SELL: HT-37, $215.00; SX-111, $125.00. Both in excellent condition. Will deliver within 200 miles. K9OYB, 306 N. Seminole Circle, Ft. Wayne, Indiana 46807.

SELL: QSTs 1952-1966. Meters Weston 301, 100, 300, 1000, mil; galvanometer 0-100, RF 3 amp., B&W balun, Johnson SWR bridge, new Hy-Gain 2 BDT Dow-Key relay. Reasonable offers accepted. Baker, 40 Del Monte, Hillsborough, Calif. 94010.

SELL: Drake 2-A with Q-multiplier; Apache and SB-10 with coax relay, B&W 30 mc. filter. Going to school. No reasonable offer refused. Will deliver within 75 miles of NYC or Lancaster, Penna. Carl Metzler, 2303 Wilson Ave., Bronx, N.Y. 10469.

QSTS, January 1964-September 1966; 33 magazines and 2 binders. Make offer. WN2RNS, 381 North Forest Ave., Rockville Centre, N.Y. 11570.

VIKING II with forty-meter VFO. In good condition. $75.00 or your best offer. Want Gonset G-76 AC power supply. W5CLP, Box 9044, Auston, Texas 78756.

SWAN 350; 117XC AC 412 DC. P.S. Vox unit, $485.00. WA4JUT, D. C. Hubbard, 3501 Meadowbridge Rd., Richmond, Va. 23222.

TRADE Tektronix 511AD/manual, 4X150As, 16A Variac, rack panel blower. Interested in KWM-1, Monitorscope, HW-32, Kompact, 2B, etc. WA5ENP, 218 Karen Drive, Lafayette, Louisiana 70501.

NCX-5 Mk II, NCX-A, NCX-D, $425.00. I've no use for SSB. Want 75S-3B and/or X455KQ200, F455FA-05 filters. Bill Myers, K2SIL, 3023 Woodland Hills Dr., Ann Arbor, Michigan 48104. Tel: (313)-761-8361.

DXERS/Contesters: Reducing size and reorganizing. For sale: 1 custom-built final with power supply—20 meters only; 1 custom-built final with power supply, all bands. Collins KW-1, unmodified and in superb condition; Collins 32S3s and 75S3s with 516F2 power supplies; Collins KWM-2, PM-2, with carrying case, rejection tuning, and Waters Channelator. 75A4 with 4 filters. Clegg Zeus, Interceptor-B, Intercept all-band converter, two power supplies, Clegg Venus Transceiver for 6 with 416-A power supply. Priced for quick sale. K2HLB, 29 Circle End Drive, Ramsey, N.J. Tel: (201)-327-1119.

SELL: NC-303. Clean with 6-meter converter, xtal cal., manual. W4JZB, Fred Brauner, 5719 Taylor St., Hollywood, Fla. 33021.

VERTICAL 18AVQ Hy-Gain, $40.00. No shipping. W6GVP, 112 Fallbrook Ave., Newbury Park, Calif. Tel: (805)-498-4259.

WANTED: Brochure or wiring diagram for a type 404A Advancetron phase-meter. Willing to purchase or copy and return data to donor. R. I. Cozzens, RD #1, Box 348, Glenmoore, Penna. 109343.

HEATH HR-10 receiver, Globe HE-303 transmitter, Globe V-10 VFO. Separately or complete station for $100.00. Tom Benewicz, WA2OBT, 11 Montrose, Allendale, N.J

SELL: GPR-90 receiver with matching speaker, A-1 condx. Operating manual, ship in original carton. Asking $250.00 or reasonable offer. W2IHD, 17 Monroe Ave., Roseland, New Jersey 07068. Phone (201)-226-3560.

FOR Sale: Collins, MP-1 and 351D-2 mint condition. $175.00; also crystal bank, contains 126 crystals in plastic carrying case, 3.4 Mcs. to 30.0 Mcs. $175.00. R. C. Cater, Rt. #1, Frederick, Md. 21701.

FOR Sale: In Mint condx: SX-100, $150.00 or will trade for KW linear. W9GYV, 104 Michael Manor, Glenview, Illinois 60025. Pete. Tel: (312-966-7690.

SELL: Knight TR-106 transceiver, Eico 723, V-44 VFO, Lafayette KT-320, K3SIE. Richard Maietta, 2050 Roosevelt Ave., Williamsport, Penna.

HALLICRAFTERS equipped station, or units for sale. SX-140 receiver ($85.00), matching HT-40 transmitter ($60.00): D-104 mike, $15.00. Package deal also includes relay, antennas, speaker, manuals, etc.: $150.00. All equipment seldom used and in excellent condition. College is expensive! Cameron Parrett, WA6PCU, 301 Marilyn Place, Arcadia, Calif. 91006.

HALLICRAFTERS HA-1 T-O keyer; like new condx. Won it at Christmas party. $60.00 or will trade for Heathkit Spectrum Monitor or good 6-meter rig. No homebrew. K5ZGA, 813 E. Tucker Blvd., Arlington, Texas 76010.

$175.00 saved if you buy this latest model Swan 400, 410 VFO and 117X power supply. This perfect rig, used less than 10 hours, shipped prepaid to you for only $415.00. Money-order or certified check. Still 6 months warranty left on it. Elmo Seale, KØQIH, 307 W. Washington, Brainerd, Minnesota 56401.

SELL Complete Collins S/Line. One year old. Mint condition. 75S-3B receiver with 2.1 kc, 4 kc., 500 cy. and 200 cy. filters. 312B-4 control box, 32S-1, 62S-1, 30S-1. Spare tubes, all cables, manuals, orig'nal cartons. Price includes 9-TO keyer, Mosley TA-36 beam, Ham-M rotor, 60 ft. Rohn 25-G tower, all new, and KW Matchbox. $3100 takes all. H. Grant, 1115 Fulton St. Albertville, Ala. Phone 878-3802 or 878-0255.

SWAP Or sell: SB-100, SB-600, HP-23 for HW-32, HP-13 and $200.00. Or sell the above for $375. Prefer Jacksonville, Florida area. W6GTJ. Lt. j.g. John Butrovich, Operations Department, USS F. D. Roosevelt (VA-42 c/o FPO, New York, N.Y. 09501.

SELL: Complete mobile SSB rig Swan 240 transceiver with matching D.C. power supply, Turner mike, under dash mount. Hustler mast with 20-40-75 resonators, stainless steel antenna mount and spring. $275.00. K2MYW, Dr. Mort Solomon, 41 Westbrook Lane, Roosevelt, N. Y. 11575. Tel: (516)-223-3575.

DRAKE 2B, 100 Kc calibrator, one owner. Mint condition, $185.00. LM-7 frequency meter with power supply and original calibration book. $65.00. K6EJY, 11471 Richardson, Loma Linda, Calif. 92354.

FOR Sale: Collins 75A2, $185.00. Hallicrafters HT-40, $50.00; SX-140, $80.00 and SX-100 with speaker, $140.00. DX-20, $20. All like new. WA7CQX, 808 East 4th Place Mesa, Arizona 85201.

HAMMARLUND BC779A, super Pro. $75.00; Ranger, factory-wired. $125.00: Hy-Gain 12AVQ, $12.99. Lou Schaefer, Huntington Station, N.Y. Phone AR1-1468.

FOR Sale: DX-60, mint condition, $50.00. 50% down, balance c.o.d. W. B. Dodge, WB4CSD, 300 Wayneridge Road, Waynesboro, Va. 22980.

SWAN 350, latest, mint, 117C P/S. Bargain. W2CE, 55 East Bedell, Freeport, N.Y.

GONSET III, 2-meter with preamp. Excellent condition. $135.00 or will trade. Newton, 86 Haywood St., Greenfield, Massachusetts 01301.

OST 1926 thru 1945. Bound volumes. $50.00. Cash & carry. W2AEB.

NCX-3, good condition, $200.00. Also mobile power supply if desired. WB2GAL, 7240 Broadway, Fort Edward, N.Y. 12828.

WANTED: FT-241 xtals, 3-6 Mc. ARC-5 rcvr, BC-221. Bob Turner, W3RBW, Rte. 1, Box 258, Accokeek, Maryland 20607.

FOR Sale: Heathkit Marauder, excellent shape. Be glad to work you on sked. $225.00. Ship collect. WØJBI, 7500 Raleigh, Westminster, Colo. 80030.

HUNTER Bandit 2000B linear amplifier, $325.00. Factory-wired. Like new condition. Will deliver to 150 miles. KØCKX, 511 5th Ave., Coralville, Iowa. Tel: 319-338-1814.

HALLICRAFTERS HT-46 SSB-CW transmitter, $295.00 and mated SX-146 receiver, 100, kc. calibrator, $245.00. Transceive capability. Spotless. Nearby delivery. Walter Grove, W2BZJ, (609)-737-1458, Box 212, Pennington, N.J. 08534.

75A4 #2818 with 0.5 and 3.1 kc filters and speaker, $375.00; Heath Marauder, $190.00. Both excellent operating condx. Edward Rebennack, WA5EID, 386 Tudor Avenue, New Orleans, La. 70123.

GOING Transceiver; Hammarlund HQ-170AC-VHF, with S-200 spkr., clock, less than 6 months old, original cartons, manuals; perfect condx, not a scratch, sacrifice, $325.00. M. Kriegel, WB2ORZ, 1552 E. 35th St., Brooklyn, N.Y. 11234.

SELL: Legal limit station Swan Mark I amplifier 2000 P.E.P., $325.00; Galaxy V transceiver, $325.00. Both for $625.00. Consider 2B or R4 on a trade. WAØCHK, 2117 W. 21st, Topeka, Kans. 66604. Schedule on 75 meters.

SALE Or trade: Drake 2B, 2BQ, 2AC, mint condition, $190.00; Heath Marauder HX10, excellent, without a scratch, $190.00; Heath Sixer, HW29 unused, $35.00. All unmodified f.o.b. with manuals. Wanted: 32S3, 75S3, 312B4, W4UUI/4, 1003 Appleton Ave., Orlando, Florida 32806.

QSTS. Misc. copies. Years 1937-1964. 3 for $1.00. P.P list W3FYW.

75S-3B: 3 filters, $450.00; 75S-3C: 3 filters, extral xtals, $550.00; 32S-3 with power supply, a.c., $575.00; 312B4, $110.00; 30S-1 extra final and other tubes, $650.00; new 4CX1000, $30 each. Send certified check to Clinton Pierce, 6136 Manton Ave., Woodland Hills, Calif. Phone 3467908.

COMPLETE Station: Johnson 500 xmtr, 500 watts AM, 600 CW; Hammarlund HQ-170C receiver with speaker; Hallicrafters HA-1 T-O keyer with Vibroplex key, Turner 250 dynamic desk mike, 4-inch scope, SWR and power meter, Drake TV 1000 low-pass filter; TH-3 beam; Lattine 40-80 dipole, spare 4-400, relays, loads of coax and connectors, plus large assortment of electronic surplus: $550.00 firm. Arthur Santella, K1-VKO, 43 Seaview Ave., East Norwalk, Conn. 06855.

VOTE! Hams: A national Incentive Licensing poll is being conducted by The Southern Cayuga County Amateur Radio Club! You are requested to vote on a QSL or postcard either For or Against Incentive Licensing, also please sign your call and handle. Ham Clubs: please publish this poll in your club paper! Net Controls: please air our poll over your net! Results will be sent and petitioned to the FCC and announced as soon as possible. Tell every ham to vote in the United States. Rush your vote now to: SCCARC-WB2NOD, Dept. P., Box 685, Moravia, New York 13118.

CQ Magazine, back issues for sale. 1945—Feb., Mar., Apr., June, July; 1946—Feb., Mar., Apr., May, June, July, Aug., Sept., Dec.; 1947—all; 1948—all; 1949—all; 1950—all; 1951—Jan., Feb., June; 1953—Mar., May; 1954—May, June, July; 1955—Mar., Aug., Sept., Nov., Dec. 1945 and 1946 issues $1 @, others 50¢ each, complete years $5.00, plus shipping. R. L. Baldwin, 26 Ridge Road, Simsbury, Conn. 06070.

SELL: Large rolls plastic Electritape, $1.14. Brass washers, even #4 through 14, ¼ through ½", 2 ounces 94¢. Antenna Springs 88¢, feed through insulators, threaded brass rods, nuts, pullies, hardware. Send postage. Walt, W8BLR, 29716 Briarbank, Southfield, Mich. 48075.

INSTRUCTOGRAPH with ten (10) tapes, $30.00; Sencore component resistor and capacitor substitutor Model RC-121, $20.00; realisic capacitor tester, in or out of circuit, Model 112 (Paco), $15.00; Millen grid dip meter type No. 90651 in case, $35.00. Eico signal generator Model 324, $18.00; Eico signal tracer Model 147A, $18.00. These articles are in opened boxes, but brand new. K1PNL, Tel: (203)-583-5433.

SWAN 350, 117-C power, speaker. Used very little. A-1 condx, will ship. First $360.00 check. Willie Murphey, W5SAR, Guthrie, Okla. 73044.

FOR Sale: Drake 2-B, little used, in original packing, $150.00; Hallicrafters HT-40, like new, $45.00; Globe Chief 75-watt xmttr, $30.00; Autronic Keyer and key, like new, $40.00. Ivan Fry, 202 W. High St., Minerva, Ohio. 44657.

SELL DeLuxe 4-1000-A linear. Other quality parts. Send SASE for list. WØHNA.

NC-270 and SX-99 with Q-multiplier. Best offers. K3CEW, 238 Duncan Ave., Wilmington, Del. 19803.

HEATH "Tener", $25.00; 10 M. Heliwhip, $5.00; 6 M. converter, Int'l FCV-2, $6.00. WB2AEO, Tel: (212)-721-4518.

NEW SB-34, won in contest, factory sealed carton (already have good rig). Best offer. Bob Rule, WA7EGK, 1219 McIntyre, Laramie, Wyoming 82070. Tel: (307)-766-2415.

WOW! DX-100B, DX-60, Novice and general xmtrs; Eico 722 VFO, Hallicrafters S-120 rcvr. Sacrifices. Make ur offer. Jim, WA5CTD, Box 4041, Tech Station, Lubbock, Texas.

FOR Sale: Int'l. 6 M. conv., $8.00. BTEL 10-80 turret, $5.00; 4-250 and socket, $9.00; 100 kc. cal., $5.00; transformer 6.3V, 20A, $6.00. W1YZL, 45 Chandler St., Haverhill, Mass.

GONSET G-76-3350 DC power supply; Webster Bandspanner, master matches, cables, mike and speaker and body mount. Will sell separately. Don VenHuizen, KØAAJ, Wimbledon, N. Dak.

NOVICE: Knight T-60 transmitter, exclnt condx. Xtals for 80, 40 and 15 meters. Original carton and manual. I'll pay shipping, $38.00. WA1FLC, 219 Little Hill Drive, Stamford, Conn. 06905.

HALLICRAFTERS SX-117 with extra xtals for 10M, WWV and 2 other ranges, $240.00; Heathkit DX-60, $55.00; HG-10 VFO, $25.00. All in excellent condx, with manuals. Thomas Tate, WA1GTA, 105 Sears Rd., Wayland, Mass. 01778. Tel: (617)-348-4059.

FOR Sale: Globe Champ, 300A in good condition. Best offer. Will ship in continental U.S. Otto Ficek, KØIAB, New Hradec, N.Dak., 58648.

NEW And excellent reconditioned equipment at low prices. Terms. Collins 75S-3, KWM-2, Drake 2-A, TR-3, Gonset GSB-101, GSB-201, G-50; Hallicrafters SX-110, SX-101A, HT-37, SR-160, National NC-300, NCX-3, NCX-5, NCL-2000. Much other equipment. Write for price lists. Henry Radio Co., Butler, Mo.

INCENTIVE Licensing? You need Posi-Check, Amateur Extra and General Class FCC type exams, complete in detail and style, even to IBM type answer sheets. A very good aid to learning and a Must in preparation for FCC Amateur exams. General Posi-Check consists of 297 questions and explained answers for only $2.98. Extra Class, 115 questions and diagrams with explained answers, $2.00, 139 questions of the 297 in the General Posi-Check apply directly to Extra Class also. Get both for only $4.50 postpaid. Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322

"CRYSTALS Airmailed: SSB, Nets, MARS, Novice, Marine etc. Custom finished etch stabilized FT-243 .01% any frequency or fraction, 3500 to 8600 kilocycles $1.90. (Five or more same or mixed frequencies $1.75) (Nets: Ten or more same frequency $1.40). 1700 to 3499 and 8601 to 20,000 $2.50. Overtones supplied above 10.000. 10.000 to 13,500 fundamentals $2.95. Add 50¢ each for .005%. HC-6/u metal miniatures above 3000 add 75¢ each. Crystal groups for "IMP", "SSB Package" "DCS-500" and other ARRL projects. State specific needs. Write for order-bulletin. Crystals since 1933. Airmail 10¢/crystal, surface 5¢. C-W Crystals, Marshfield, Missouri 65706."

BC-624 (12) tube Superhet for 2 meters, untouched, with conversion manual: $20.00. Gary Schwob, 5 Park Place, Athens, Ohio.

TO Settle estate: Heathkit Cheyenne-Comanche mobile twins, receiver-transmitter, microphone, mobile mounting rack, AC supply and transistorized mobile supply included. Make offer. Also March 1917-1961 QST, in binders, complete. Mrs. Sylvia Allen, #1401 Boulevard Allies, Pittsburgh, Penna.

FOR Sale: Superior Electric powerstats, type 136, spec. 8P-57515, 2.8 KVA, 20A, 120V, 50/60 cycle, 1 phase, 0-140V output, bench or panel mount. $24.50 each, c.o.d. F.o.b. Whittaker Electric Co. 1850 Park St., Muskegon, Michigan 49442.

VACATION Maine lakeside cottage, beach boat, 75-10 meter antennas. Details. Richardson, W1COG, 3 Francis Kelley, Bedford, Mass. 01730.

TRANSMITTERS-Receivers repaired. Kits wired, custom-building, alignment, calibration. Free Estimates. J-J Electronics, Windham Road, Canterbury, Conn.

SELL: Gonset G-50, $200.00; Gonset Comm. IV, $225.00; both 6 Mtr., good condition; Johnson Matchbox 275W, $35.00. Will ship REA. K8LXA, 399 Furnace Road, Conneaut, Ohio 44030.

EICO 720, $50.00; 730, $35.00; 722, $30.00. All excellent condition. Less than 25 hours use. WB2DPG, Larry Leventhal, 290 Ninth Ave., New York, N.Y. 10001.

COLLINS KWM-2 transceiver, noise blanker, portable a.c. supply. Excellent condition, $825.00. J. Scott, 600 East 72nd, Kansas City, Missouri 64131.

HRO 190 Kc-30 Mc. RAS. Military surplus receiver. Best offer. WA9IYF.

WANTED: Collins 312B-5, mint condition, W9NRT, Effingham, Ill.

QST June 1919 thru Dec. 1944, complete. Modern Electrics, April 1908 thru Dec. 1913. All that were published. Popular Electricity May 1909 thru June 1914, complete. Cash or trade on 51J-4, HT-32B or other gear. H. J. Lohman, W3OC, 223 Cresswood Dr., Elizabeth, Penna. 15037.

VALIANT. Immaculate F.W., $150.00. K2OIL, 1518 Longfellow, Cherry Hill, N.J.

LOS ANGELES Area: Viking II, Collins VFO, Heath SSB Adapter, D-104 mic, 6 M xmtr, relay, B&W LP filter, xtra power supply, etc; $250.00. SX-101A, xtal calibr., 6 M conv., spkr, $235.00. Package deal. All of the above plus six meter Sel. beam. $500.00. Stephen Fry, WB6OOV, 14590 Deervale Pl., Sherman Oaks, Calif. 91403.

COLLINS 75A-4 receiver. Looks and operates like new! $375.00. S. Cokas, 16 Edgehill Road, Swampscott, Mass.

HELP K9LUF celebrate 1 year as a General on April 1st and 2nd and receive a special certificate. 21.350 and 14.250.

WANTED: Collins 2.1-K.C. filter for 75A-4. State price and condition to Jake Mirigian, W6JXY, 666 W. Morris, Fresno, Calif.

WANTED: Telrex TM-30C or D, Heath Pawnee or Polycomm 2. W2MVR, James Geras, 108-12 227th St., Queens Village, L.I., N.Y. 11429. Tel: (212)-HO-48377.

SELL Or Trade for ham receiver: 15 H.P. 2 cyl. Onan engine for natural gas Mod. J60-13MCH, new and unused. Includes compressor. Fine for emergency power plant. WN6TNA, 5412 Stanford, Garden Grove, Calif.

BARGAINS: Drake 2B with xtal calibrator, like new, $170.00. Johnson Valiant 3-6146s final. Built-in VFO transmitter (275 watts P.E.P. SSB with adapter); excellent. $120.00. K2KGU. Tel: (212)-666-8513.

HALLICRAFTERS SX-101 Mk III; WRL Meteor SB-175 transmitter and power supply. Eico 722 factory wired VFO. All in A-1 condx. Must sell. Make offer. W8HHX, 529 Oakview Drive, Kettering, Ohio 45429. Tel: (513)-299-8535.

COLLEGE Bound, quick sale. Sacrifice entire rig like new. Hallicrafters SX-111, Eico 720, 730, VFO for $200. WB6DDS, 3680 Ventura Canyon, Sherman Oaks, Calif. Tel: 788-4474.

HEATHKIT: HX-20, factory serviced; HR-20, HP-20, HP-10, mobile mount, mike, $275.00, or reasonable offer. W4LHD, 595 West Drive, Memphis, Tenn. 38112.

WHEATSTONE Code Perforator, Boehme tape keyer, excellent, $295.00. Tektronix 514, $275.00. Wanted: USM-26, HP-524, HP-525, HP-540. W8RMH, 1910 Longpoint, Pontiac, Mich.

TO Settle estate: Selling HT-37, $225.00; SX-111, $135.00. Both clean, good condition. F.o.b. Hartford, Conn. Hy-Gain Hu-Tower, $50.00. Excellent condition, but cannot ship. You dismantle and pick up near New London. J. Huntoon, c/o ARRL Hq.

SWAN 350, $250.00 takes it home. 117 supply, $30.00 extra. David Walsh, WB2EQS, 28 Atterbury Ave., Trenton, N.J.

WANTED: Operating instructions and building plans that come with DX-100B. Don Alberigi, Dragerton, Utah.

SELL: 439 issues of QST, 1925-1965; 197 issues of CQ, 1947-1965, $125.00. W0MFS, 340 43rd St., Des Moines, Iowa 50312.

SALE! RCA AR-77 receiver, $65.00; Sonar XE-10 exciter, $25.00; 2 mtr. xmtr and rcvr, extra set tubes, $50.00. F. H. Mac Indoe, W3AJV, Havertown, Penna. 19083.

HT-37 for sale. Mint condition. Serial #216114, only $199.00. Will ship in original carton. L. G. Lyday, 3647 W. Arbutus, Okemos, Michigan or call (517)-ED-21774.

DRAKE 2-B and 2-BQ in absolutely perfect condition, $199.00 and $29.00; DX-60A, $59.00; HG-10, $29.00; E-V 729SR microphone, $9.00; DKC-TRP T-R switch, $15.00. WA3CRA, 4715 Merivale, Washington, D.C. 20015 (301)-656-4803.

FOR Sale: Hammarlund HQ-180AX, mint condition, cost $500.00. Will sell for $290.00. Also Eico VFO, Heath Q-multiplier, Hammarlund Super Pro, Misc. Novice gear. W. S. Bacon, W2CJR, 53-51 193rd St., Flushing, L.I., N.Y. 11365. Tel: (212) BA-4-1013.

WANTED: Individuals who can build electronic equipment, if I send to them the schematic. Also need individuals who can design electronic equipment. If interested, send name to: W8GUJ, J. L. Courtney, YMCA, Box 69, 3200 Franklin Blvd., Cleveland, Ohio.

SB-300 SSB-AM filters. $190.00 f.o.b. WØKSK, 2300 South 4th Street, Sioux Falls, South Dakota 57105.

SELL: DSB-100 in excellent condition. $60.00. WA9OUX, David Wilhelmus, Route 3, Boonville, Indiana 47601.

CORNELL-DUBILIER manufacturer of the famous Ham-M amateur antenna rotor and a leader in electronic components has an opportunity for a tech writer/catalog specialist in its advertising department. Those interested, please send resume to W. K. Carlson, Cornell-Dubilier Electronics, 50 Paris Street, Newark, N.J. 07101.

HAM, over 18, to instruct at a children's camp in the Pocono Mountains in Penna. Own equipment required. Please explain type equipment and further qualifications to Pocono Highland Camp, 6528 Castor Avenue, Phila., Penna. 19149.

SALE: Hallicrafters S-76-S-75; Ameco CR-144 S-20; Heath HR-10, with Spkr. $60.00; Eico 720 with new power supply and final $55.00; HT-40 with Novice xtals and extra final, $55.00. Jim, WN2WAG, 60 Chestnut Dr., Hastings, N.Y. 10706. Tel: (914)-478-2525.

WARRIOR Amplifier 1000 watts P.E.P., $150.00; Drake 2-B reconditioned, Q-multiplier, calibrator, low-frequency converter, $240.00; SB-34 SB-2LA, 1000 watts P.E.P. 4 months old, factory checked. $570.00. Nick, K7AOA, 5750 Yukon, Sparks, Nevada 89431.

14 Month old HG-180AC, DX-100N wid SB-10. Space needed. Going transceive. Delivered package $450.00. WA3ERA.

SELL: Swan 350, 117XC power supply, 6 months old, in mint condition. Manual and factory cartons, $425. Pick-up deal only, sry. No shipping. Ed Abbott, 127-04 109th Ave., Queens, L.I. Phone (212)-641-0502.

HALLICRAFTERS SX-101A and HT-32 with R47 speaker, Dow-Key, Kw. low pass, all cables and manuals $475.00. Peter Trapp, 2596 Belmill Lane, Bellmore, New York 11710. WB2HAV.

TRADE: Collins 51J4 for old U.S. coins or $50 gold pieces, guns, Henrys, Volcanics, Winchesters or Colts. W2MCA, 130 Beech St., Valley Stream, L.I., N.Y. 11580.

BARGAINSVILLE: 48 ft. crank-over tower, $99.00; mint 2B, $165.00; Navigator, $65.00 or package deal: $310.00. H. Horrocks, Sykesville, Md. 21784.

SELLING: My all-band 4-250A kw rig (runs 2 Kw. P.E.P.) in 8 ft. cabinet, with Ranger-tupe trans/exciter, all power, powerstat, C1B mod. components. Neat, efficient. $495.;;. No shipping, sry. HQ-170 RX, excint. $225.00 prepaid. TA-36 beam, little used. $79.00 picked up. Communicator II, 2 meters, 115/6 volt, Good. $79.00 prepaid. B. G. Day, W1JRU, Suffield, Conn. 06078.

RANGER II, $150.00; SX-110, $75.00; SR-46, $120.00; Heath MP-10 inverter, $25.00; 6M Halo, bumper mount, mast, $10.00; V-4-6 (new), $18.00; misc. equipment. SASE for complete list. K9YWO, 211 West Hintz, Arlington Heights, Ill. 60004.

4CX250Bs with socket and chimney, $5.00. Few other items SASE for "goodie list". Wanted: RTTY Model 14 punch only. Will trade. Dell Thomas, WB2NBY, 15 Creek Bend Rd., Poughkeepsie, N.Y. 12603.

WANTED: Broadcast Command receiver. BC946 or ARC, no modifications. Desire nearly new. Pay good price. W6JXW, 3801 So. A Street, Oxnard, Calif. 93030.

QST Sale: 1956, 1958-1964, complete; 1955, 1957, except January; $5.00 per year (1955, 1957, $4.50). $40.00 the set. Gary Knight, 2023 Empress, So. Pasadena, Calif. 91030.

"HOSS-TRADER Ed Moory offers on a "cash, no trade deal" demonstrator floor models, factory warranty, NCX-5, $459.95; NCL-2000, $549.00; NC-200, $298.00; Swan-350, $349.95; Swan Mark I linear, $389.00; Galaxy V, $345.00; SB-34, $339.00; Drake R-4A, $329.95; T4-X, $339.00; 2-C receiver, $179.95; new Ham-M rotor and demo TA-33, $184.95; demo Classic 33, $104.95; demo Ham-M rotor, $89.95; Special Rohn 50 ft. fold-over steel tower, $188.00 prepaid; reconditioned gear: 2-B, $179.95; SX-101A, $149.00; KWM-2, $599.00; 32S-3, $499.00; 62S-1, $489.00; TR-4, $399.50; TR-3, $349.00; SB-33, $179.00; DX-100, $54.00; Heath Mohawk RX-1, $139.95; Swan 240, $169.00. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Phone 946-2820.

KWM-2 factory-modified, set of spare tubes, PM-2 AC power supply, 516E-1 12-volt mobile power supply negative ground 10-C mike, $815.00; 30L-1 final, $385.00, All manuals. Prepaid stateside. $1200.00 certified check. W. P. Searcy, Jr., W5LV, 1821 N. Turnbull Drive, Metairie, Louisiana 70001.

W2HF Wants instruction manual for Hickok Model 640-AF 'scope. All mail answered.

VIBROPLEX Bug for sale: $10.00. WB2TUT.

SALE: HA-1 Hallicrafters T-0 keyer and Vibroplex Vibro-Keyer. First sixty dollars. Perfect. W9ABO, Washburn, Wisconsin 54891.

FOR Sale: Gonset G-50 6-Meter Transceiver. Excellent condition. $190.00. John T. Chandler, WA4YXK, 3904 Brenda Lane, Annandale, Va. 22003.

COLLINS 75A-1 receiver recently reconditioned by World Radio Labs. Excellent condition. Asking $200. Purchaser must pick up. WN2SSV, Larry Shulman, 215-05 29th Ave., Bayside, L.I. N.Y. Tel: (212)-BA5-2025.

VIKING II with 122 VFO, mint condx; recently replaced all tubes. $100.00 f.o.b. A. Pike, W1MYA, 758 Nott St., Wethersfield, Conn. 06109. Tel: 529-2065.

VIKING 500. Like-new condition. AM, CW, SSB, first $300 takes it. Complete 2000 P.E.P. SSB station. 20A with VFO and power supply and Thunderbolt linear. Excellent condition. Both for $300. Bob, K1PQT, 12 Creswell Road, Worcester, Mass. 754-0931.

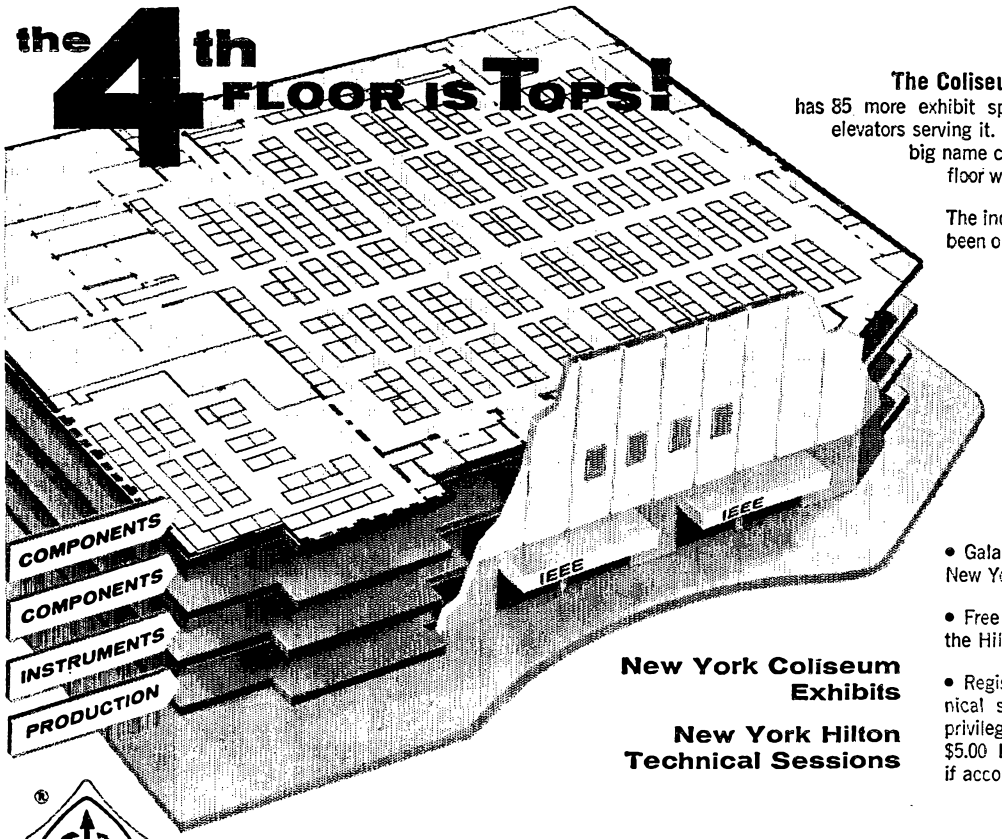
TRADE: Bell & Howell Model 240, 16 mm Electric eye camera and case, mint condition, plus cash for late model Collins receiver or transmitter or Henry 2 K linear. Andrew L. Freeman, 1805 North Third St., Grand Forks, North Dakota 58201.

WANTED: Gonset Communicator IV, 2 meters. Also Gonset VFO. Charles Simmons, KØMOH/2, 5251-C Minnesota, Plattsburgh, N.Y. 12903.

SELL: Clegg Zeus and PS/mod. unit, $350.00. Art, WA9IQP, 811 Franklin, River Forest, Ill. 60305.

Index of Advertisers

the 4th FLOOR IS TOPS!



New York Coliseum Exhibits

New York Hilton Technical Sessions

The Coliseum's newly constructed fourth floor has 85 more exhibit spaces and new escalators and express elevators serving it. Many engineers will go there first to see big name components firms who are exhibiting. This floor will really buzz!

The increased space finally gives firms who have been on the waiting list an opportunity to exhibit. It also helps to relieve crowding on the other floors. Any way you look at it, the fourth floor is tops and the IEEE EXHIBITION this year will be bigger and better than ever.

- 74 Technical Sessions at the New York Hilton
- FOUR COMPLETE FLOORS OF EXHIBITS (over 700 firms) at the New York Coliseum
- Gala Annual Banquet—Wednesday 7:15 p.m. New York Hilton Grand Ballroom—$15.00
- Free shuttle busses every few minutes between the Hilton and the Coliseum
- Registration—Good for all four days—Technical sessions and exhibits, with in and out privileges. IEEE Members $2.00 Non-members $5.00 Ladies $1.00 High School Students $2.00 if accompanied by an adult.

IEEE *'67 International* **CONVENTION / EXHIBITION**

Monday thru Thursday
March 20 - 23

WHAT'S FREE IN NEW YORK?

The Annual Single Side-Band Show, all day Tuesday of IEEE convention week..

THAT'S WHAT!

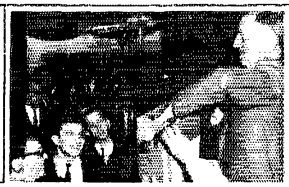
Here's your big opportunity to see the newest Ham gear from the leading manufacturers, and to talk directly with the factory people. All at the 1967 Single Side-Band Show, Tuesday, March 21st, from 11 AM to 9 PM.

Everyone is invited! All Hams, would-be Hams, CB-Hams, and their friends! Come to the Penn Top Room of the Statler-Hilton Hotel, 7th Avenue and 33rd Street, New York City (opposite Pennsylvania Station).

FREE!

VALUABLE PRIZES

Prizes to be awarded every hour on the hour. (Be sure to bring your Ham License or QSL).



FREE!

TECHNICAL SESSIONS

Informative discussions by the experts from leading equipment manufacturers.

FREE!

TWICE THE PRIZES
TWICE THE ROOM
TWICE THE EXHIBITS

GRAND PRIZES!

hallicrafters
SR-2000
"Hurricane"
$1,390.00
TRANSCEIVER

NEW
SWAN
"500"
TRANSCEIVER

PLUS
MANY
MANY
MORE
ALL FREE!

Coordinated, in the interest of Amateur Radio, by "HAM HEADQUARTERS, USA"®

HARRISON

225 Greenwich Street, New York, N.Y. 10007
(212) BARCLAY 7-7922
[139-20 Hillside Avenue, Jamaica, New York]

OPENING SOON! Our new, larger store, at 8 BARCLAY STREET (opposite Woolworth Building)

New from National

The most versatile 5-bander on the market ...priced even lower than a kit rig!

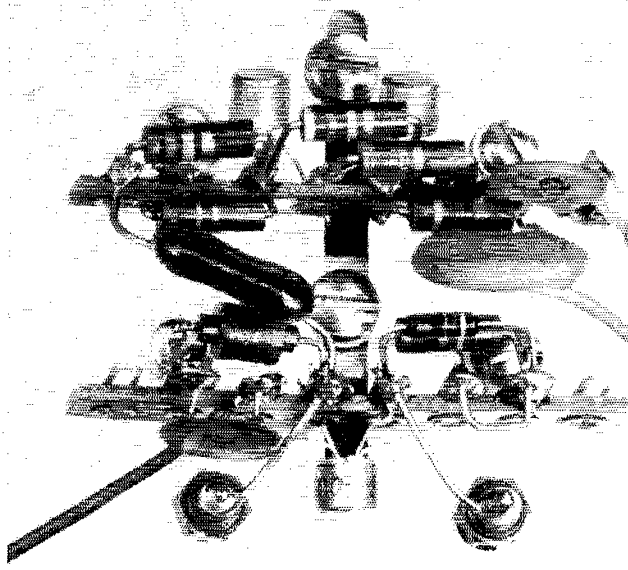
Here's the fastest way to move up from single band or triband operation . . . the all-new National 200. It's a fabulous five-bander, an ideal rig for mobile, portable, or home operation . . . and it's only $359! For the first time at this amazingly low price, you get top-notch SSB, CW, and AM performance on the 80 through 10 meter bands . . . plus National's traditional quality and full One-Year Guarantee.

National gives you these important features: ■ Complete coverage of the 80 through 10 meter bands. ■ 200 Watt PEP input on SSB, plus CW and AM. — Separate product and AM detection plus fast-attack slow-release AGC. ■ Crystal-controlled front end and single VFO for high stability, and identical calibration and tuning rate on all bands. ■ Crystal lattice filter for high sideband suppression on transmit, and rejection of adjacent QRM on receive . . . plus solid-state balanced modulator for "set-and-forget" carrier suppression. ■ Operation from new low-cost AC-200 supply or from NCX-A or mobile power supplies. ■ ALC. ■ 45/1 planetary/split gear tuning drive. ■ Automatic carrier insertion in AM and CW modes. ■ Panel meter automatically switched to S-units on receive. ■ Universal mobile mount included.

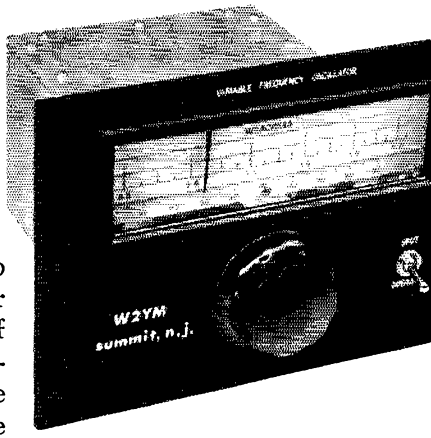
ONLY $359.
with National's full One-Year Guarantee

National Radio Company
37 Washington Street, Melrose, Massachusetts 02176

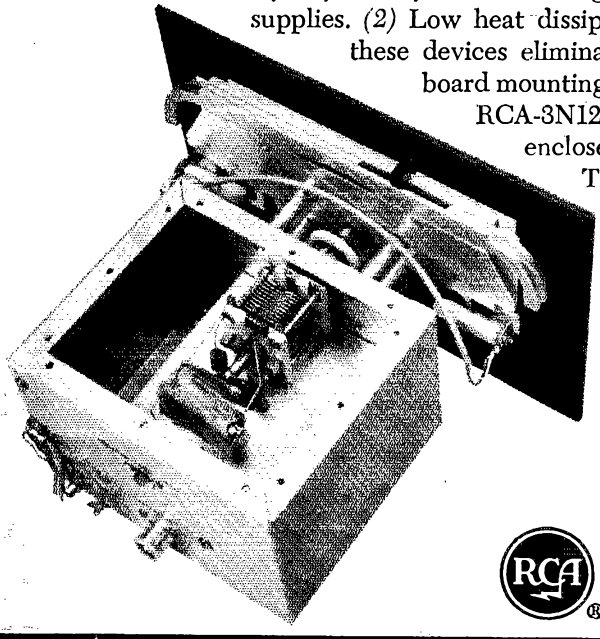
30 H_z/2 hrs drift—after 30 seconds warm-up with this solid-state VFO for 80 through 2 meters



Uses New RCA-3N128 MOS Field-Effect Transistor plus low-voltage power



The new RCA-3N128 Metal-Oxide-Semiconductor Field-Effect Transistor combines the vacuum tube's very high input impedance with the transistor's very low power requirements and operating potentials. These characteristics provide the VFO designer with these advantages: *(1)* Operation directly from 12-volt supplies, auto battery, dry battery and low-voltage power supplies. *(2)* Low heat dissipation of these devices eliminates outboard mounting. *(3)* The RCA-3N128 can be enclosed in the box with tuning coil and capacitors. The VFO article in December QST by W2YM gives full design details, including low-level DC power supply.



The RCA-3N128 MOS Field-Effect Transistor—and other RCA transistors, rectifiers, and diodes—are available from your RCA Distributor. Write RCA Commercial Engineering, Section C37M, Harrison, N.J. for a reprint of the W2YM design article.

AVAILABLE FROM YOUR RCA DISTRIBUTOR

RCA Electronic Components and Devices

RCA®

The Most Trusted Name in Electronics