

November, 1948

40 Cents

# QST

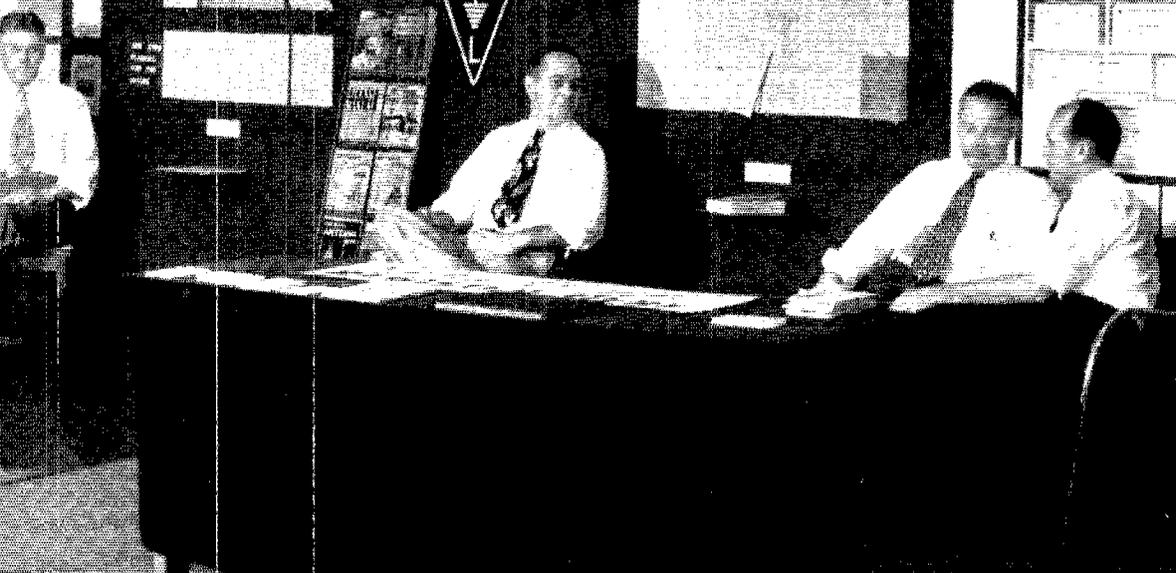
devoted entirely to

# amateur radio

AMERICAN RADIO RELAY LEAGUE

FOR THE RADIO AMATEUR

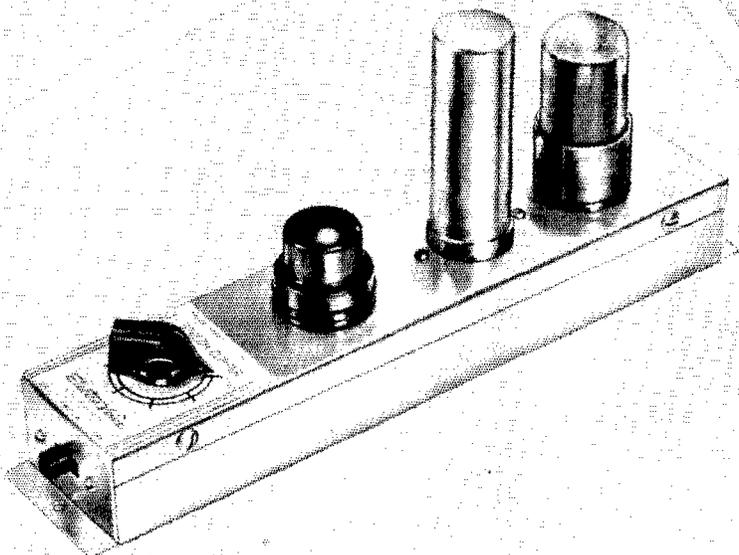
YOUR REPRESENTATIVE AT  
INTERNATIONAL CONFERENCES



PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

**NEW**  **MODEL 1000** *Speech Clipper*

**ADDS GREATLY TO ARTICULATION  
HOLDS MODULATION AT 100%  
...in Phone Communications!**



THE SPEECH CLIPPER is a specially designed Peak Limiting Pre-Amplifier . . . Clips the tops and bottoms from speech frequencies which rise above a pre-set amplitude . . . Increases the ratio of consonant-to-vowel intensity . . . Adds greatly to articulation and intelligibility in speech transmission, especially in the presence of high QRM or QRN . . . Attenuates sidebands above 3000 cps. as recommended by ARRL . . . Holds modulation to 100%. Small, compact, easy to install and operate. Model 1000, List Price . . . \$24.50

Ask your E-V Distributor or write for Bulletin No. 145

ELECTRO-VOICE, INC., BUCHANAN, MICH. Export: 13 E. 40th St., New York 16, U. S. A. Cables: Arlab

ANOTHER FINE PRODUCT BY

*Electro-Voice*

**PLUS-PACKAGE**

## BEGINNER'S CW RIG

**Streamlined Model**

Using one G-E 6AR5  
miniature pentode as a  
crystal-controlled oscillator



**TYPE  
6AR5**



**N**O, larger old-style tubes aren't a "must" for the transmitter of the novice ham. From the start, he can take advantage of ultra-modern, compact design.

G-E tube distributors have the detailed circuit layout which tells how to build this plus-package 3.5-mc and 7.0-mc CW rig, using a single 6AR5 miniature. Ask for your copy. You'll find the transmitter easy to construct . . . economical (the 6AR5 costs less than any other tube you would be apt to use for this application) . . . and a rig powerful enough for many enjoyable QSO's, because of a tube input of 15 w when operating at 250 v and 60 ma.

Equivalent to the 6K6-GT in performance, G.E.'s 6AR5 is good for much higher frequencies—up to 150 mc—owing to short internal leads, a feature of miniatures. When the ham beginner moves on to advanced circuits and disassembles his old rig, here is a tube that need not be junked, but will continue to do a key job in some new piece of h-f equipment.

Tube and plus-package transmitter are small, taking up minimum space on your table that one day will be crowded. Visit your G-E tube distributor today. He'll give you the complete, helpful story! *Electronics Department, General Electric Company, Schenectady 5, New York.*

### CHARACTERISTICS

Heater voltage	6.3 v
current	.40 amp
Plate voltage	250 v
Screen voltage	250 v
Max plate dissipation	8.5 w

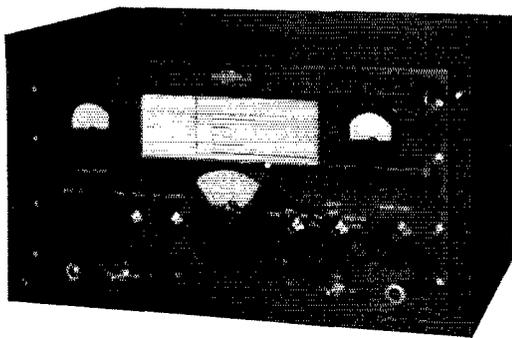
**S. S. C.** . . . Ham News continues to break new ground for amateurs! See the November-December issue for full details on how to build a single-sideband receiver. Ask your G-E tube distributor now to reserve your free copy for you—this issue will go fast when received in your area.

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

**GENERAL**  **ELECTRIC**

161-GA11-8850

# How it feels to own a 32V-1



We have had spontaneous letters from many owners of Collins 32V-1 ham transmitters. Here are extracts from a few of them:

W5SH—"About the transmitter, I have nothing but praise for it. It is constructed with the usual Collins excellence, and performs in a superior manner. It has lots of sock and the quality is perfect. The ease of changing frequency and the accuracy of calibration is a dream."

W1AHX—"I have been building transmitters since 1920 and I have never seen the equal of the 32V-1. The antenna loading circuit is one of the most astonishing features I have ever operated on amateur frequencies. The receiver silencing and audio tone circuits are a delight. Shifting frequencies is like tuning a broadcast receiver. Your engineers have my profound respect."

W5AUB—"Just a line to notify you that the 32V-1 is really a nice job and I am more than pleased with it. Having been a 'ham' for 24 years, it's the finest piece of gear for the money I have ever seen or owned! DX is a pleasure, and to work WAC in less than 6 hours is just a matter of form."

W3EYX—"I've repeatedly been told

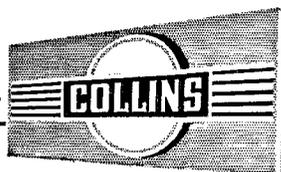
that the crispness of the voice qualities plus the stability of the signal permit copying me through QRM that is actually stronger than I in signal strength."

W9EMT—"I am enclosing the registration card for my 32V-1 transmitter. This is really a sweet little rig. In three weeks I have contacted 34 states, 3 ZL and several South and Central American contacts."

W2SLU—"It has been about six months since I first put my 32V-1 into operation, so will pass along in writing my appreciation to your organization for a completely satisfactory amateur type transmitter. During this six months a great deal of DX has been worked on 20 CW, as well as 40 and 10 meters. The reports received from all stations worked have consistently been T9. I have also found the VFO to be extremely stable during operation and that seldom has it been necessary to reset the dial when zero beat with WWV."

The price of the VFO controlled, band-switching, gang-tuned Collins 32V-1 amateur transmitter, conservatively rated at 150 watts input on CW and 120 watts input on phone, is \$475.00. See or write your Collins dealer about it. If you don't know him, write us for his name and address.

FOR RESULTS IN AMATEUR RADIO, IT'S . . .



**COLLINS RADIO COMPANY, Cedar Rapids, Iowa**

11 West 42nd Street, New York 18, New York

458 South Spring Street, Los Angeles 13, California



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

**STAFF**

*Editorial*

A. L. BUDLONG, W1BUD  
(Acting Secretary, ARRL)  
*Editor*

HAROLD M. MCKEAN, W1CEG  
*Assistant Editor*

GEORGE GRAMMER, W1DF  
(Technical Director, ARRL)  
*Technical Editor*

DONALD H. MIX, W1TS  
BYRON GOODMAN, W1DX  
*Assistant Technical Editors*

EDWARD P. TILTON, W1HDQ  
*V.H.F. Editor*

RICHARD M. SMITH, W1FTX  
C. VERNON CHAMBERS, W1JEQ  
*Technical Assistants*

ROD NEWKIRK, W9BRD  
*DX Editor*

WALTER E. BRADLEY, W1FWH  
*Technical Information Service*

*Production*

RALPH T. BEAUDIN, W1BAW  
*Superintendent*

NANCY A. PRICE  
*Assistant*

*Advertising*

F. CHEYNEY BEEKLEY, W1GS  
LORENZ A. MORROW, W1VG  
EDGAR D. COLLINS

*Circulation*

DAVID H. HOUGHTON  
*Circulation Manager*

RALPH T. BEAUDIN, W1BAW  
*Assistant Circulation Manager*

**OFFICES**

38 La Salle Road  
West Hartford 7, Connecticut

Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.50 in the Dominion of Canada, \$5.00 in all other countries. Single copies, 40 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.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

Copyright 1948 by the American Radio Relay League, Inc. Title registered at U. S. Patent Office.

INDEXED BY  
INDUSTRIAL ARTS INDEX

**-CONTENTS-**

"It Seems to Us . . ."	9
A Simple Single-Sideband Transmitter <i>Oswald G. Villard, jr., W6QYT</i>	14
A Lightweight 14-Mc. Four-Element Beam <i>Katashi Nose, KH6IJ</i>	18
Improving F.M. Transmission Techniques <i>Edmund C. Harrington, W1JEL, and Calvin F. Hadlock, W1CTW</i>	21
The "Coax Twin-Lamp" . . . . . O. S. Keay, W0SJK	25
Our Cover . . . . .	26
Silent Keys . . . . .	26
Happenings of the Month . . . . .	27
The 15th Sweepstakes . . . . .	29
Milwaukee or Bust! . . . . .	30
The ARRL — Your Organization <i>Kenneth B. Warner, W1EH</i>	33
On the Air with Single Sideband . . . . .	35
A VFO/Crystal Exciter <i>G. L. Countryman, W1RBK, W3HH</i>	36
Technical Topics —	
The "Quad" Antenna . . . . .	40
About Antennas for 80-Meter Mobile . . . . .	42
So It's Hard To Get on V.H.F.! <i>Edward P. Tilton, W1HDQ</i>	44
Results, 14th ARRL DX Competition . . . . .	46
How's DX? . . . . .	55
A Rack-Top Operating Table <i>Neil A. Johnson, W2OLU</i>	58
The World Above 50 Mc. . . . .	60
In QST 25 Years Ago This Month . . . . .	64
WWV Schedule . . . . .	64
Hints and Kinks . . . . .	65
Correspondence from Members . . . . .	66
Operating News . . . . .	68
May V.H.F. QSO Party Results . . . . .	75
Station Activities . . . . .	76
Houston Host to West Gulf Division Conventioneers . . . . .	126

# THEY'RE BETTER BECAUSE...

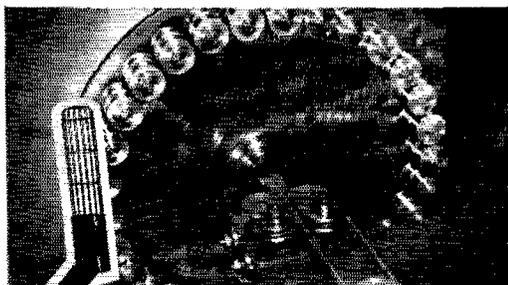


the  
**EIMAC**  
4-65A

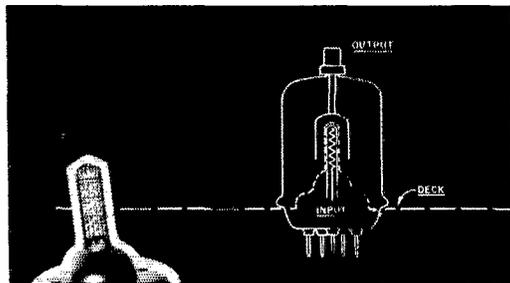
**APPLIED RESEARCH** by Eimac engineers has produced a thoriated tungsten filament with ample reserve emission. Its instant heating characteristics make the 4-65A well adapted to mobile application.



**PYROVAC\* PLATES**, the revolutionary Eimac development, withstand excessive abuse. Manufactured by an advanced technique, these plates can handle momentary overloads in excess of 1000%, consequently they contribute appreciably to the tube's life.



**EIMAC PROCESSED GRIDS**, manufactured by an exclusive technique, impart a high degree of operational stability. Both primary and secondary emission are controlled.



**SPECIALLY DESIGNED** screen grid effectively shields input and output circuits, within the tube, without excessive screen power. All internal structures are self supporting without the aid of insulating hardware.



**CONTROLLED PRODUCTION** practices include a slow oven-anneal to remove the last vestige of residual strains, and four to eight hours of testing under severe VHF conditions.

\*Trade Mark Reg. U. S. Pat. Off.

These are but some of the features that combine to make the Eimac 4-65A a better tetrode. It is unexcelled in its category as a power amplifier, oscillator or modulator. For example, in typical operation as a power amplifier or oscillator (class-C telegraphy or FM telephony) one tube with 1500 plate volts will supply 170 watts of output power with less than 3 watts of driving power. A complete comprehensive data sheet on the 4-65A has just been released. Write for your copy today.

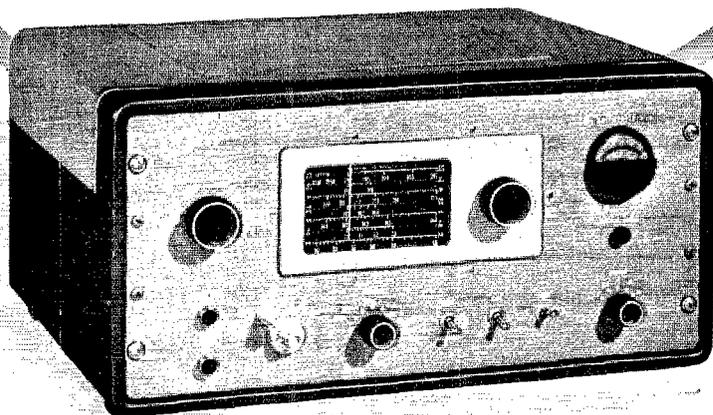
**EITEL-McCULLOUGH, INC.**  
204 San Mateo Ave., San Bruno, California

Export Agents: Frazer & Hansen, 310 Clay Street, San Francisco 11, California

Follow the Leaders to

**Eimac**  
TUBES  
The Power for R-F

**NBFM *or* CW**  
**VFO *or* CRYSTAL!**



**\$350<sup>00</sup>**

Slightly Higher  
West of Rockies

## *...the New HT-19 transmitter*

● Designed for the modern-minded Ham. Maximum flexibility on 5 Bands — 3.5, 7, 14, 21, and 28 MC. High stability, low FM distortion (measured at less than 5%). Provisions for applying AM from external modulator. 125 watts output.

Oscillator—reactance modulator with speech amplifier—buffer—and final. The 4-65A in/output stage is air-cooled by a 1000-rpm fan! 5 Tubes plus 2 Voltage Regulators and 3 Rectifiers.

**See it at your Hallicrafters Dealers!**

**the hallicrafters co.**

4401 W. Fifth Ave., Chicago 24, Ill.

World leading manufacturers of precision radio and television equipment

## 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. All ARRL Field Organization appointments are now available to League members. These include ORS, OES, OPS, OO, and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* are invited to join the ARRL Emergency Corps (ask for Form 7).

ATLANTIC DIVISION			
Eastern Pennsylvania Maryland-Delaware D.C. Southern New Jersey Western New York Western Pennsylvania	W3BES W3BWT W2QXX W2PQT W3KWL	Jerry Mathis Eppa W. Darne G. W. (Bill) Lunell Harding A. Clark Ernest J. Hlinsky	623 Crescent Ave. 132 Tennessee Ave., N.E. 22 Wyoming Ave. 753 Westmoreland Ave. 509 Beechwood Ave.
Illinois Indiana Wisconsin	W9EVI W9FSG W9RQM	Lloyd E. Hopkins Charles H. Conway Reno W. Goetsch	27 Lynch St. 3335 College Ave. 929 S. 7th Ave.
North Dakota South Dakota Minnesota	W0GZD W0NGM W0CWB	Paul M. Bossolotti J. S. Foasberg Walter G. Hasskamp	204 Polk St. 509 Idaho Ave., S.E. 116 3rd Ave., S.W.
Arkansas Louisiana Mississippi Tennessee	W5JIC W5T W5IGW W4QT	Marshall Riggs W. J. Wilkinson, jr. Harold Dry Ward Burhman	Room 313, Jefferson Hotel Route 2, Box 333 1000 Overlook Ave.
Kentucky Michigan Ohio	W4CDA W8SCW W8WZ	W. C. Alcock Joseph R. Beljan, jr. Dr. Harold E. Stricker	155 St. Mildred's Court 13959 Tuller Ave. RFD 5
Eastern New York N. Y. C. & Long Island Northern New Jersey	W2HZL W2KDC W2ANW	Ernest E. George Charles Ham, jr. Thomas J. Lydon	2044 Lexington Parkway 200 Harvard St. 190 Mortimer
Iowa Kansas Missouri Nebraska	W0PFP W0AWP W0ICD W0RQK	William G. Davis Alvin B. Jiruh Ben H. Wendt William T. Gemmer	3rd St. 842 N. Terrace Drive RFD 10 1708 West 6th St.
Connecticut Maine Eastern Massachusetts Western Massachusetts New Hampshire Rhode Island Vermont	W1VB W1GKT W1ALP W1WLN W1AQQ W1CJH W1NLO	Walter L. Glover F. Norman Davis Frank L. Baker, jr. Premiss M. Bailey Gilman K. Crowell Roy B. Fuller Burtis W. Dean	Glover Ave. RFD 1 91 Atlantic St. 62 Dexter St. 15 Academy St. 17 Lodge Road P. O. Box 81
Alaska Idaho Montana Oregon Washington	K17PQ W71WU W7EGN W7HZZ W7ACF	August G. Hiebert Man K. Ross Fred B. Tintinger Ralph A. Munkres Clifford Cavanaugh	Box 879 2105 Irene St. 328 Central Box 744 Route 1
Hawaii Nevada Santa Clara Valley East Bay San Francisco Sacramento Valley* Philippines*	KH6EL W7CX W6BPT W6TII W6NL W6ZF K6ICB	John Souza N. Arthur Sowle Roy E. Pinkham Horace R. Greer Samuel C. Van Liew Ronald G. Martin Craig B. Kennedy	Box 2025 1061 Fremont St. 414 Fairmount Ave. 215 Knovies Ave. 3820 Second Ave. 25 Roosevelt Road
San Joaquin Valley	W6FKL	Ted R. Souza	3515 Home Ave.
North Carolina South Carolina Virginia West Virginia	W4CVB W4RQF/ANG W4KFC W8JM	W. J. Wortman Fred Ferguson Victor C. Clark Donald B. Morris	6/2 Duke Power Co. 3322 Rosewood Drive Box 13 303 Home St.
Colorado Utah-Wyoming	W0IQZ W7NPU	M. W. Mitchell Alvin M. Phillips	1959 Uinta St., RFD 2
Alabama Eastern Florida Western Florida Georgia West Indies (Cuba-P.R.-V.I.) Canal Zone	W4GJW W4FWZ W4DAA W4DXI KZ5AW	Dr. Arthur W. Woods John W. Hollister Fletcher M. Holt Clay Griffin Everett Mayer Everett R. Kimmel	411 Woodward Bldg. 3809 Springfield Blvd. 238 W. Romana St. 1557 Athens Ave., S.W. P. O. Box 1061 Box 264
Los Angeles Arizona San Diego	W6IOX W7MLL W6GC	Vincent J. Haggerty Gladden C. Elliott Irvin L. Emig	1017 Indio Muerto St. 39 North Melwood 4852 Marlborough Drive
Northern Texas Oklahoma Southern Texas New Mexico	W5CDU W5HXI W5HIF W5SMA	Joe G. Buch Bert Weidner Ted Chastain Lawrence R. Walsh	5234 Vickery Boulevard Box 14 3037 So. Staples St. P. O. Box 1063
Maritime (Nfld. & Labr. att.)	VE1DQ	A. M. Crowdt	69 Dublin St.
Ontario	VE3CP	Thomas Hunter, jr.	1774 Westcott Road
Quebec	VE2GL	Gordon A. Lynn	c/o Radio Division, Montreal Airport
Alberta British Columbia Yukon	VE6MJ VE7II VE8AK	Sydney T. Jones J. T. Hepburn W. R. Williamson	P. O. Box 373 1439 Corbett Rd. Radio Range Sta., D.O.T.
Manitoba Saskatchewan	VE4AM VE5CO	A. W. Morley Norman Thompson	26 Lennox Ave. 1120 7th Ave., N. W.
Glenside Gardens Washington 7, D. C. Auburn Syracuse 10 Farrell			
Elgin Indianapolis 5 Wausau			
Grand Forks Huron Crosby			
Danville Shreveport Greenville Chattanooga			
Danville Detroit Marysville			
Schenectady 8 Westbury Rutherford			
Mitchellville Wichita 6 North Kansas City North Platte			
Newtown Old Orchard Beach North Quincy 71 Pittsfield Concord East Greenwich Burlington			
Anchorage Boise Whitefish Baker Auburn			
Wailuku, Maui Reno Santa Clara Oakland 11 Palo Alto Sacramento 17 San Francisco Del Monte Quezon City, Rizal Fresno 4			
Charlotte 1 Charlottesville 25 Annandale Fairmont			
Denver 7 Ogden, Utah			
Birmingham Jacksonville 8 Pensacola Atlanta San Juan 5, P. R. Gambou, C. Z.			
Santa Barbara Tucson San Diego			
Dallas Crescent Corpus Christi Los Alamos			
Halifax, N. S.			
Windsor, Ont.			
Montreal, P. Q.			
Edmonton, Alta. North Vancouver Teslin, Y. T.			
St. Vital Moose Jaw			

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

**BUILD YOUR OWN TEST**

**EQUIPMENT**

with the  
**MARION**  
**MULTI-RANGER**  
**METER**

- **ACCURATE!**
- **DURABLE!**
- **DEPENDABLE!**
- **A GREAT VARIETY OF SIZES!**

When it comes to TEST EQUIPMENT build your own with Marion Multi-Ranger Meters. They will solve your problem of finding reasonably priced instruments with the critical accuracy you demand for test equipment or other auxiliary equipment with multiple functions.

These Multi-Ranger Meters permit you to assemble a highly accurate instrument for use as a voltmeter, milliammeter, high and low resistance ohmmeter, AC voltmeter and decibel meter. — Build As Many Ranges As You Desire.

All instruments use Alnico Magnets, have full 100° three-color scales, feature the new, tough Marion "Bulldozer" moving system that insures long life under severe operating conditions plus the highest degree of accuracy.

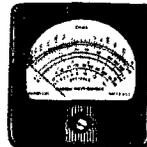
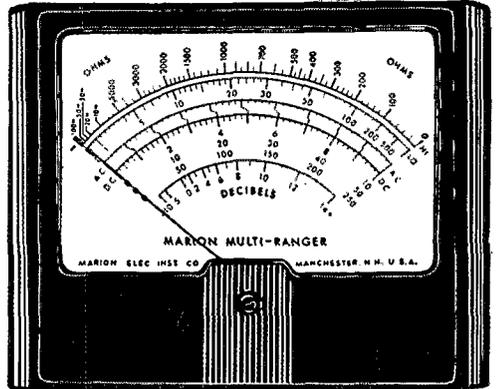
**MARION RESISTOR KIT**  
**NEW! LOW-PRICED! VERSATILE!**

Contains: 18 Resistors Ranging from .4 Ohms to 750,000 Ohms. A Schematic Diagram for Constructing Your Own Test Equipment.

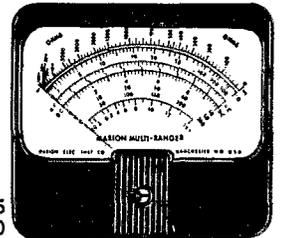
It's easy to construct accurate, useful, versatile test equipment with the Marion Resistor Kit, used in conjunction with Marion Multi-Ranger Instruments. List \$12.50.

ASK YOUR DEALER . . . OR WRITE DIRECT

Model 57 S List \$20.00



Model 53SN  
 List \$12.00



Model 55  
 List \$15.00

**SCALE RANGES POSSIBLE WITH STANDARD RESISTOR KIT**

**VOLTS AC-DC**  
 0-10 Volts    0-250 Volts  
 0-50 Volts    0-1000 Volts

**MILLIAMPERES**  
 0-1 MA    0-50 MA  
 0-10 MA    0-500 MA

**OHMS**  
 0-500 Ohms    0-1 MEG  
 0-100 M    0-10 MEG

**DECIBELS**  
 -10 — +14 decibels  
 +4 — +28 decibels  
 +18 — +42 decibels  
 +30 — +54 decibels

**ALSO AVAILABLE WITH VTVM SCALES**

THE NAME "MARION" MEANS THE "MOST" IN METERS

**MARION ELECTRICAL INSTRUMENT COMPANY**

Manchester, New Hampshire



Export Division  
 458 Broadway  
 New York 13, U. S. A.  
 Cables MORGANEX

In Canada:  
 The Astral Electric Company  
 Scarborough Bluffs, Ontario

# 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 prerequisites, although full voting membership is granted only to licensed amateurs.

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



## Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914-1936  
EUGENE C. WOODRUFF, W8CMP, 1936-1940

• • • • •

## Officers

**President** . . . . . GEORGE W. BAILEY, W2KH  
New York, N. Y.

**Vice-President** . . . . . J. LINCOLN MCCARGAR, W6EY  
Oakland, California

**Acting Secretary** . . . . . A. L. BUDLONG, W1BUD  
West Hartford, Connecticut

**Communications Manager** . . . . . FRANCIS E. HANDY, W1BDI  
West Hartford, Connecticut

**Treasurer** . . . . . DAVID H. HOUGHTON  
West Hartford, Connecticut

• • • • •

**General Counsel** . . . . . PAUL M. SEGAL  
816 Connecticut Ave., Washington 6, D. C.

**Assistant Secretaries** . . . . . JOHN HUNTOON, W1LYQ  
LEROY T. WAGGONER, W1PEK, RICHARD L. BALDWIN, W1IKE  
West Hartford, Connecticut

## DIRECTORS

**President**  
GEORGE W. BAILEY . . . . . W2KH  
1 East 79th St., New York 21, N. Y.

**Vice-President**  
J. LINCOLN MCCARGAR . . . . . W6EY  
86 Hamilton Place, Oakland 12, Calif.

**Canadian General Manager**  
ALEX REID . . . . . VE2BE  
240 Logan Ave., St. Lambert, P. Q.  
*Alternate:* Leonard W. Mitchell . . . . . VE3AZ  
78 Raglan Ave., Toronto, Ont.

**Atlantic Division**  
WALTER BRADLEY MARTIN . . . . . W3QV  
1033 Arbutha Rd., Abington, Pa.  
*Alternate:* Henry W. Wickenhiser, Jr. . . . . W3KWA  
1112 State Ave., Coraopolis, Pa.

**Central Division**  
CLYDE C. RICHELIEU . . . . . W9ARE  
Marshfield, Wisconsin  
*Alternate:* Harold H. Jansen . . . . . W9DJG  
3519 California Ave., Alton, Ill.

**Dakota Division**  
GOODWIN L. DOSLAND . . . . . W4TSN  
Moorhead, Minnesota  
*Alternate:* Robert A. Kimber . . . . . W8BIK  
Canyon Lake Rd., Rapid City, S. D.

**Delta Division**  
VICTOR CANFIELD . . . . . W5BSR  
P. O. Box 965, Lake Charles, La.  
*Alternate:* James W. Watkins . . . . . W4FLS  
220 N. Howell St., Chattanooga, Tenn.

**Great Lakes Division**  
HAROLD C. BIRD . . . . . W8DPE  
114 Hickory Dr., Crescent Lake, Pontiac, Mich.  
*Alternate:* John H. Brabb . . . . . W8SPF  
1321 Berkshire Rd., Grosse Pointe Park 30, Mich.

**Hudson Division**  
JOSEPH M. JOHNSTON . . . . . W28OX  
Avon-by-the-Sea, N. J.  
*Alternate:* Robert A. Klekman . . . . . W2DSY  
1910 Oak Drive, West Belmar, N. J.

**Midwest Division**  
LEONARD COLLETT . . . . . W0DEA  
Civil Aeronautics Administration  
Box 776, Joplin, Mo.  
*Alternate:* Alvin G. Keyes . . . . . W0KTQ  
1201 Merchants Nat'l Bank Bldg., Cedar Rapids, Ia.

**New England Division**  
PERCY C. NOBLE . . . . . W1BVR  
37 Broad St., Westfield, Mass.  
*Alternate:*

**Northwestern Division**  
HAROLD W. JOHNSTON . . . . . W7DXF  
2727 Belvidere Ave., Seattle 6, Wash.  
*Alternate:* R. Rex Roberts . . . . . W7CPY  
110 W. Brennan St., Glendive, Mont.

**Pacific Division**  
WILLIAM A. LADLEY . . . . . W6RBQ  
200 Naylor St., San Francisco 12, Calif.  
*Alternate:* Kenneth E. Hughes . . . . . W6CIS  
810 W. Orange Ave., So. San Francisco, Calif.

**Roanoke Division**  
H. L. CAVENESS . . . . . W4DW  
2607 Vanderbilt Ave., Raleigh, N. C.  
*Alternate:* J. Frank Key . . . . . W3ZA  
Box 707, Buena Vista, Va.

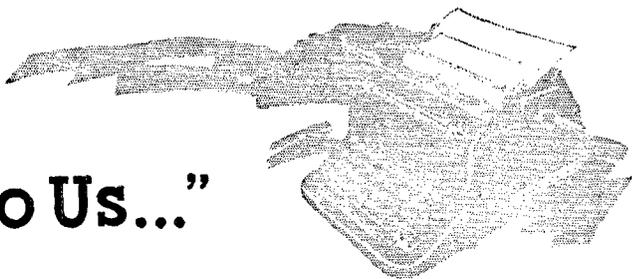
**Rocky Mountain Division**  
FRANKLIN K. MATEJKA . . . . . W9DD  
P. O. Box 212, Estes Park, Colo.  
*Alternate:* P. Arthur Smoll . . . . . W0KVD  
529 No. Nevada Ave., Colorado Springs, Colo.

**Southeastern Division**  
WILLIAM C. SHELTON . . . . . W4ASR  
327 Keville Blvd., Daytona Beach, Fla.  
*Alternate:* William P. Sides . . . . . W4AUP  
Fleming Road, Montgomery, Ala.

**Southwestern Division**  
HANS R. JEPSEN . . . . . W6KEI  
6837 Ethel Ave., No. Hollywood, Calif.  
*Alternate:* Arthur E. Schifferman, sr. . . . . W6CGI  
1445 Raymond Ave., Glendale 1, Calif.

**West Gulf Division**  
WAYLAND M. GROVES . . . . . W5NW  
P. O. Box 586, Odessa, Texas  
W5NW at Harte Pipe Line Camp, Odessa  
*Alternate:* Jack T. Moore . . . . . W5ALA  
4531 Fairway Ave., Dallas 4, Texas

## “It Seems to Us...”



On September 2nd the omnipotent hand of the Great Operator forever stilled the key at WIEH. Thus passed into immortal history the man who gave of his genius and devotion in building amateur radio and the American Radio Relay League from humble beginnings into the magnificent edifice that is amateur radio and ARRL today.

Kenneth B. Warner, WIEH, was for nearly thirty years secretary and general manager of ARRL. With his passing we suffer the loss of a great leader, an untiring servant in the cause of amateur radio, a skillful litterateur, a versatile fellow-ham and a beloved friend. Not since the death of Hiram Percy Maxim, our first president, have we experienced the heavy-hearted sadness with which we address ourselves to the task of chronicling in these pages something of the tremendous debt that amateur radio owes to a single individual. For if it was Maxim who conceived our League, it was Warner who breathed into it life and energy and vitality, whose balanced judgment and clear vision ensured its growth and success.

KBW's death, of coronary

thrombosis, was completely without warning. Aside from an understandable tiredness because of a habit of throwing himself energetically into all of his duties, he was in excellent health. The day before his death, he was in the office as usual. A part of the day he spent in putting final touches on the speech he was to have delivered at the national convention in Milwaukee. At luncheon he was his usual cheery self, talking of experiences in the days when he had been a pilot, of photography, of gardening and, of course, of ham radio. That

evening he completed plans for his and Mrs. Warner's trip to Milwaukee and then retired early. In the early morning hours, he became restless for a moment or two, then peacefully lapsed into the sleep from which there is no awakening. He is survived by his wife, Anita Zimmer Warner; a son, Richard Maxim Warner; a daughter, Mrs. Paul Averitt; a brother, J. Howard Warner; and a grandson.

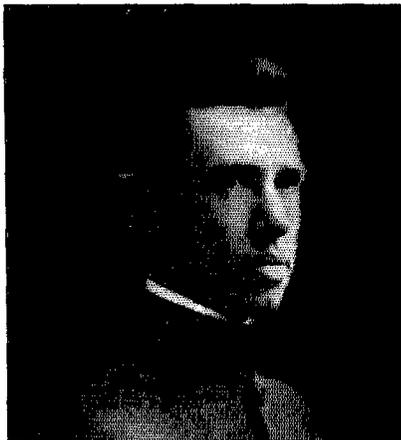
Kenneth Bryant Warner, the son of the late Jefferson and Clara Warner, was born on October 3, 1894, in Cairo, Illinois, and spent his early years in the atmosphere of that



Kenneth Bryant Warner  
1894-1948

river-front town. He quickly progressed from mechanical toys through a modest amount of home chemistry to his inevitable love — electricity. He learned the Morse code, and strung lines along back fences to practise with neighboring fellow-telegraphers. For him it was an inevitable short step to “wireless” and amateur radio; in the days before War I, Warner built and operated 9JT, registered in the 1915 edition of the ARRL *List of Stations* as a half-kilowatt fixed spark, “maximum range 12 miles, operating speed 12 words per minute.” In his first letter to the editor of *QST*, published in the August, 1916, issue, he announced his intention of entering long-distance relay work; with the flair for driving home his point that always characterized him, he described the advantages of Cairo as a relay point, comparatively free from the manmade interference of the larger cities. Thus it was that he became a member of the famous Green Ink Gang that maintained ARRL Trunk Line E from Chicago to the Gulf.

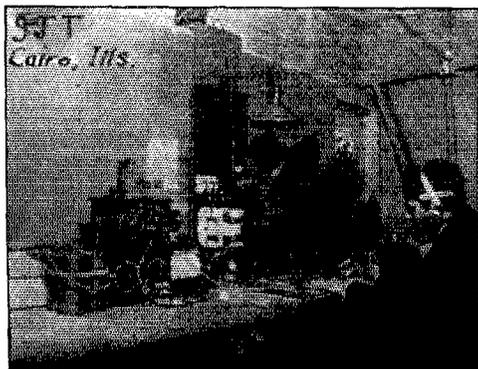
Businesswise, young Warner first served an apprenticeship as accountant-bookkeeper for his father's wholesale dry goods business — handling a complete set of double-entry ledgers at the age of 12. He worked as stenographer-bookkeeper-cashier for a local lumber company, as chief clerk to the commercial agent for the Big Four railway, then as general manager of O. H. Bartlett Company, manufacturers of wood products. With the coming of War I he enlisted in November, 1917, and was given an instructor's assignment in the radio school at Ellington Field, Texas, where he was rapidly advanced to sergeant, and then to master signal electrician. He was sent to the radio officer's school at Columbia University and commissioned as second lieutenant upon graduation in October, 1918, with a higher mark



“Your New Editor,” 1919.

than any previous graduate. For a while, he was retained at Columbia to instruct future classes, and was later assigned to the staff of the Director of Military Aeronautics in Washington, D. C., from which headquarters he supervised the selection and organizing of new radio schools. He was honorably discharged in April, 1919.

The editor of *QST* in the days before War I was C. D. Tuska, 1WD. When the ARRL board of direction decided immediately after the war to reorganize the League and hire a secretary, Tuska (who was entering the radio manufacturing field) said, “I know just the man for the job: a young fellow from Cairo, Illinois, and a brother officer of mine during the war, named K. B. Warner.” President Maxim was favorably impressed after a personal interview and, on April 26, 1919, Warner assumed his new duties. In a half-page item in the July, 1919, issue of *QST* entitled “Your New Editor” Warner devoted most of the space to a tribute to Mr. Tuska on his accomplishments as first secretary of ARRL and editor of *QST*, but in a final paragraph, modestly described himself as an “enthusiastic amateur and an ardent member and supporter of the ARRL.” He foresaw the immense fields of activity and progress then before the amateur world and wished humbly and sincerely that he might succeed in his work in the up-building of a greater and more closely-ce mented ARRL, and a bigger and better *QST*. From that time on, the new secretary-editor threw himself so energetically into achieving those objectives that the history of amateur radio and ARRL is virtually a personal history of K. B. Warner.



9JT, circa 1915.

During those early years, he plugged for amateur acceptance of the new system of vacuum-tube transmission of continuous-wave signals, an outgrowth of the war. Despite much opposition from the die-hard advocates of spark, the superiority of the new mode won out. This ability of Warner's to judge and recognize a milestone in the progress of amateur radio and to sell his fellow amateurs on achieving it is discernible throughout amateur history. In this he was helped by an inborn, insatiable curiosity about all things scientific. From the decoherer to the Transistor, from the VT-1 to atomic energy, from loop modulation to single sideband, Warner watched every development with an inquisitive eye and the perennial question: how can this be used to better the standards of amateur radio? It was this inherent curiosity that led his amateur interests toward the u.h.f.s during the war, a field into which he plunged wholeheartedly in postwar hamming. He started on two meters, making contacts up and down the northern Atlantic Seaboard with satisfying regularity. One of the unfinished projects at the time of his death was the conversion of a surplus radar countermeasure unit to our 1215-Mc. band. Before starting the job, he had gathered the full story of the original design and operation of the unit as a wartime device, to ensure that his conversion procedures would not overlook any advantages that might be used in amateur operation. He often spoke, as much in seriousness as in humor, of setting up a huge metal sphere atop a tower of a near-by hill, to be used as a "relay point" from which u.h.f. signals from West Hartford hams could be bounced to provide city-wide communication.

W1EH was in every way a typical ham

layout. The main transmitter was used on the 3.5-, 7-, 14- and 28-Mc. bands, both 'phone and c.w. Before the war, Warner built a series of V-beams with remotely-controlled switching. Postwar, he decided on a rhombic. For KB, that meant hours of work with globe, compass and town maps in planning orientation, precise surveying and clearing out a young forest in the swampland back of 73 Mohawk Drive, prior to the raising of the poles, antenna and several hundred feet of feedline. The completed job was his pride and joy, its performance a credit to his customary careful planning. He was meticulous in the operation of W1EH; his logs were kept to perfection; his operating, whether 'phone or c.w., of the highest order. Typical was the fact that, having recently purchased an electronic key, he spent many hours' practice with it — although a skilled bug operator — before feeling he could put on the air a "fist" up to W1EH standards. He was WAC, WAS, WBE and a charter member of the Royal Order of Transatlantic Brasspounders; he took pride in his 35-w.p.m. Code Proficiency Certificate and his A-1 Operator, Rag Chewers and Old Timers club memberships. Next to operation from his home station his chief interest in amateur activity was Field Day. As president of the "South Lyme Beer, Chowder and Propagation Society" he took keen delight in the opportunities afforded for competition and good fellowship in the annual outdoor event. Field Day operation was under his call, with comfortable scores turned in for W1EH/1 year after year.

Despite having had such experiences as being second operator at the U. S. end of the first amateur transatlantic communication and making the first U. S. QSO with England, his

◆

W1EH, 1948. The main transmitter, ending up in a pair of 100THs, is on the right, with a universal antenna coupler immediately to the rear. Conveniently placed at the operating position are the receiver, a frequency meter, VFO, Q5-cr, a war-surplus spare receiver and an electronic "bug" key. Two-meter equipment fills a rack to the left of the operating desk, topped by a converter working into a standard receiver. A hand-wheel for rotating the two-meter five-element beam is located just under the small window. Miscellaneous gear, including a surplus radar countermeasure unit, at the extreme left, rounds out the station.

◆



interest in the everyday aspects of amateur operating never waned. Incidents which to most of us would seem commonplace — perhaps a particular bit of snappy operating in message-handling or 'phone round-table procedure — invariably were to him experiences to add to the sheer enjoyment of ham operating and often became the basis of lively lunch-table discussions he would initiate the next day on some aspect of amateur operating practices. To KBW, nothing in ham radio was commonplace.

He had a great variety of interests into all of which he threw himself with characteristic enthusiasm and thoroughness. In common with many amateurs he was keenly interested in photography, and was a charter member of the Hartford Camera Club. He had a remarkable sense of composition and on occasion took prizes in local exhibitions. For many years he worked with black-and-white; in later years he turned almost exclusively to color. He was interested in music, playing the piano for his own diversion and lending support to various local musical organizations. He was a member of a small informal conversation group whose members, including a newspaper editor, a professor of romance languages, several industrialists, a sprinkling of scientists, a psychologist and a physician, met once a month to spend an evening discussing everything under the sun. He liked to get his hands into the soil and was an avid gardener; typically, after deciding what he wanted in his garden, he would carefully plan it within the limitations of New England weather and Connecticut soil, drawing curves on weather probabilities, carefully checking growing times, studying plant food requirements and apportioning his

plot of ground among various crops to get the maximum return. He was a Mason, a Fellow of the IRE, and an honorary member of many foreign amateur societies. He had served as secretary of the International Amateur Radio Union since its formation in 1925.

As editor-in-chief of all the publications of the League during his ARRL service, Warner saw to it that new publications appeared in the Radio Amateur's Library to fill membership needs as they arose: the *Radio Amateur's Handbook*, the *ARRL Antenna Book*, *How to Become a Radio Amateur*, *How to Learn the Radiotelegraph Code*, *A Course in Radio Fundamentals*, *Hints and Kinks* and the *Radio Amateur's License Manual*. But *QST* remained his first love; he guided it carefully during the years, never departing from his conviction that it must stay faithfully wedded to ham radio. The times were not without their temptations; in the early '20s, practically all of the few radio magazines then in existence, seeing shiny dollar signs in the broadcast boom then just getting under way, turned eagerly to the new field, forsaking amateur radio entirely or at best relegating it to second place. KBW felt that *QST* must remain devoted exclusively to our hobby, and he so announced to the world. Perhaps in that moment he looked ahead and envisioned for amateur radio the growth and stature it was to attain under the League's leadership.

Few amateurs today realize that the democratic form of constitution we enjoy in the League today is mainly due to KBW's conviction that a strong League must be a democratic League, with members entitled to participate actively in the affairs of their organization. Twenty-five years ago, the League's board of direction was composed of the Headquarters officers and such additional prominent and capable amateurs as were invited to serve; there were no nominations for director by the general membership. Under this set-up Warner, as the secretary, was a director, with full voice and vote as a member of the board. Yet it was Warner himself who first labeled this form of League government undemocratic, who plugged for a new constitution which would put control of the affairs of the League in the hands of the membership and who, after he had sold the old board on the merits of his proposal, drafted a new constitution so technically perfect that only minor changes have been required in the intervening years. Under the new concept of League government, for which he was mainly responsible, neither the secretary nor any other Headquarters officer is a member of the Board.



At the Fourth ARRL National Convention in Chicago, W9NLP and W9ELL relive the 1936 Ohio flood with W1EH.

It was inevitable that throughout his career, Ken Warner became the target for criticisms from anyone dissatisfied with anything in ham radio, whether it might be a policy decision of the Board or the way in which the FCC handled license examinations. He accepted that as part of the job, but to the end of his life it remained an aspect of his position which distressed him. His own fairmindedness was perhaps most apparent to his associates at League headquarters; a skillful and determined fighter in an argument, he was quick to perceive the merit in the other fellow's point of view and, if convinced he was wrong, had no hesitancy in acknowledging it. But convinced of what he believed to be right, he had that intangible inner drive to do his job as he saw it regardless of criticism.

As secretary of the League, it was Warner's lot to represent the radio amateurs of the country and to fight vigorously and determinedly for their rights and privileges. He became a familiar figure in radio circles in the nation's capital and was intimately acquainted with commissioners, engineers, lawyers and other administrative personnel through the years of negotiations with FCC and predecessor bodies. As spokesman for amateur radio for many years, Warner became fast friends with practically everyone in the Governmental communications picture. His opinions were respected, his counsel sought, his friendship valued, and — in countless instances — his aid and that of the nation's amateurs whom he represented earnestly solicited. Among Government people, his name was practically synonymous with amateur radio and the American Radio Relay League. The esteem in which he and amateur radio were held in Washington made the return of amateur bands after World War II merely a matter of working out a timetable — there was no repetition of the dark days after World War I, when the fate of amateurs hung precariously in the balance for months.

Warner's service as a representative of amateur radio at international conferences is an integral part of his ARRL career; yet it can only be recorded briefly here, for particularly is it true in this instance that the history of ARRL is almost verbatim a history of K. B. Warner. From Washington to Havana, from Lisbon to Cairo, from Copenhagen to Atlantic City, the many *QST* reports of his journeys on behalf of amateur radio document the same skill and personality in world-wide meetings as in domestic hearings. That amateur radio occupies its present lofty position is tribute to the man who for thirty



K. B. Warner, somewhat overwhelmed, examines the testimonial volume of congratulatory letters on his twenty-fifth anniversary while fellow ARRL officers F. E. Handy and D. H. Houghton look on approvingly.

years had been our principal representative.

On April 26, 1944, the radio world honored K. B. Warner on his twenty-fifth anniversary as managing secretary of the ARRL. His anniversary was an occasion for letters of congratulation and commendation numbering more than four hundred. They came from the White House, from former President Hoover, from federal, state and local officials, from scores of high-ranking Army and Navy officers, from ARRL directors, and from hundreds of other old-time ham friends and associates here and abroad. Perhaps Connecticut's U. S. Senator John A. Danaher came closest to summarizing completely Warner's achievements when he wrote:

My dear Mr. Warner:

. . . The sheer romance of radio as a means of communication with its limitless possibilities which you foresaw, is matched by the allegory of a young man whose genius took him from the status of radio amateur in Cairo, Illinois, to that of an internationally-known expert representing the amateurs of the United States at Cairo, Egypt. Even the idea of international cooperation as you nurtured and expanded it demonstrates that thousands of like minds and kindred interests linked by international radio communications might be regarded as a symbol of similar achievement in other fields in times to come.

If it be true, as someone has said, that man's greatest job can be found in achievement, your cup must indeed be overflowing. . . .

We humbly submit that the cup of achievement of our late secretary was indeed overflowing. Words alone will never be able to convey all that Ken Warner meant to amateur radio, nor to fathom the depths of sorrow into which his passing has plunged us. Our sense of loss can be plumbed only by looking into the hearts of a hundred thousand amateurs.

# A Simple Single-Sideband Transmitter

Combining A.M. and P.M. Signals for Sideband Reduction

BY OSWALD G. VILLARD, JR., \* W6QYT

• By properly combining amplitude modulation with phase modulation, a single-sideband-with-carrier signal is the result. This article tells how to apply the principle to any existing a.m. or p.m. transmitter. Although it does not give ideal single-sideband performance, because the carrier is not suppressed and a small spurious sideband is generated, the system is attractive because it can be applied to any transmitter and the signal requires no special handling in receiving.

At the present time there are available to the amateur a variety of means for improving receiver selectivity in 'phone operation. These include the Q5-er (both the original and the lazy man's variety), the McLaughlin "Simple Simon," and the remarkable (though expensive) General Electric YRS-1 single-sideband selector. Devices of this sort (and crystal filters, to some extent), make it possible to copy just one sideband of an a.m. signal. A steadily-increasing number of operators, with the aid of these receiver improvements, are using single-sideband reception. As a matter of fact, detuning to one side of the carrier to avoid QRM is something that is done almost automatically, no matter what the receiver.

With QRM present so much of the time, it seems altogether unnecessary for the transmitter to go on radiating the sideband that is not being listened to. There is need, accordingly, for some means of suppressing one sideband of a conventional transmitter; a means preferably not as complicated as those required to generate a single sideband with suppressed carrier; and a means,

\*Trustee, W6YX, Department of Electrical Engineering, Stanford University, Stanford, Calif.

moreover, that can be added to existing gear.

While the ultimate goal in amateur 'phone work should unquestionably be carrierless or reduced-carrier single sideband (because of the carrier-heterodyne elimination thereby made possible), its universal acceptance is bound to be slow because of the touchier receiver tuning involved. Whereas the alert amateur looking for the best results in point-to-point communication will adopt single sideband because of the advantages it affords, the "Sunday-driver" operator, who is content to chew the rag with whatever station happens to be loudest at the moment, will probably be unwilling (and very understandably so!) drastically to alter his present equipment and to adopt a more difficult tuning technique.

As an interim device, the scheme to be outlined in this article may have some merit. Here is a substantially single-sideband modulation system that can be added with little trouble to virtually any existing a.m. or p.m. 'phone transmitter. It has no balanced modulators nor any critical 90-degree r.f. phase adjustment. It can be received without distortion on any conventional receiver. Finally, it will give results equivalent to 100-per-cent-modulated a.m. with only two-thirds the normal audio power, provided that a single-sideband receiver is available at the other end.

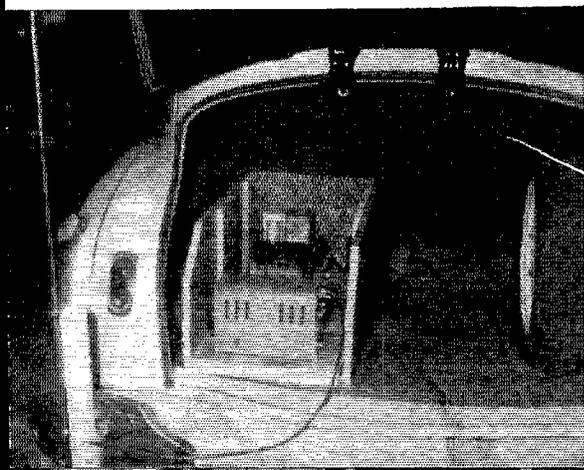
The sole disadvantage of this method is the presence, beyond the desired sideband on one side, of a second-order sideband of appreciable strength on the same side, capable of causing a certain amount of adjacent-channel interference.

## How It Works

Briefly, the system consists of simultaneous amplitude and phase modulation of a given carrier wave, with a 90-degree phase shift maintained between the audio voltages performing the two modulations. Sideband cancellation comes about because a.m. sidebands and first-order p.m.

◆  
The 28-Mc. single-sideband transmitter installed in the luggage compartment of W6QYT's car. It consists of a mobile p.m. transmitter to which an a.m. modulator and 90-degree audio phase-shifting network have been added.  
◆

QST for



sidebands are inherently in r.f.-phase quadrature — thus automatically meeting one of the requirements of the phase-shift method of single-sideband generation, which calls for the superposition of two sets of sidebands 90 degrees apart in radio-frequency phase. The other requirement, a 90-degree audio phase shift, is met by deriving phase- and amplitude-modulating voltages from a Domet wide-band phase-shifting network, and making sure that this phase shift is maintained all the way through to the voltages actually performing the phase and the amplitude modulation.

two sets of sidebands are not independent of each other; however, the final result is not greatly modified by this circumstance. The resulting spectrum, sideband phases ignored, is that of Fig. 1-C.

### Design Details

The reason for the choice of 81-per-cent a.m. and 0.75-radian p.m. is that the level of the first-order desired sideband is then sufficient to make the signal-to-noise ratio of this system, for single-sideband reception, equal to that of conventional 100-per-cent-modulated a.m. It works out that when one sideband only of a double-sideband signal is selected out at the receiver, the signal-to-noise ratio is reduced by 3 db. (This may readily be verified with the General Electric YRS-1 adapter by tuning in a weak signal and switching between the double-sideband and single-sideband receiving positions.) To offset this reduction, if only one sideband is to be transmitted, it must be 1.4 times as strong as before, or 0.7 (instead of 0.5) the unmodulated carrier amplitude, as in Fig. 1-C. A per cent amplitude modulation of 81 in the composite system means that only 66 per cent as much audio power is needed as in regular a.m.

It might be thought that still greater gain would be achieved by pushing the per cent a.m. to 100 and increasing the p.m. index accordingly. This is not recommended, however, as the level of the spurious sidebands would then become excessive.

The most important of these sidebands is the one on the same side of the carrier as the desired first-order sideband. This second-order sideband, undesirable from the standpoint of adjacent-channel interference, nevertheless serves a useful function. It makes possible a virtually distortionless demodulation of the signal in an ordinary linear diode detector. If only the carrier and one sideband were present, the audio output of a diode detector would be distorted. The strong second-order sideband substantially removes this distortion, for those modulating frequencies for which it falls within the passband of the single-sideband receiver. As an example, assume a modulation-frequency range of 0 to 3000 cycles. For frequencies up to 1500 cycles, the second-order sideband falls inside the receiver passband, and detection is substantially distortionless. For frequencies above 1500 cycles, the second-order sideband falls outside, causing adjacent-channel interference, and detection of the signal is accompanied by distortion. Fortunately, from the standpoint of interference, by far the greatest amount of speech power is contained in the range below 1500 cycles. As far as detector distortion is concerned, tests have shown that distortion above 1000 cycles is much less noticeable than distortion at the lower frequencies. Therefore it appears that the new system will produce only a moderate amount of adjacent-channel interference, and

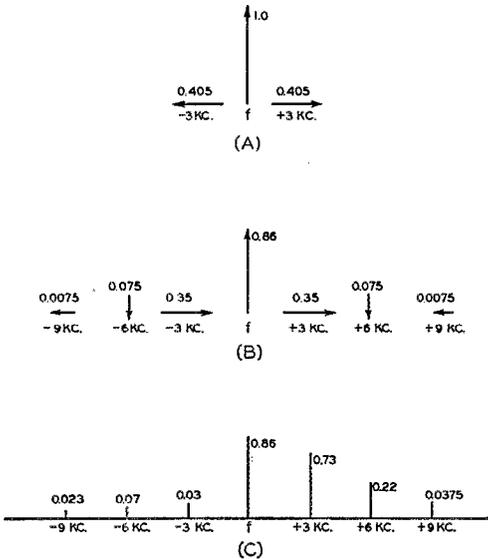


Fig. 1—How an a.m. signal and a p.m. signal are combined to give a single sideband. The vectors at (A) represent an a.m. signal with 81% modulation at 3000 cycles, and (B) shows the sidebands generated by 0.75-radian phase modulation at 3000 cycles, with the audio phase shifted 90° from that of (A). When the modulations of (A) and (B) are applied simultaneously to the same carrier, the sideband components (phases ignored) of (C) result.

Cancellation of the undesired sideband is illustrated in Fig. 1. The sideband structure for an 81-per-cent amplitude modulation of a given carrier with a 3000-cycle sine wave is shown in (A). The indicated audio phase corresponds to a zero of the modulating cycle. The sideband structure for a phase modulation of 0.75 radian, at a point in the audio cycle 90 degrees different from that of (A), is shown in (B). The direction of the arrows shows the relative phase of the sidebands; their magnitudes, relative to an unmodulated carrier of 1.0, as well as their positions in the frequency spectrum, are also shown. (Note that the length of the vectors is not to scale.) It can be seen that the lower sideband of (A) is not very far from being of the proper strength and phase to cancel that of (B). The situation when the two modulations are superimposed is complicated by the fact that the

will be virtually free of distortion when received on a conventional receiver.

Further details on the analysis of the sidebands in the new system will be found in another article by the author.<sup>1</sup> In estimating the practical effect of the interference on one side of the carrier caused by the spurious second-order sideband, it can be said that it will be roughly equivalent to that produced by a conventional transmitter having 45-per-cent second-harmonic distortion. With the composite system, in effect, a set of full-strength first-order sidebands on one side of the carrier is exchanged for a set of second-order sidebands on the other side of the carrier roughly half as strong.

A block diagram of a practical arrangement is shown in Fig. 2. The  $RC$  network, which is essential, serves to make the frequency response of the phase modulator equal to that of the amplitude modulator, and normally consists of a pair of half-watt resistors and two small condensers. Note that this network, the phase modulator, and the 90-degree phase-shift network are the only additions needed to convert a conventional 'phone transmitter to this system.

Any sort of phase modulator may be used, the most convenient being those that inherently produce a phase (rather than a frequency) modulation. The circuit used in the Sonar n.f.m. exciters<sup>2</sup> is fundamentally a phase modulator, and lends itself very well to this system. (When used for f.m., the audio system feeding this circuit usually incorporates a condenser connected as in a tone control to cut down the high-frequency response. This condenser should be removed, thus changing the modulator from f.m. back to p.m. This condenser is  $C_2$  of Fig. 3 of the reference.)

Most phase modulators have a better frequency response than most amplitude modulators, for

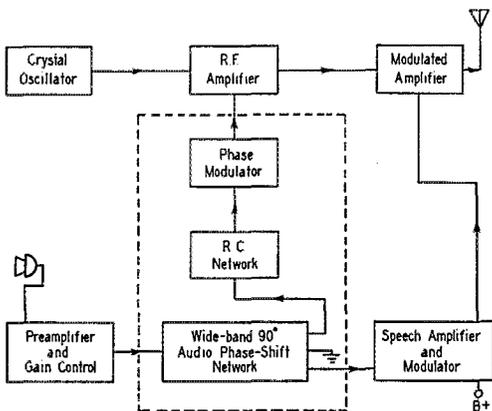


Fig. 2 — A block diagram of the single-sideband-plus-carrier transmitter. The dotted lines enclose the new equipment that must be added to any existing a.m. transmitter. The  $RC$  network is required to make the frequency response of the phase modulator identical with that of the amplitude modulator.

the reason that the latter usually contain driver and modulation transformers. Hence the phase-equalizing network will usually take the form of single-section  $RC$  high-pass and low-pass filters connected in cascade in the audio line to the phase modulator, as in Fig. 3. The cut-off frequency of the two filters is then adjusted by varying the resistors until the voltage actually performing the phase modulation varies with frequency in exactly the same manner as the voltage

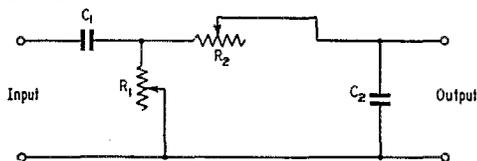


Fig. 3 — A simple frequency-response correcting network. The combination of  $R_1C_1$  reduces the low-frequency response, and  $R_2C_2$  attenuates the highs.

performing the amplitude modulation. Under these conditions, the 90-degree phase shift between the two sets of voltages at the two output terminals of the 90-degree phase-shift network will be preserved all the way through to the voltages actually producing the phase and the amplitude modulation. Typical values of  $R$  and  $C$  for a network to be connected in series with the input to a high-impedance phase modulator are:  $R_1$ , 250,000;  $C_1$ , 0.002;  $R_2$ , 50,000;  $C_2$ , 0.0008. Note that this network need not be a separate entity — its functions can be performed by the interstage-coupling networks.

### Adjustment

The easiest way to perform the initial adjustment of the correcting network, it must be admitted, is to use a 'scope and an audio oscillator. Some sort of variable- or multiple-frequency audio source is needed, although the 'scope could be replaced by a meter. Four or five single-frequency audio oscillators, spotted strategically in the audio spectrum, would probably perform nearly as well as a variable-frequency oscillator, provided care was taken in interpreting the 'scope patterns. Appropriate frequencies would be (for a 300-3000 cycle band): 300, 500, 1000, 2500 and 3000 cycles.

One amplifier of the 'scope should be connected to the phase modulator, not at the input terminals but at the tube electrode in the circuit at which the phase modulation is actually done. The other amplifier should be connected to the secondary of the plate modulation transformer via a voltage divider and a large blocking condenser. (For an example, see Fig. 4.) Then connect together the two wires normally attached to the output terminals of the audio phase-shift network and attach

<sup>1</sup>O. G. Villard, jr., "A High-Efficiency Reduced-Bandwidth Modulation System," *Electronics*, November, 1948.

<sup>2</sup>J. J. Babkes, "A New Phase-Modulation Circuit for Narrow-Band F.M. Transmission," *QST*, January, 1947.

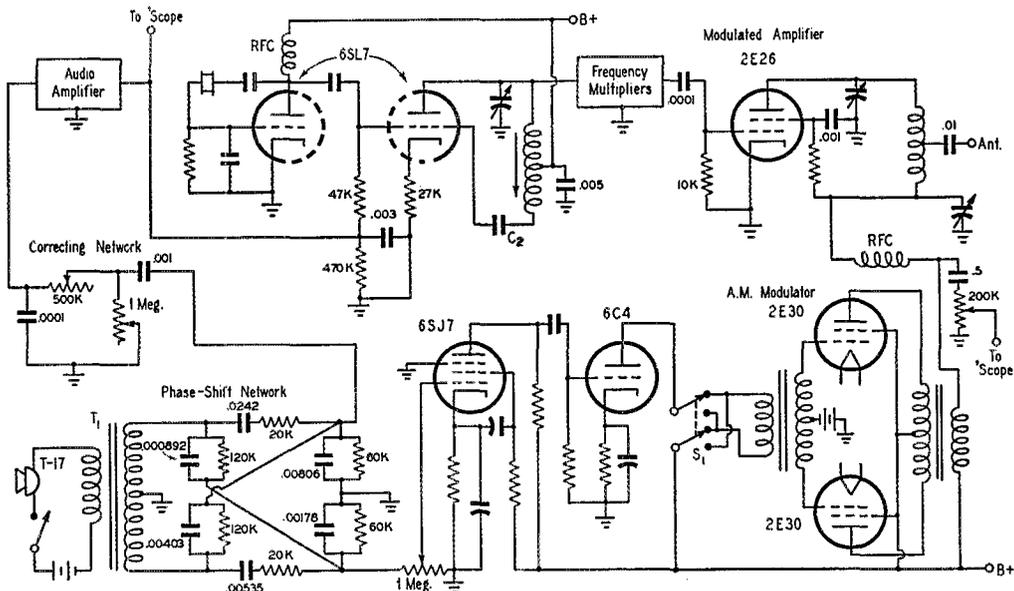


Fig. 4 — Simplified schematic of an MB-611 p.m. transmitter modified for combined a.m. and p.m.  $S_1$  is used to switch from one sideband to the other. See text for  $T_1$ .

them to the audio oscillator. Set the oscillator to some frequency in the middle of the range, say 1000 cycles, and adjust the 'scope amplifier gains until the pattern is a 45-degree line. Any tendency for this line to open out into an ellipse, particularly at the upper and lower ends of the frequency range, is an indication that the two modulators have unequal frequency response. The resistors in the compensating network may conveniently be made variable, and should be adjusted until the pattern is as close as possible to a line over the desired range. Ordinarily this adjustment is not at all hard to find. The variable resistors may then be replaced with fixed resistors of approximately the same value (they are not critical), and the two modulators reconnected to the 90-degree network. Once the correct audio-response adjustment has been found it need never be touched again unless it should prove necessary to change any of the circuit constants of either modulator that affect frequency response. A new modulation transformer, for example, would call for a recheck.

The only *operating* adjustment to be made is the relative phase-modulator gain setting. With a 2000- or 3000-cycle audio signal applied to the common input, the amplitude-modulator gain is adjusted to give approximately 80-per-cent modulation. Then the station receiver is set to be as selective as possible (crystal filter at maximum selectivity), and is tuned to one sideband or the other. As the phase-modulator gain is advanced from zero, this sideband will either increase or decrease, depending on circuit polarity. Pick the

sideband that decreases, and adjust the phase-modulator gain until the sideband is weakest. This is the correct adjustment, and once found, it should be left alone. Any subsequent adjustment of audio gain should be done ahead of the 90-degree phase shifter, so that both a.m. and p.m. channels are affected simultaneously.

The relative phase-modulator gain need not be readjusted when QSYing within a band. However, it must be reset whenever the operating band is changed, because the index of phase modulation will no longer be the same. When reducing carrier power for short-haul work, it is only necessary to cut down the amplitude-modulator gain to maintain the correct percentage of a.m.; the phase-modulator gain setting need not be touched, as the phase-modulation index is not affected by changes in input to the final stage.

A single-frequency audio source is perfectly adequate for setting the relative phase-modulator gain. If the receiver has a crystal filter, it is not essential that the signal source produce a pure sine wave, as moderate harmonic distortion does not confuse the measurement provided care is taken in picking the correct sideband. Thus almost any one-tube LC oscillator will do.

#### Operating Results

Cancellation of the undesired sideband with the composite system is readily detectable in practice, even with a fairly unselective receiver. Receiving operators are seldom aware of the nature of the incoming signal at first, since it

(Continued on page 118)

# A Lightweight 14-Mc. Four-Element Beam

*'Plumber's Delight' Construction for 20-Meter Work*

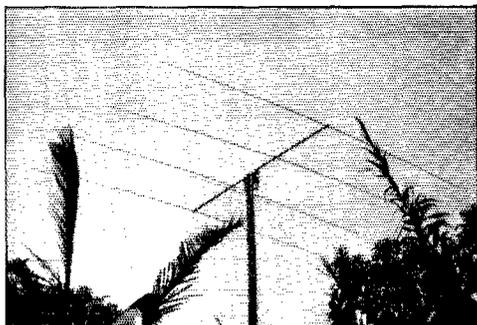
BY KATASHI NOSE,\* KH6IJ

**A** YEAR of operation on 14 Mc. with the four-element beam described in a previous article<sup>1</sup> has convinced the writer that a close-spaced parasitic beam is one of the best answers to the antenna problem. Much has been learned about the performance of beams on DX signals, and several improvements that have occurred to the writer have been incorporated in the beam to be described. Several commercial beams of a similar type for the higher-frequency bands have appeared on the market, and the writer makes no claims for originality.

## Features

Bearing in mind that this is a four-element 14-Mc. beam, here are its features:

1) *Lightness.* Weighs only 40 pounds. Entire beam, including "T"-match and mounting plate, can be lifted from the ground with one hand and held overhead.



The 14-Mc. four-element beam at KH6IJ.

2) *Low wind resistance.* No crossarms, braces, insulators or other supports to add to dead weight. Requires a minimum of maintenance.

3) *Simple supporting structure.* Being of light construction, elaborate supporting structures are unnecessary. The writer used a guyed 4 × 4 thirty feet long, with stepping spikes.

4) *Coaxial line-fed.* Simple and convenient to install, standard coaxial cable can be nailed to the house or pole, twisted at all angles around corners, or even buried underground.

5) *Smart appearance.* No sag in boom, and minor sag in elements can be corrected by bending before installation.

\* Chief Engineer, KTOH, Lihue, Kauai, T. H.

<sup>1</sup> Nose, "A 40-Pound 14-Mc. Four-Element Beam," *QST*, Dec., 1947.

• Too often a 14-Mc. rotary beam is an ungainly-looking affair that looks like it will come down in a good sneeze. Here is an article proving that cleaning up the construction of a beam cleans up its appearance at the same time. Everyone knows its reputation for cleaning up on DX.

6) *Uses cheap and available materials.* Cost of four elements is about \$20, and the material is a standard item.

7) *Accessibility.* Every point on beam accessible from the supporting structure by tilting beam, hence no catwalk required.

8) *Ease of transportation.* By proper nesting of elements, the entire beam, including "T"-match, will fit into the 3-inch diameter aluminum boom.

## Supporting Structure

As mentioned in the original article, the problem of supporting the beam is simplified by mounting a 4 × 4 on the side of the house and using the roof as a working platform. A mysterious stretching of the guy wires was traced to the pole digging into the ground through twisting in the wind. This was corrected by resting the base of the pole on a flat rock (after jacking up the pole with a car jack) and then making a better strap to hold the pole to the side of the house.

## Boom

Much of the construction work on a beam centers on the boom, the only purpose of which is to hold the elements a definite distance apart and all in the same plane. It plays no part whatsoever in the electrical performance of the beam. No satisfactory means has yet been devised to eliminate the boom, and therefore one has been chosen that is the bare minimum. Unless braced rigidly, metal or wood booms made of two members (ladder type) are apt to allow weaving of the elements in a stiff breeze. Using two members has the further disadvantage of extra weight and wind resistance.

An answer to this problem is found in making the boom out of a single piece of tubing. Pound for pound, a tubular section is able to withstand torsion more than any other type of construction and, moreover, has the advantage of low wind resistance. Tests on a 3-inch aluminum tubing 22



The author proves the light weight of his beam by holding it with one hand, the rotator with his other. The coaxial cable used for feed is draped over one shoulder.

feet long showed surprising torsional and flexural strength. Inquiries of several manufacturers revealed this material to be a stock item used in portable irrigation systems. It comes in 20-foot lengths in diameters from 2 to 3 inches.

### *Elements*

ST24 aluminum tubing was difficult to obtain, but a search of electrical-supply houses revealed the existence of "EMT" electrician's aluminum conduit. It comes in ten-foot lengths of  $\frac{1}{2}$ -,  $\frac{3}{4}$ - and 1-inch diameter. Each element of the beam requires one 1-, one  $\frac{3}{4}$ - and two  $\frac{1}{2}$ -inch sections, and one  $\frac{1}{2}$ -inch piece is needed for the "T"-match. Thus for a four-element beam the following pieces are required:

- four 1-inch diameter by 10 feet long,
- four  $\frac{3}{4}$ -inch diameter by 10 feet long,
- nine  $\frac{1}{2}$ -inch diameter by 10 feet long.

The  $\frac{1}{2}$ -inch size costs about 65 cents per 10-foot length, and the other sizes are correspondingly cheap. The tubing has the advantage of being easily bent, but not so easily as to be bent out of shape in this application. In connection with this, it is interesting to note that, on two occasions, one beam accidentally fell to the ground from a height of ten feet, and boom and elements were twisted out of shape. But they were easily bent back into shape without any ill effects.

### *Constructing the Elements*

Each element consists of a 1-inch diameter 10-foot-long center section, two 5-foot sections of  $\frac{3}{4}$ -inch diameter, and two 10-foot sections of  $\frac{1}{2}$ -inch diameter stock. The total length is 40 feet, but after telescoping and shimming it comes to about a half-wave for 14 Mc., with plenty of room for adjustment. The center 10-foot section is used without any alterations. The  $\frac{3}{4}$ -inch stock is cut in half, making two 5-foot sections. A 7-inch length is then cut off from each, to make shims. Seven-inch lengths are also cut off from each  $\frac{1}{2}$ -inch end section, to provide shims for the end pieces. These 7-inch pieces are then slit down one side, spread apart with a screwdriver, and hammered into place on the outside of the

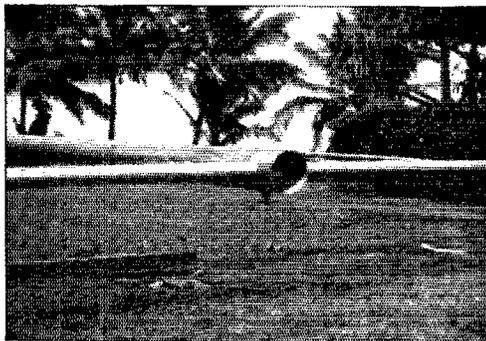
piece to be shimmed. The results are more satisfactory if the slitting is done on a milling machine, but a hack saw or tin snips can be used. The various pieces are held together by friction, and clamps and stop pins are not necessary. However, depending on the wall thickness of the tubing, it may be necessary to provide a means of locking. The simplest method is to make a stop pin consisting of an 8-32 machine screw. Obviously this will have to be done after tuning. Another alternative would be to make a clamp.

### *Construction of Boom*

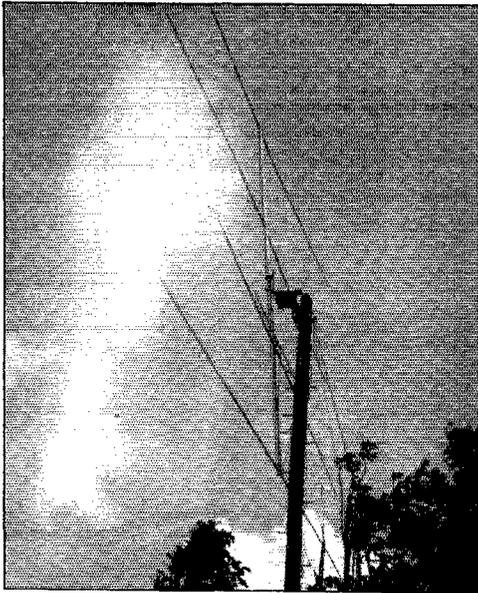
After seeing 10-meter beams with elements passing through the boom and held in place with "J" bolts, it was decided to try this method. Fears that drilling the 3-inch boom for 1-inch elements would weaken the boom or cause it to sag were dispelled upon completion of the job. After assembling the beam and flexing it, the boom showed little sign of bending or torsion.

Drilling the hole for the elements should be done with meticulous care, as any error will show up in misaligned elements. The preferable method is to use a drill press but, in the absence of one, hand tools should suffice. Draw a pencil line down one side of the boom to serve as a guide line, and drill  $\frac{1}{4}$ -inch pilot holes. The end holes should be about three inches in from the ends of the boom. The two others will depend on the length of your boom. Do not drill pilot holes on both sides, but on one side only. Then select a drill slightly smaller than the final diameter. Be sure to feed gently, since aluminum is very soft and the large-size drill may take out a gob of metal and ruin the hole. Finally, ream out to the proper size. Insert the 1-inch section, and sight for trueness when drilling the other holes.

The elements are held to the boom by means of open-eye hooks threaded on one end. These hooks should be made of strong material not less than  $\frac{1}{4}$  inch in diameter, as they must take considerable strain. The head end of the hook is inserted into a suitable hole drilled just below where the element crosses the boom.



This view of one end of the boom shows how the elements are held in place by single hooks.



The beam is made accessible for adjustment by hinging the mounting plate on top of the rotator head.

All is not lost if the holes do not line up evenly, because after assembling the elements on the boom, minor misalignment can be corrected by bending the center section. As a last resort, the misaligned hole can be reamed out on the bottom edge with a half-round file. The hook will then press the element tightly against the reamed bottom. Aluminum shims should be provided for the reamed hole, as any play in the hole makes for swaying elements.

#### *Feeding the Beam*

Since the driven element is one continuous piece, there is little choice in feed systems. The "T"-match was chosen for its mechanical rigidity and ease of construction. Coaxial-line feed was used because of ease of installation and convenience, notwithstanding its imagined loss, since what was good for radar work certainly should be good enough on 14 Mc. Moreover, with the development of devices for checking standing waves, coaxial line looks mighty attractive.

To make the "T"-match, cut a ten-foot section of  $\frac{1}{2}$ -inch stock into two equal lengths. Suitable material for the straps was made from aluminum recording disks. The vinylite can be removed easily by pouring hot water over the disk. A piece of lucite serves as the insulator for the center straps.

#### *Mounting*

Many ways of mounting the beam on the rotor will occur to the ingenious amateur, but the following method has several advantages. Aluminum blocks were cast out of old aluminum recording

blanks. Two of these blocks were then drilled for the boom, and setscrews were inserted to hold the boom fast. By loosening these setscrews the whole beam can be rotated for vertical polarization if desired. If the mounting plate is hinged, the beam can be tilted and this, combined with the ability of the elements to turn vertically, enables every point on the beam to be reached from the pole.

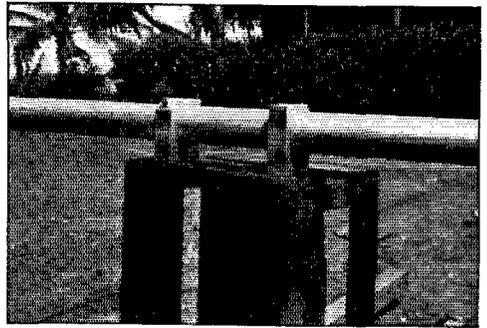
After assembling the elements on the boom, you may be disappointed by the amount of sag. It should be noted, however, that this sag has a negligible effect on the electrical performance. Moreover, after getting the beam in the air, the effect is not as apparent. If you decide to bend the elements to correct the sag, bend only the center section, and then only by lifting both ends while pushing down the center. This will avoid the "gull-wing" appearance that results if other sections are bent.

Tuning can be done either on a temporary pole as tall as your stepladder will permit, or it can be done with a temporary mount on the roof. The latter is a better place. For this temporary mount, a  $\frac{3}{4}$ -inch threaded pipe fitted with a flange can be screwed on to the wooden mounting plate. The pipe is then bolted to the pole.

Painting the whole beam is a necessity to prevent corrosion. The ends of the elements should be corked and painted.

#### *Tuning the Beam*

On tuning, the reader is referred to the many excellent references on the subject. For ease of ad-



The boom is held to the mounting plate by two solid pieces of cast aluminum.

justment, feed the beam with your exciter, and adjust for minimum response with the back end of the beam pointed at the indicating antenna. A convenient indicating device is a 1N34 crystal inserted in the center of a dipole, with a millimeter or multimeter hooked across it, as described in a recent article.<sup>2</sup> The pick-up antenna

*(Continued on page 48)*

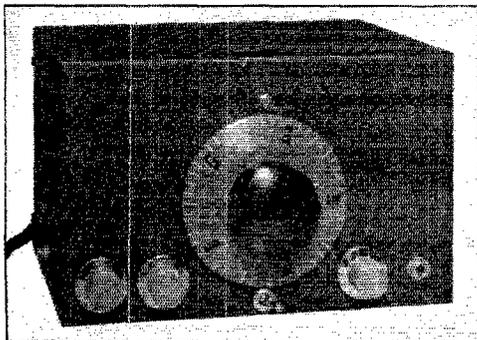
<sup>2</sup> "Field-Strength Measurements with a Volt-Ohmmeter," *QST*, Hints & Kinks, April, 1948.

# Improving F.M. Transmission Techniques

## Speech Clipping and Filtering in an N.F.M. Adapter Unit

BY EDMUND C. HARRINGTON,\* WIJEL, AND CALVIN F. HADLOCK,\* WICTW

At the present time, the amateur who uses narrow-band f.m. is handicapped in competing with those who use a.m. for 'phone operation. The reason for this, we believe, is more historical than technical, and revolves around the fact that a.m. came into use first. As a result, practically all receivers in use today are designed primarily for a.m. reception, and when n.f.m. signals are tuned in on these receivers, they obviously cannot present a favorable appearance in comparison with a.m. As a result, most operators draw the conclusion that a.m. is superior to f.m. If f.m. had been put into use first and receivers down through the years had been developed and continually improved for peak performance on n.f.m., the reverse would undoubtedly have been true. The important point is this: To compare n.f.m. and a.m. signals, a receiver that is designed for the particular method of modulation employed at the transmitting end should be used. Only then can a fair comparison be made.



The n.f.m. adapter unit described by WIJEL and WICTW. Below the main tuning dial can be seen the oscillator "B"-plus switch. Other controls are, left to right, buffer-doubler tuning, deviation control, and speech gain control. The microphone jack is at the right of the gain control, and the output jack can be seen on the left side of the cabinet.

To do this, it is not necessary to build or buy a complete new receiver but merely to adapt your present receiver for n.f.m. reception. The only part of the receiver that differs for the two types of signals is the section including and immediately preceding the second detector. This can be taken care of by providing a small auxiliary unit, containing two, or at the most three, tubes that can be plugged or switched into the circuit in place of the usual second detector. It is not the intention

\*% The National Company, Malden, Mass.

• The use of speech-range and audio-peak limiting is finding increasing favor in connection with amplitude-modulated voice operation, and the benefits resulting, in the form of narrower bandwidth and improved readability, are well known. Application of similar techniques to narrow-band f.m. produces even greater improvement in these respects. Here is a simple VFO-and-reactance-modulator unit, the principles of which should be of interest to every present or potential user of n.f.m.

of this article to describe such a unit, as this has been done before by others. We are merely pointing out the need of using such a unit to get really good results when working stations using n.f.m. We are firmly convinced that if the now-available techniques are properly used, n.f.m. will be practically on a par with a.m. operation.

In addition, n.f.m. has two outstanding advantages in its favor. First, it eliminates the necessity for expensive high-level a.m. modulators; a 1-kw. rig can be modulated with a 6J5! Second, it will give a tremendous reduction to BCI. Anyone who has operated on six or ten meters in a large apartment house surrounded by dozens of broadcast receivers can readily appreciate what this means! There is, however, another fly in the ointment. Since practically all receivers now are not equipped with n.f.m. detectors and f.m. reception is accomplished by slope detection on a.m. receivers, the hams who use n.f.m. transmitters adjust their deviation to the point that produces the best performance in this form of detection. This results in deviations which swing far beyond what can truthfully be called "narrow band," and lends support to the belief that n.f.m. requires more channel space than a.m. The result of overdeviation shows up immediately when an operator acquires an f.m. adapter and plugs it into his receiver. Since these adapters are designed to receive properly-deviated transmissions, the majority of the n.f.m. signals received sound distorted, more so than on the more tolerant (and less-selective) slope tuning previously used. It is only human to blame the adapter for this distortion when the fault is really that of the transmitters. It is difficult to measure deviation directly and the deviation is usually adjusted by reports from others, or, by listening to your signal on your own receiver.

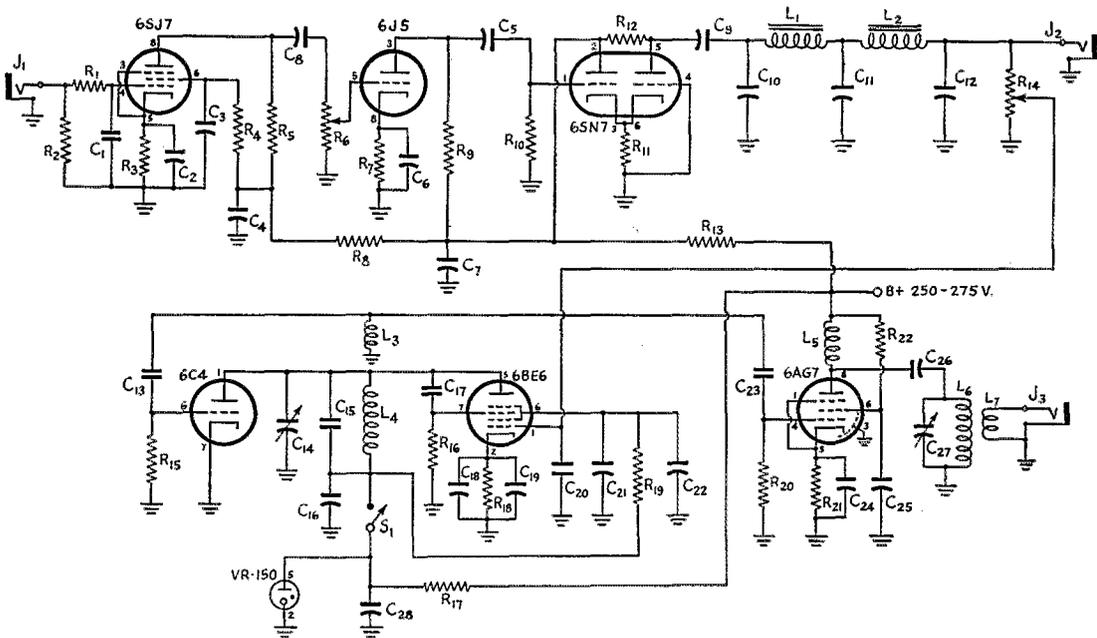


Fig. 1 — Schematic diagram of the n.f.m. adapter unit.

- C<sub>1</sub> — 25- $\mu$ fd. ceramic.  
 C<sub>2</sub>, C<sub>6</sub>, C<sub>19</sub> — 10- $\mu$ fd. 25-volt electrolytic.  
 C<sub>3</sub>, C<sub>9</sub>, C<sub>16</sub>, C<sub>28</sub> — 0.1- $\mu$ fd. 400-volt paper.  
 C<sub>4</sub>, C<sub>7</sub>, C<sub>22</sub> — 8- $\mu$ fd. 450-volt electrolytic.  
 C<sub>5</sub>, C<sub>8</sub>, C<sub>10</sub>, C<sub>12</sub>, C<sub>24</sub>, C<sub>25</sub>, C<sub>26</sub> — 0.01- $\mu$ fd. 400-volt paper.  
 C<sub>11</sub> — 0.02- $\mu$ fd. 400-volt paper.  
 C<sub>13</sub> — 250- $\mu$ fd. ceramic.  
 C<sub>14</sub> — 450- $\mu$ fd. variable (National PW-2).  
 C<sub>15</sub> — 670- $\mu$ fd. ceramic (inside L<sub>3</sub>, L<sub>4</sub>).  
 C<sub>17</sub> — 2- $\mu$ fd. ceramic.  
 C<sub>18</sub>, C<sub>21</sub> — 0.01- $\mu$ fd. 300-volt mica.  
 C<sub>20</sub> — 470- $\mu$ fd. mica.  
 C<sub>23</sub> — 150- $\mu$ fd. ceramic.  
 C<sub>27</sub> — 50- $\mu$ fd. variable (UM-50).  
 R<sub>1</sub>, R<sub>5</sub>, R<sub>8</sub> — 0.22 megohm.  
 R<sub>2</sub> — 4.7 megohms.  
 R<sub>3</sub> — 1000 ohms.  
 R<sub>4</sub> — 1 megohm.

- R<sub>6</sub> — 0.5-megohm potentiometer.  
 R<sub>7</sub> — 2200 ohms.  
 R<sub>9</sub>, R<sub>13</sub>, R<sub>16</sub> — 47,000 ohms.  
 R<sub>10</sub>, R<sub>18</sub> — 0.47 megohm.  
 R<sub>11</sub> — 4700 ohms.  
 R<sub>12</sub> — 33,000 ohms.  
 R<sub>14</sub> — 5000-ohm potentiometer.  
 R<sub>15</sub> — 22,000 ohms.  
 R<sub>17</sub> — 5000 ohms, 5 watts.  
 R<sub>19</sub>, R<sub>22</sub> — 15,000 ohms.  
 R<sub>20</sub> — 0.1 megohm.  
 R<sub>21</sub> — 100 ohms.  
 L<sub>1</sub>, L<sub>2</sub> — 0.8 henry (Stancor filter).  
 L<sub>3</sub>, L<sub>4</sub>, L<sub>6</sub>, L<sub>7</sub> — See coil table.  
 L<sub>5</sub> — 2.5-mh. r.f. choke (National R-100).  
 J<sub>1</sub> — Microphone jack.  
 J<sub>2</sub> — Audio output jack.  
 J<sub>3</sub> — R.f. output jack.

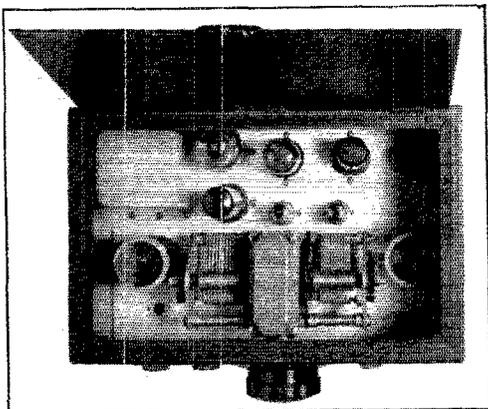
If this adjustment is made with an a.m. receiver, the deviation will almost certainly be too great for a properly-designed n.f.m. discriminator. This method of adjustment is satisfactory only if an n.f.m. discriminator is used and a means of maintaining correct deviation is provided. Such a device will be described later.

Comparative checks have been made with a signal generator between the use of slope tuning and a well-designed n.f.m. adapter on the same receiver. The signal was reduced to the point of producing a 1-db. signal-to-noise ratio. Use of the adapter instead of slope tuning, with an f.m. signal from the generator modulated with a sine-wave tone, produced an improvement of 8 db. in signal-to-noise ratio. This is about the same improvement that results from replacing a ten-meter dipole with a well-designed three-element beam!

The use of voice instead of a sine wave for modulation presents a somewhat different picture. One disadvantage (?) of n.f.m. is that it cannot tolerate overdeviation at all, while overmodulation is possible (and all too common!) when using a.m., as far as readability is concerned. With either type of modulation excessive audio will cause unnecessary QRM to adjacent signals, but the fellow who is tuned to the center of the signal can tolerate overmodulation on a.m., but not overdeviation on f.m. We should define "overdeviation" as a total deviation exceeding the i.f. bandpass of the receiver, which is already fairly well standardized. Note that the deviation limit is set by the bandwidth of the i.f. amplifier, rather than by the width of the discriminator, if the latter is properly designed. Broadening the discriminator will not allow greater deviation. If the receiver selectivity is just wide enough to

pass the a.m. signal, it is wide enough to pass an n.f.m. signal, as FCC has defined n.f.m. as a signal which occupies no more space than a corresponding a.m. signal. Although overdeviation is a limit set by the i.f. of the receiver, it must be taken care of at the transmitter. A little coöperation is in order.

The trouble is that when the fellow running the transmitter reduces his deviation to a point where the disagreeable "grunting" caused by overdevi-



Top view of the n.f.m. adapter unit shows, starting from the upper left-hand corner, the low-pass filter, VR-150 regulator tube, 6SN7 clipper, 6J5 second-audio and 6SJ7 first-audio tubes. Below this are the 6AG7 buffer tube, 6BE6 reactance modulator and the 6C4 oscillator. The coils, which are mounted at either end of the tuning condenser, are made plug-in, to permit output on any desired frequency.

ation on peaks is eliminated, the voice level is often so low that a poor signal-to-noise ratio results. This would not be so if sine-wave modulation were used but is the result of the fact that voice modulation is full of sharp pulselike peaks and bursts. If these peaks or bursts were cut off or limited at the point of maximum permissible deviation, no discernible effect on the quality would result, but the average voice level could be raised considerably and a signal-to-noise ratio comparable to that of sine-wave modulation could be achieved without the objectionable overdeviation distortion being present. This calls for some kind of limiter or "clipper" circuit and this, with a low-pass filter to eliminate harmonic distortion, is included in the unit to be described. The results obtained with it have been so outstanding that we believe that its use will be a "must" in future f.m. modulator units. The same principles may be employed in transmitters using phase modulation, wherein distortion is caused by attempts to deviate beyond the permissible limit of the system in use. In this case, the clipper should be adjusted to limit the deviation capability of the transmitter to the point which will eliminate distortion developed within the transmitter itself.

### An N.F.M. Unit with Peak Limiting

With the above thoughts in mind, an n.f.m. exciter was built for use at W1JEL. A similar unit using only the audio section will be used at W1CTW for phase modulation on 144 and 220 Mc. We will describe the original exciter that has already been in use at W1JEL for several months. The following characteristics were desired:

- 1) Operation on all amateur bands between 80 and 6 meters inclusive.
- 2) VFO operation, with stability approaching that of crystal control.
- 3) Output ample to drive a small doubler.
- 4) Self-contained modulation limiter.
- 5) Hum-free output.

Other minor refinements could be added to this list, if desired, such as "direct calibration." However, an old National PW-2 ganged condenser, still in excellent condition, was salvaged from a duplicate of Grammer's "High-Performance Super" which was built in 1936. This condenser was very suitable and was already on hand. A 6C4 tube was used as the oscillator as it was felt that its low heater drain and internal capacitance would contribute to oscillator stability. From past experience, we had decided that the reactance modulator was an easy way to get really good f.m. and some of the requirements listed above made this type of modulator the logical choice. The miniature 6BE6 was chosen for use as a modulator tube. Here again, low tube capacitances were a factor. A 6AG7 was used in the output stage, delivering enough power to drive the first doubler in the main transmitter which is a 6V6. The main exciter uses a string of 6V6 tubes with outputs on 80, 40, 20 and 10 meters. The oscillator frequency is approximately 1650 to 2000 kc., taking in the eleven-meter band in addition to those mentioned above. The speech amplifier uses two tubes, a 6SJ7 pentode and a 6J5 triode. It is not necessary to go into detail in regard to this part of the unit, except for one point. The audio response can be modified by using values between 0.01 and 0.0005  $\mu$ fd. for the audio coupling condenser  $C_8$ . Readability is much better if the bass response is reduced.

We have now arrived at the heart of the unit, the "clipper" and its filter. This clipper uses a different and somewhat better type of limiter than some we have seen described previously. It has seen extensive service in commercial frequency-shift c.w. transmitters where the duties imposed on its operation are quite severe. It uses a 6SN7 dual-triode instead of diodes and is known as a "transient-free" limiter. It produces a very definite flat-clipped output when driven to cut-off. The waveform at the output is quite square, so that good filtering is needed to remove the harmonic distortion. It is amazing to see how badly the voice waveform can be distorted, as

### Coil Data for the N.F.M. Adapter Unit

#### 1650-2000-Kc. Output:

- L<sub>3</sub> — 13 turns No. 28 enamel close-wound on 1½-inch diameter form.
- L<sub>4</sub> — 13 turns No. 22 enamel, ½ inch from L<sub>3</sub>.
- L<sub>6</sub> — 51 turns No. 22 enamel close-wound on 1½-inch diameter form.
- L<sub>7</sub> — 8 turns No. 20 enamel, adjacent to L<sub>6</sub>.

#### 6250-6750-Kc. Output:

- L<sub>3</sub> — 8 turns No. 28 enamel close-wound on ¾-inch diameter form.
- L<sub>4</sub> — 11 turns No. 20 enamel, spaced to occupy ¾-inch length. Space ⅛ inch from L<sub>3</sub>. C<sub>15</sub> for this range is 180-μufd. silver mica.
- L<sub>6</sub> — 7 turns No. 20 enamel on 1½-inch diameter form, spaced to occupy ¾ inch.
- L<sub>7</sub> — 2 turns No. 20 enamel close-wound at cold end of L<sub>6</sub>.

shown on an oscilloscope, and still pull in quality reports that are not only good, but definitely complimentary! The filter used was not made up especially for the job, but was a 3000-cycle low-pass filter unit left over from a previous project. Tests have shown that sideband splatter is nil.

Two audio gain controls are provided. The first adjusts the amount of audio ahead of the clipper, and consequently the degree to which the speech is clipped. The second, following the filter, is the deviation control and adjusts the maximum swing to which the clipper will hold the oscillator frequency. The deviation control can be set in several ways, probably the best being to adjust the control to a point just under that at which overdeviation distortion occurs when the signal is monitored on a receiver equipped with an n.f.m. adapter.

Getting back to the r.f. part of the unit, it was originally planned to gang the two stages but there was not enough capacitance range to allow the use of sufficient fixed capacity for swamping out drift and still include the eleven-meter band, so the sections of the PW-2 were connected in parallel for the oscillator and the 6AG7 plate was tuned separately.

The power supply was not included within the unit as it had been found from previous experience that less trouble is experienced with hum and vibration if the power supply is external. This is particularly desirable if the unit is to be used for c.w. A switch was provided on the deviation control to disconnect the filament of the 6BE6 reactance modulator when c.w. or a.m. 'phone is to be used.

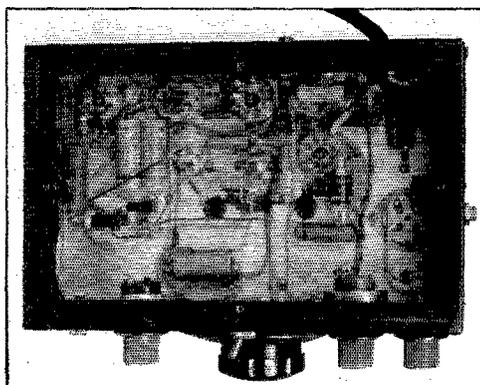
The output of this unit is at a low impedance and is run through a length of coaxial line to a tuned circuit plugged in place of the crystal on the front panel of the exciter. This tuned circuit was made from an old i.f. transformer. The coil

was removed and a broadcast antenna coil was installed in its place. This coil has a low-impedance winding on it and it will tune to the output frequency of the adapter. It is seldom necessary to retune this circuit so it can be set and forgotten unless the VFO frequency is changed radically. The plate tuning of the 6AG7 is very much the same.

The adapter could be operated at some other frequency range than that used, but the exciter with which it was designed to work uses 80-meter crystals. The two coils in the unit were made plug-in so that the frequency could be changed to take in any new bands or transmitters. The six-meter rig started off at 6 Mc. and constants are given for operation of the adapter at that frequency.

### On-the-Air Results

The initial use of this circuit resulted in some unusual reports, most of them unsolicited, and many of them from near-by friends who had been worked regularly. The clipper was installed so that reception would be better on f.m. receivers, but we also found it greatly improved when slope detection was employed. The reports from the fellows who were using a.m. receivers indicated that the signal tuned almost like a.m., and some friends who had been worked consistently actually asked if the rig had been changed over to a.m.! We were able to raise the *average deviation*



View underneath the n.f.m. adapter unit.

greatly, and the audio recovered was, of course, much higher. Later, this clipper was installed at WILFF, W1QIU and W1HOH with the same results and reports. The audio could be copied over the entire carrier, with the exception of one very critical spot in the center, with the receiver in the a.m. position, and in the f.m. position the audio recovered was increased tremendously, yet with no trace of the distortion attributable to excessive peak deviation. In the case of WILFF

(Continued on page 118)

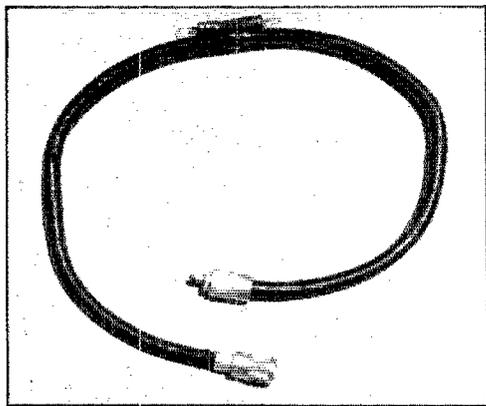
# The "Coax Twin-Lamp"

A Simple S.W.R. Indicator for Solid Line

BY O. S. KEAY,\* WØSJK

SOME months after the original "Twin-Lamp" article<sup>1</sup> was published, it was deemed advisable at WØSJK to change from 300-ohm Twin-Lead feed to RG-8/U coaxial line. However, in the intervening months the Twin-Lamp had become such a fixed part of this station that the operator felt lost without the little standing-wave indicator to tell him that all was well between the transmitter and the antenna. Considerable thought was given to a coaxial-line adaptation of the Twin-Lamp idea, and this article describes the solution that was finally developed.

Complete credit and honor is acknowledged to Mr. Wright, W4HVV, for all of the basic ideas, and it is earnestly recommended that his article be reread before constructing the coaxial-line version. The principles set forth apply equally to both types of indicators. The mechanical arrangement of the coaxial-line Twin-Lamp is all that originates in the present article.



Coaxial-cable version of the Twin-Lamp, suitable for RG-8/U or RG-11/U. The over-all length of the gadget is 30 inches.

The fundamental design principles are the same in either a parallel-wire or coaxial-line Twin-Lamp. The two bulbs should be of the same size, the reactance of the loop should be low compared with lamp impedance, and the reactance of the coupling capacity should be high compared with the lamp impedance. This means using a loop that is short compared with a wavelength and no larger than necessary to give a good indication at the power level used. The little gadget seems to work well at 28 Mc. with any of the small

• Here is a neat adaptation of the Twin-Lamp principle to solid-dielectric coaxial lines, involving only a pair of lamps, some tools and some patience. It would seem to be a "must" if you feed your beam with RG-8/U or RG-11/U.

flashlight lamps whose d.c. resistance is 15 ohms or more. A pair of No. 47 6-volt 150-ma. lamps are working fine for the writer. Their d.c. resistance is about 16 ohms.

Lamp failures — which can happen in a hurry! — caused some inconvenience in early Twin-Lamp models, and this was alleviated by using a pair of miniature screwbase sockets on the indicator. At least it facilitated the changing of lamps when burn-outs did occur and made it possible to use heavier-duty lamps when using more transmitter power.

## Construction

Each user of this little device will be able to apply his own ingenuity in its construction, but after several attempts the following process seemed best to the writer, for his own use on 28-Mc. 'phone.

Previous experience had indicated that a loop about 12 inches long was required at WØSJK. This loop was made from a piece of 75-ohm Amphenol Twin-Lead, as shown in Fig. 1-A, by stripping the insulation from one wire for about one inch and cutting this wire in the exact center, to form the leads that go to the lamp bases. The ends of the loop were closed by soldering the two wires together as near as possible to the insulation so that the wire and solder would be smaller than the original pair. A short piece of plastic tubing was then slipped tightly over each end to insulate these ends from any unwanted contact.

A 30-inch piece of RG-8/U was then trimmed to receive connectors, and the two pieces of braided sheath thus obtained from the ends were saved for future use. This is indicated at the right-hand end of Fig. 1-B. The center of the cable was next determined, and the outer insulating vinyl cover was removed for a distance of 9 inches either side of the center by carefully cutting around the cable and slitting lengthwise between the cuts. The removed cover insulation is shown in Fig. 1-D.

The braided conductor was then cut two inches

\*169 Seymour S.E., Minneapolis 14, Minn.

<sup>1</sup>Wright, "The Twin-Lamp," *QST*, October, 1947.

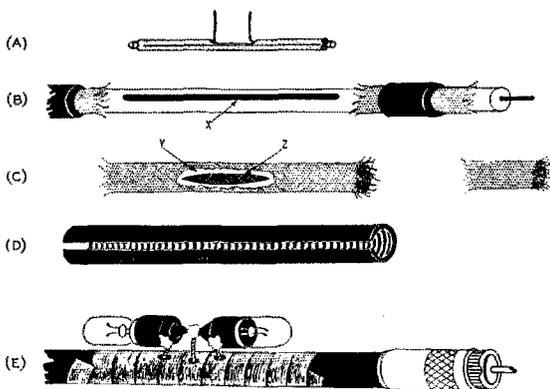


Fig. 1 — Steps in the construction of the coax Twin-Lamp. The pick-up loop is a length of 75-ohm Twin-Lead fitted into a slot cut in the coax line. There is no connection between the lamp circuit and line except at the common connection between the bulbs. This point may be joined to the outer braid.

shorter than (D), as shown in Fig. 1-B. By pushing the two ends of this braid together to expand its diameter, it is possible to slide the braid (Fig. 1-C) over the end of the cable. An oval hole about two inches long was then carefully cut in the center, and the edge was lightly tinned with solder to avoid any fraying, as shown at Y in Fig. 1-C. This produced port Z through which the loop connections could be brought out. A pigtail was soldered to one side of the port to act as the common connection for the two lamps.

A slot fourteen inches long was next cut out of the polyethylene core insulation just wide enough to receive section (A) edgewise, as indicated by X in Fig. 1-B. The cut was made deep enough to permit one side of the coupling loop to rest on the inner conductor of the coaxial line. This process was the most trying of the whole construction, but it was accomplished with the point of a pen-knife and some tough fingers. It was found that the coaxial-line insulation was about the same thickness as the 75-ohm Twin-Lead was wide, thus allowing (A) to drop into the slot and be nearly flush on top.

The loop was placed in the slot, and the braid placed back over the cable and pulled from each end to tighten it firmly back in place, leaving the loop connections exposed centrally through port Z. The two short pieces of braid from the ends of the cable were then fitted over the junction of the braid ends and soldered in place. This was necessary because part (C) did not quite cover the space it was removed from. The braided sheath was again a continuous conductor from end to end of the cable, with the loop inside, and the three pigtails were protruding at right angles to the cable. Three nail holes were punched in section (D) on the side opposite the cut, so that the vinyl covering could be slid over the three pigtails and still be properly insulated. With the wires through

these holes, the outer cover was then smoothed down and tightened as much as possible. It was then secured by winding with Scotch Tape.

It was then only necessary to connect the two miniature sockets, as shown in Fig. 1-E, and attach the cable connectors at the ends. As an added precaution, Scotch Tape was also wound around both the sockets and the cable to hold the sockets firmly in place and remove any strain from the connecting leads.

The finished product has been in use at WØSJK for over six months. It is almost as flexible as the original cable, gives a nice little light to watch while chewing the rag on the air, and absorbs so little power that it is left permanently in the transmission line to indicate when anything goes amiss. It also acts as a sort of modulation indicator, since its brilliance will increase when the average power in the signal goes up with modulation. In addition, it shows when the transmitter is fired up and it is time to talk. The writer is now working on an idea for a gadget to tell him when it is time to stop talking!

#### OUR COVER

The ARRL booth, one of the many popular exhibits at the Fifth ARRL National Convention, with displays of historical papers and League services surrounding the familiar ARRL diamond. On hand to make visitors welcome in the best Milwaukee fashion, at the time this photo was taken, were the following members of MRAC: L. to r., "Cy" Wysocki, W9DOS, Hugh Wilson, W9NAV, George Bowen, W9DWI, and Joe Collins, W9PYM.

#### Silent Keys

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

W1EH, Kenneth B. Warner, Managing Secretary, ARRL and Editor, *QST*, West Hartford, Conn.

W2GOX, ex-W8RKR, John E. Preston, Northport, L. I., N. Y.

W2WMM, John J. Jenne, Newark, N. J.  
W3AVK, ex-W8AVK, F. Alan Glass, Williamsport, Penna.

Ex-W5QQ, Rayburn Jones, Leland, Miss.  
W8BSI, Donald A. Culver, Battle Creek, Mich.

W8PL, Willard K. Francis, Shawnee, Ohio  
W9JY, ex-7JY-W7CZJ-W7FRC, Clarence L. Cook, Chicago, Ill.

VE2BV, Fred George, Ste. Rose Station, P. Q.

VP9V, William T. Dickinson, Paget West  
VS6AS, H. M. R. Hodgman

# Happenings of the Month



## ELECTION RESULTS

Valid nominating petitions have been filed by the membership, in response to the solicitations in August and September *QST*, naming candidates for the 16 director and alternate director positions to be filled in the current autumn election procedures. Seven of those offices have been filled automatically, without the need for balloting, in cases where only one eligible candidate has been nominated. Two director incumbents have been thus returned to office, while five new names will appear as alternate directors as of January 1st.

Joseph M. Johnston, W2SOX, has been declared reelected as director of the Hudson Division for a two-year term beginning January 1, 1949. Franklin K. Matejka, W0DD, has been similarly reelected as director of the Rocky Mountain Division.

John E. Bickel, W6NY, will become alternate for the Southwestern Division, being the only eligible candidate nominated. A petition was filed for Frank J. Cuevas, jr., W6AOA, who was found unable to comply with the requirements of By-Law 12. John is no newcomer to the Board, since he has had experience as director of his division from 1941 to 1946. He spends his business hours managing a ranch in Whittier, Calif.

David H. Calk, W5BHO, will fill the office of alternate director, West Gulf Division, beginning January 1st. George C. Becker, W5EVI, was duly nominated but found ineligible under By-Law 12. W5BHO is an electrical installer with the Houston Lighting and Power Company, has held various offices in the Houston Amateur Radio Club, and has past experience with Board matters as the first alternate director of his division.

William R. White, W0PDA, of Denver, was the only nominee for alternate director of the Rocky Mountain Division and will assume that post January 1st. He is assistant sales manager of the Red Dot Oil Company; his ham experience goes back to 1IBC in 1920, and in recent years he has held various offices in the Denver Radio Club.

Allan D. Gunston, W7GP, Seattle, will be the new alternate director of the Northwestern Division. Petitions were filed for Dr. William Harstad, W7GZK, and Wendel R. Williams, W7HVX, both of whom were found ineligible under By-Law 12. OM Gunston is a radio-radar inspector in the procurement division of the War Department in Seattle; he's an old-timer in ham radio, having started in 1920, and currently is president of the West Seattle Amateur Radio Club.

There were two eligible nominees for the post of alternate director, Hudson Division: Gay E. Milius, jr., W2NJJ, and Robert A. Kirkman, W2DSY. Mr. Kirkman is the incumbent but, because his business affairs are requiring extensive travel outside his home division, regretfully felt obliged to withdraw. Mr. Milius therefore will assume the alternate's post on January 1st. Gay is past president and currently treasurer, general counsel and publicity manager of the Westchester Amateur Radio Association, and a Lieut.-Commander in the Naval Reserve. An attorney, he has taken particular interest in legal matters relating to amateurs.

Balloting is now under way to select the remaining nine directors and alternates. First results will be available from W1AW, probably the evening of November 22nd, and a full report will appear in the January issue of *QST*.

## BAILEY HONORED

League President George W. Bailey was among those recently presented in special ceremonies with the President's Certificate of Merit as a testimonial to outstanding services in technological research and development during World War II. President Bailey has also been appointed an advisor to the Director of the Draft in Washington.

## WASHINGTON NOTES

Television problems continue to occupy much of the attention of the Commission. Several hearings bearing on this were held by FCC during September, one of which, beginning on September 20th and already referred to in the October "Happenings," was attended by Acting Secretary Budlong and Technical Director Grammer. As anticipated, most of the testimony bore on high-band (475-890 megacycle) television problems; however, in its announcement for the hearing the Commission has stated that any additional information on interference problems in low-band television would also be welcome. No significant testimony was introduced on this subject except that of RCA's service experience with some 150,000 of their television receivers now in use. Data show that the number of receivers affected by undesired signals existing in television channels is surprisingly low, coming to only 8.63% of the receivers in use. Of this 8.63%, 7.5% is charged up against ignition and diathermy, with amateur signals being responsible for only 0.82% of the receivers affected. It is not safe to assume there is no real amateur problem

**UNITED STATES RADIO DISTRICTS**

District No. 1, 1600 Customhouse, Boston, Mass. The states of CONNECTICUT, MAINE, MASSACHUSETTS, NEW HAMPSHIRE, RHODE ISLAND and VERMONT.

District No. 2, 748 Federal Bldg., 641 Washington St., New York, N. Y. In the state of NEW YORK, the counties of Albany, Bronx, Columbia, Delaware, Dutchess, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Rensselaer, Richmond, Rockland, Schenectady, Suffolk, Sullivan, Ulster and Westchester; in the state of NEW JERSEY, the counties of Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren.

District No. 3, 1005 Customhouse, Second and Chestnut Sts., Philadelphia, Pa. In the state of PENNSYLVANIA, the counties of Adams, Berks, Bucks, Carbon, Chester, Cumberland, Dauphin, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Perry, Philadelphia, Schuylkill and York; in the state of NEW JERSEY, the counties of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean and Salem; and the county of Newcastle in the state of DELAWARE.

District No. 4, 508 Old Town Bank Bldg., Baltimore, Md. The state of MARYLAND; the DISTRICT OF COLUMBIA; in the state of VIRGINIA, the counties of Arlington, Clark, Fairfax, Fauquier, Frederick, Loudoun, Page, Prince William, Rappahannock, Shenandoah and Warren; the counties of Kent and Sussex in the state of DELAWARE; in the state of WEST VIRGINIA, the counties of Barbour, Berkeley, Grant, Hampshire, Hardy, Harrison, Jefferson, Lewis, Marion, Mineral, Monongalia, Morgan, Pendleton, Preston, Randolph, Taylor, Tucker and Upshur.

District No. 5, 402 Federal Bldg., Norfolk, Va. The state of VIRGINIA except that part lying in District 4, and the state of NORTH CAROLINA except that part lying in District 6.

District No. 6, 411 Federal Annex, Atlanta, Ga. The states of GEORGIA, SOUTH CAROLINA and TENNESSEE; the state of ALABAMA except that part lying in District 8; in the state of NORTH CAROLINA, the counties of Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Cleveland, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Swain, Transylvania, Watauga and Yancey.

District No. 7, 312 Federal Bldg., Miami, Fla. The state of FLORIDA except that part lying in District 8.

District No. 8, 400 Audubon Bldg., New Orleans, La. The states of ARKANSAS, LOUISIANA and MISSISSIPPI; in the state of TEXAS, the city of Texarkana; in the state of FLORIDA, the county of Escambia; in the state of ALABAMA, the counties of Mobile and Baldwin.

District No. 9, 324 U. S. Appraisers Stores Bldg., Houston, Tex. In the state of TEXAS, the counties of Angelina, Aransas, Atascosa, Austin, Bandera, Bastrop, Bee, Brooks, Bexar, Blanco, Brazoria, Brazos, Burleson, Caldwell, Calhoun, Cameron, Chambers, Colorado, Comal, DeWitt, Duval, Dimmit, Edwards, Fayette, Fort Bend, Frio, Galveston, Gillespie, Goliad, Gonzales, Grimes, Guadalupe, Hardin, Hays, Harris, Hidalgo, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kenedy, Kendall, Kerr, Kinney, Kleberg, LaSalle, Lavaca, Lee, Liberty, Live Oak, Matagorda, Madison, Maverick, McMullen, Medina, Montgomery, Nacogdoches, Newton, Nueces, Orange, Polk, Real, Refugio, San Augustine, San Jacinto, San Patricio, Sabine, Starr, Travis, Trinity, Uvalde, Val Verde, Victoria, Walker, Waller, Washington, Webb, Wharton, Willacy, Williamson, Wilson, Zapata, Zavala and Tyler.

District No. 10, 500 U. S. Terminal Annex Bldg., Dallas, Tex. The state of TEXAS except that part lying in District 9 and in the city of Texarkana; the states of OKLAHOMA and NEW MEXICO.

District No. 11, 539 U. S. Post Office & Courthouse Bldg., Los Angeles, Calif. The state of ARIZONA; in the state of NEVADA, the county of Clarke; in the

state of CALIFORNIA, the counties of Imperial, Inyo, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, Ventura.

District No. 12, 323-A Customhouse, San Francisco, Calif. The state of CALIFORNIA except that part lying in District 11; the state of NEVADA except the county of Clarke.

District No. 13, 406 Central Bldg., Portland, Ore. The state of OREGON; the state of IDAHO except that part lying in District 14; in the state of WASHINGTON, the counties of Wahkiakum, Cowlitz, Clark, Skamania and Klickitat.

District No. 14, 801 Federal Office Building, Seattle, Wash. The state of MONTANA; the state of WASHINGTON except that part lying in District 13; in the state of IDAHO, the counties of Benewah, Bonner, Boundary, Clearwater, Idaho, Kootenai, Latah, Lewis, Nez Perce and Shoshone.

District No. 15, 521 New Customhouse, Denver, Colo. The states of COLORADO, UTAH and WYOMING; in the state of NEBRASKA, the counties of Banner, Box Butte, Cheyenne, Dawes, Deuel, Garden, Kimball, Morrill, Scottsbluff, Sheridan and Sioux; in the state of SOUTH DAKOTA, the counties of Butte, Custer, Fall River, Lawrence, Meade, Pennington, Shannon and Washington.

District No. 16, 208 Uptown P.O. Bldg., St. Paul, Minn. The states of MINNESOTA and NORTH DAKOTA; the state of SOUTH DAKOTA except that part lying in District 15; the state of WISCONSIN except that part lying in District 18; in the state of MICHIGAN, the counties of Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and Schoolcraft.

District No. 17, 838 U. S. Courthouse, Kansas City, Mo. The states of KANSAS and MISSOURI; the state of IOWA except that part lying in District 18; the state of NEBRASKA except that part lying in District 15.

District No. 18, 246 U. S. Courthouse Bldg., Chicago, Ill. The states of ILLINOIS and INDIANA; in the state of IOWA, the counties of Allamakee, Buchanan, Cedar, Clayton, Clinton, Delaware, Des Moines, Dubuque, Fayette, Henry, Jackson, Johnson, Jones, Lee, Linn, Louisa, Muscatine, Scott, Washington and Winneshiek; in the state of WISCONSIN, the counties of Brown, Columbia, Calumet, Crawford, Dane, Dodge, Door, Fond du Lac, Grant, Green, Iowa, Jefferson, Keewauke, Kenosha, Lafayette, Manitowoc, Marinette, Milwaukee, Ozaukee, Oconto, Outagamie, Racine, Richland, Rock, Sauk, Sheboygan, Walworth, Washington, Waukesha and Winnebago; the state of KENTUCKY except that part lying in District 19.

District 19, 1029 New Federal Bldg., Detroit, Mich. The state of OHIO; the state of MICHIGAN except that part lying in District 18; the state of WEST VIRGINIA except that part lying in District 4; in the state of KENTUCKY, the counties of Bath, Bell, Boone, Bourbon, Boyd, Bracken, Breathitt, Campbell, Carter, Clark, Elliott, Estill, Fayette, Fleming, Floyd, Franklin, Gallatin, Garrard, Grant, Greenup, Kenton, Harlan, Harrison, Jackson, Jessamine, Johnson, Knott, Knox, Laurel, Lawrence, Lee, Leslie, Letcher, Lewis, Lincoln, Madison, Magoffin, Martin, Mason, McCreary, Menifee, Montgomery, Morgan, Nicholas, Owen, Owsley, Pendleton, Perry, Pike, Powell, Pulaski, Robertson, Rockcastle, Rowan, Scott, Wayne, Whitely, Wolfe and Woodford.

District No. 20, 328 Federal Bldg., Buffalo, N. Y. The state of NEW YORK except that part lying in District 2; the state of PENNSYLVANIA except that part lying in District 3.

District No. 21, 609 Stangenwald Bldg., Honolulu, T.H. The Territory of HAWAII and outlying Pacific possessions except Alaska and adjacent islands.

District No. 22, 323 Federal Bldg., San Juan, P.R. PUERTO RICO and the VIRGIN ISLANDS.

District No. 23, 6 Shattuck Bldg., Juneau, Alaska. The Territory of ALASKA and adjacent islands.

from these figures, since there is no way of knowing how many receivers that were unaffected were getting by only because near-by amateurs remained off the air; however, in his testimony on these interference aspects, Dr. G. L. Beers, of RCA, emphasized that their service people had been getting great coöperation from amateurs and that recent reports from the field-service organization indicate amateur interference is decreasing as a result of coöperative activity. . . . Don't be alarmed at possible amateur implications in connection with an order issued by the Commission in September freezing all pending television-station applications while the Commission makes a further study of the "allocation" aspects of the low-band channels; this is not the study of the over-all allocation table but will be of the actual television-channel assignments within the existing television bands. No effect on amateurs. . . . We continue active participation in preparatory meetings for the next inter-American conference but there is still no announcement of the time and place; it is almost certain, however, that the conference will be held in some other country than Colombia.

#### BUDLONG ACTING SECRETARY

As the result of the death of the late Secretary Warner on September 2nd, the Executive Committee of the League has designated former Senior Assistant Secretary A. L. Budlong, W1BUD, as Acting Secretary of the League until the next meeting of the Board of Directors.

#### STAFF NOTES

We take pleasure in announcing the addition to our staff, as an assistant secretary, of Richard L. Baldwin, W1IKE. "Dick" is a native New Englander — thus breaking the monopoly the W9s have held on Secretarial Department jobs for many years — and comes to us from Oakville, Connecticut. He left Bates College in his sophomore year to go into the Navy where for five years, as a lieutenant, he saw service principally with the Pacific Fleet as a communications officer on destroyers; following the war, he completed his course at Bates, has just obtained his master's degree in physics from Boston University. W1IKE's 200 watts can be found on the air almost any evening, principally on 20 c.w., but also on 75 and 20 a.m. 'phone, 10-meter n.f.m. and 80, 40 and 10 c.w. He is an expert traffic handler, having before the war been net control of the Connecticut Net, is WAC and WAS and is up to 89 countries (72 confirmed) for his DXCC.

#### THE F.C.C. DISTRICTS

When you work portable or mobile more than 48 hours away from home, § 12.91 of our rules requires that you give notice to the FCC Engineer in Charge of each of the districts in which operation will occur, including your own district

where that is applicable. These districts are not call areas. The reference is to the 23 administrative districts in which FCC divides the United States & Possessions. To help you to learn where to send your notices, we list on the facing page the addresses of the FCC field offices and the area that each comprises. Address your notices to Engineer in Charge, Federal Communications Commission, at the address given.

## The 15th Sweepstakes

**Annual ARRL Competition To Be Held  
Nov. 13th-15th and 20th-22nd;  
Rules in October QST**

How many ARRL sections can you work in a week-end? All hams with stations on any amateur band, 'phone or c.w., are invited to get into this popular ARRL radio-operating activity. Stations may be anywhere in the League's field-organization territory (see page 6). The week-end periods starting Saturday afternoon (3 P.M. PST or 6 P.M. EST) on the 13th and 20th of November will mark the "open season" for 72 section-wide contests for most QSOs, and most sections worked, in not more than 40 hours' total operating time. Please note that the SS periods end at 3:01 A.M. EST (12:01 A.M. PST) on November 15th and 22nd. The dates were incorrectly listed in the October QST announcement.

Seventy-two c.w. and seventy-two 'phone contests! Voice entries are compared only with other voice entries — c.w. scores only with other c.w. scores — in one's own geographical section to determine awards. "CQ SS" or "Calling any Sweepstakes station" will be calls indicating your wish to net some contest exchanges.

How to score, explanation of proof-of-QSO exchanges (such as message preambles), the form for contest logs, rules for high- and low-power classes, and other club and general requirements are all detailed in October QST, starting on page 24.

Mimeographed contest forms will be sent gratis to all amateurs who request them by November 5th, either by mail or by radiogram. It is not necessary to make advance entry or use these blanks, if the form described last month is followed closely. BCNU in the "SS."

**SWITCH  
TO SAFETY!**



# Milwaukee or Bust!

## *A Report on the Fifth ARRL National Convention*

**F**ROM Oskaloosa they came . . . from Daytona Beach, Tucson, Tacoma and Tallahassee . . . from Algeria, Ethiopia and India . . . from all points of the compass. Nearly two thousand amateurs, their wives and friends journeyed to Milwaukee, the Labor Day amateur mecca, for the Fifth ARRL National Convention. Visiting military personnel, students, exhibitors, etc., swelled the total count by the registration committee to 2621.

The Milwaukee Radio Amateurs' Club were ready; they'd been preparing for over a year to make this convention, the first in ten years, outstanding in ham history. Did they succeed? Just ask anyone who attended!

From the opening gun Saturday until the final bang of the gavel late Monday there was a full program, something of interest for all, in various halls of the spacious Milwaukee Auditorium.

### *Saturday*

Central Division Director Richelieu, W9ARE, presided at the initial session in the main arena Saturday, introducing convention chairman Jack Doyle, W9GPI, club president George Bowen, W9DWI, Milwaukee alderman George Ruger, W9VWG, and Mayor Frank Zeidler—all of whom gave short addresses of welcome and set the keynote of Milwaukee's hospitality. (The Mayor, it turned out, is an ardent SWL and a prospective ham under the guidance of W9VWG.) ARRL President George W. Bailey, W2KH, responded on behalf of the League, acknowledging the expressions of welcome and thanking the committees for their hard work.

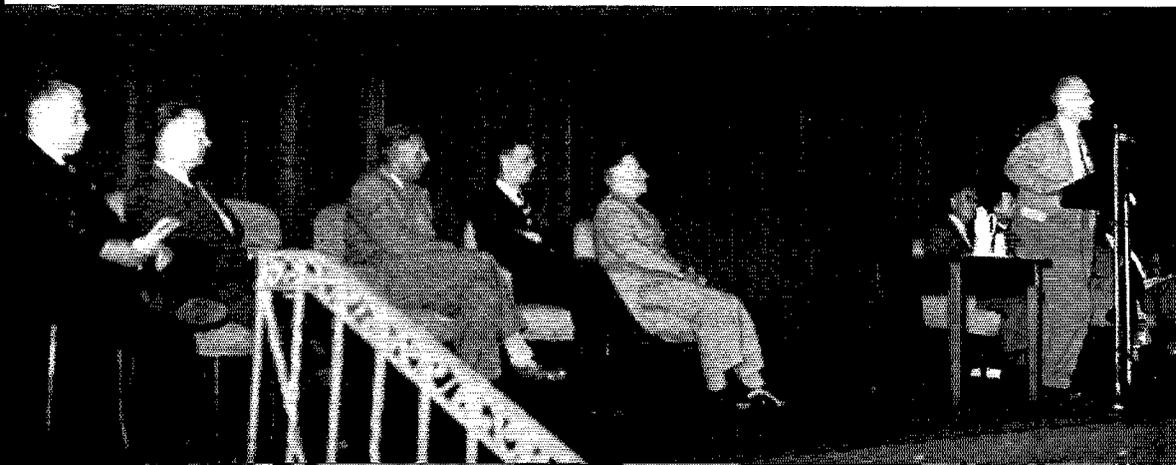
"We are here at our first National Convention since the World War," he said in part, "to cele-

brate our return to free communication among citizens; to honor those radio amateurs, both living and dead, who have served their country so well in times of need; to meet each other face to face; and to chart our future. You remember that on the stone entrance to the great Hall of Archives in Washington, D. C., there are carved the words, 'The Past Is Prologue.' With us radio amateurs the past is indeed prologue to the future, and it behooves us to give thought to that future, to so chart our courses that we may continue to operate 'in the public interest, convenience and necessity,' and to continue to be vital to our national existence."

Fred Catel, W9DTK, program chairman, outlined to the assembly some last-minute program changes, whereupon the group settled back to hear, from Government and military officials, the Washington viewpoint on the amateur radio service. FCC Commissioner George E. Sterling, W3DF, complimented amateurs on their record of contributions to the national welfare, explained in detail some of the problems which face the Commission in administering amateur radio and other services, and outlined ways and means the amateurs could help themselves, particularly in the matter of television interference. Rear Admiral Earl E. Stone, chief of Naval communications, praised amateurs for their wartime record in the Navy, solicited continuing amateur participation in Reserve activities, and spoke of the challenges amateur radio must meet if it is to continue as successfully as in the past.<sup>1</sup> Lieut.-Colonel Paul Oscanyan, W2AZA, brought greetings from Major-General Harold McClelland, AACS, and Captain Nielsen addressed the group

<sup>1</sup> *QST*'s next issue will carry excerpts from these addresses.

The opening ceremonies in the main arena Saturday, September 4th. Left to right: Fred Catel, W9DTK, convention vice-chairman; George Bowen, W9DWI, MRAC president; George Ruger, W9VWG, Milwaukee alderman; Hon. Frank Zeidler, mayor of Milwaukee; Rear Admiral Earl E. Stone, chief of Naval communications; Clyde C. Richelieu (speaking), W9ARE, Central Division director; George W. Bailey, W2KH, ARRL president; Lt.-Col. Paul Oscanyan, AACS; Capt. Nielsen, Signal Corps; Hon. George Sterling, W3DF, Federal Communications Commission; Jack Doyle, W9GPI, general convention chairman.



on behalf of Major-General Spencer Akin, chief signal officer.

Whereupon the assembly adjourned, splitting up into small groups to discuss the afternoon's events and to browse through the numerous booths in the manufacturers' exhibit hall — pastimes which of course were engaged in at odd moments throughout the week-end. Entering the exhibit section of the ground floor of the Auditorium, amateurs paused first to examine the historical and documentary wall panels in the ARRL booth (see cover), and the MRAC host booth which served as nerve center for convention affairs. Then there was a choice of numerous aisles — all of them well-filled at one time or another — to look over the latest in ham gear exhibited by manufacturers, as well as elaborate installations by the Naval Reserve and Army.

By this time the fellows and gals were right in the mood for one of the highlights of the Milwaukee program: the Black Forest evening. Mountains of food, buffet style, and barrels of refreshment were attacked and properly disposed of, all to the spirit of good fellowship and camaraderie which, with the help of a German ragtime band, and hams being what we are, just naturally overflowed.

For the remainder of the evening, there were two waiting attractions: The main body of amateurs and their wives gathered in the main hall to hear a two-hour program of entertainment by the staff of WMAW, a Milwaukee b.c. station which was celebrating its affiliation with the ABC Network. The microphone that evening carried to BCLs many tributes to amateur radio by notables present at the convention. The serious v.h.f. enthusiasts had adjourned separately to a hamfest-meeting where Vince Dawson, W9ZJB, v.h.f. editor of *CQ*, led a general discussion of practices, procedures and techniques from the pioneer days to the present; and Calvin Hadlock, W1CTW, of the National Company, followed with a talk and demonstration concerning "General Techniques at 220 Mc."

### *Sunday*

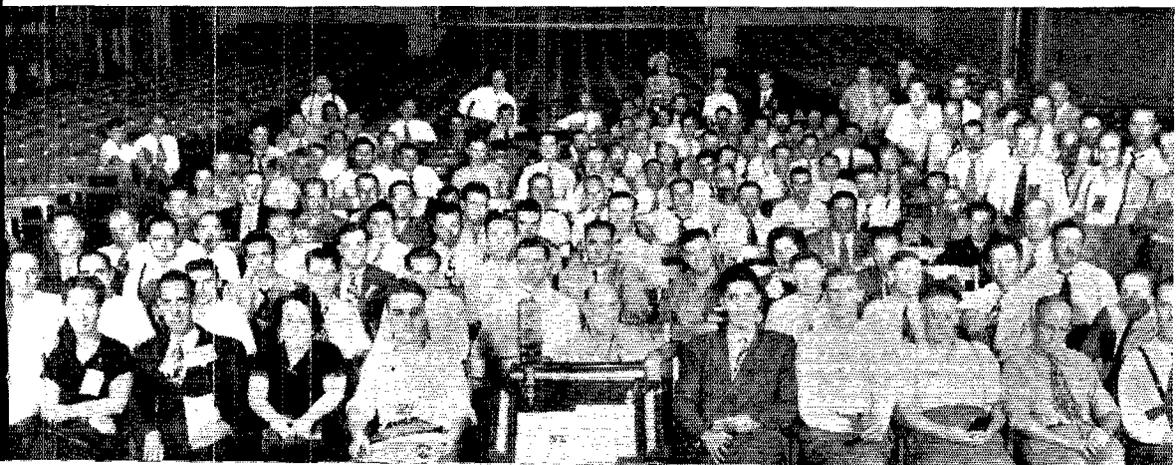
*Sunday morning is normally a difficult time to*

The Milwaukee Auditorium, ideally suited to handle large gatherings, was the site of all formal convention meetings. Typical of the special technical sessions was this v.h.f. gathering in Juneau Hall.

get attendance at an amateur convention meeting, but bright and early September 5th there assembled at various hotel coffee shops for breakfast sizable groups of DX men, v.h.f. enthusiasts, traffic handlers and emergency coordinators, broadcast engineers, and the Navy — the latter in honor of Admiral Stone. There were good opportunities for exchange of personal ideas and the hams took advantage of them, swapping experiences and making plans over the proverbial orange juice, eggs and coffee. While most of the early birds then returned to wander through the exhibits, the v.h.f.-mobile fellows tuned up their gear for the hidden-transmitter hunt, which attracted 37 entries. Henry Kobylinski, W9YUP, of Duluth, Minn., was the first arrival at the secreted 10-meter location. John Landeck, W9-WOK, was tops in 2-meter detectives. Meanwhile, the traffic and emergency boys held a special session to discuss disaster planning, with Red Cross representatives Allen R. Richter, W3OGQ, and Richard D. Cortwright outlining communications needs of that agency.

By this time even the late sleepers were up and ready for another day of vigorous activity. They found it starting off with "Coupling to That Antenna," a thorough treatise of feedline and matching problems delivered by Jean Jacques Brand, an engineer who recently moved to Texas from the Midwest because he "wanted a location where he could work on antennas 12 months of the year instead of seven!" His talk before a large audience communicated that enthusiasm. Ernie Pappenfus, W0SYF, of the Collins Radio Company, held forth on "Modulation Control Circuits" during the following technical session. He gave several complete demonstrations of frequency-response combinations and control circuits and discussed the advantages and disadvantages of controlling frequency passage of speech equipment.

All this time the v.h.f. boys had gone off in their corner — figuratively speaking, of course, because the "corner" was a room with a capacity of 800 — to participate in a forum conducted by Edward P. Tilton, W1HDQ, v.h.f. editor of *QST*, and to observe a 2300-Mc. demonstration by





◆  
Host booth and nerve center of the convention. In the usual order: W9FAD, W9NAV, W9DWI, W9PYM, W9IDV, and H. Devendorf, booth chairman.  
◆

George H. Floyd, W2RYT, of the General Electric Company. The DX gang had similarly gone its separate way, meanwhile, to a gathering of country-chasers cochairmanned by Byron Goodman, W1DX, and Larry LeKashman, W2IOP. There the fur and the prefixes flew thick and fast.

After taking time out for luncheon, the conventioners gathered on Fifth Street (closed to traffic through the cooperation of Alderman W9VWG) to inspect several dozen amateur mobile installations. Throughout the afternoon there were lively discussions on this and that phase of the merits and demerits of the various rigs. One of the first questions asked, "Let's see your log," eliminated many an entry. When it was all over, the judges — Gene Applebaum, W9AI, Louis Wollaeger, W9ANA, Vince Dawson, W0ZJB, and "Doc" Wyman, W9SZH — awarded first prize for the best mobile unit to Robert Waller, W9QIO, of the Chicagoland Mobile Club, for his "dynaflo-drive special," and second prize to Tommy Gettleman, W9IZO, of Elm Grove, Wis.

In the main arena Sunday afternoon, amateurs gathered to hear a discussion of League affairs under the title, "The ARRL and What It Means to You." President Bailey spoke briefly, accenting his theme of the previous day. Vice-President McCargar, W6EY, read to the assembly the speech which the late Secretary Warner had prepared with the expectation of delivering it in person (and which is reprinted in this issue). ARRL General Counsel Paul M. Segal discussed briefly some of the responsibilities of amateur radio, and the position of the ARRL Board as the voice of amateur representation. Antonio C. Uribe, XE1BT, presented to the assembly a letter of greeting from the *Liga Mexicana de Radio Experimentadores*. Communications Manager F. E. Handy, W1BDI, and National Emergency Coördinator Albert E. Hayes, jr., W1IIN,

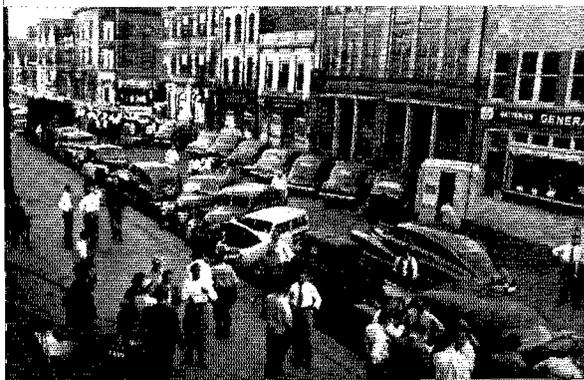
outlined and discussed organized amateur operating activities. A brief open forum followed.

Sunday night, Clyde Richelieu donned his bib, tucker and banjo and performed as master of ceremonies for the Kickemhi Review. The latter group, 18 hams from the Minneapolis Radio Club, was directed by Honey and Joe Sentyrz, W0YLZ. Leo Meyerson, W0GFQ, and Charles Boegel, W0CVU, regaled with a piano duet; but when CVU returned to attempt a violin solo his constant heckler, W8GXH, succeeded in interrupting the proceedings and breaking the "Strad" into kindling. Which, need we say, ended the session with a bang!

Nearing the mystic hour of midnight, several hundred "novices" entered the scene of the formal ceremony of the Royal Order of the Wouff-Hong, the rites being skillfully performed by the famous Milwaukee team under the direction of Charlie Meyer, W9GVL, who played the part of QRM; H. H. Devendorf portrayed the Spirit of Amateur Radio, Ellis Saxton the Old Man. Milton Peters, W9KJR, was Crystal, and Quentin Peters, W9FAD, QRN.

### Labor Day

Early Monday, an ardent group gathered for some concentrated technical discussions and demonstrations: Byron Goodman, assistant technical editor, *QST*, and Donald E. Norgaard, W2KUJ, of the General Electric Company, in turn spoke on the application of single-sideband techniques to amateur 'phone, and used a table-load of demonstration equipment to drive home their points. Leonard Mayberry, W9EIL, of Hallcrafters, outlined the effectiveness of various types of transmission and modulation in his talk, "Communications Receiver Design Problems." During the above program, the v.h.f. specialists again had their own session, W0ZJB discussing the past and future of the very-highs, and John L. Reinartz, W3RB, of RCA, presenting some



◆  
All afternoon Sunday the inspection of mobile units was a chief attraction.  
◆

**QST for**

excellent material on the elimination of television interference.

Lest our interest in the formal amateur program makes this account one-sided, let us say here and now that the ladies, of which there were several hundred in attendance, had their own special events under the direction of Mrs. "Jackie" Toppe, W9AYX. Features of the weekend were a quiz hour staged by a Milwaukee radio artist, "Carla," and a contest to see which XYL could build "the best hat out of an assortment of parts from the radio junk box." At last reports, the winners were still refusing to return the spare parts to the OMs.

Monday afternoon, the Chicagoland Mobile Radio Club held a discussion of mobile procedures, under the chairmanship of Harry Harrison, W9LLX, particularly such matters as drills on spot frequencies in preparation for possible emergency applications. Separate groups journeyed to inspect the submarine *Tautog*, a Reserve training unit, or the television installation at WTMJ. And then began the trek homeward for two thousand tired but happy excursioners, who hoped that it would not be ten more years before another "national."

This account would not be complete without recording at least some of the names and calls of Milwaukee amateurs who worked long and hard for months in advance of Labor Day to make the convention a success. Under the general chairmanship of Jack Doyle, W9GPI, the organization was by committees:

*Program*, Fred Catel, W9DTK. *Technical Program*, George Pfister, W9IZQ. *V.H.F.*, Louis Wollaeger, W9ANA. *Entertainment*, Tommy Gettelman, W9IZO. *Registration*, Joe Collins,



Portraying the true ham spirit, E. F. ("c.w. forever!") Henning, W5BMI, shakes hands with C. W. ("phone forever!") Boegel, W0CVU, while ARRL Directors Collett and Richelieu beam in the background.

W9PYM. *Housing*, Fred Morton, W9AMB. *Finance and Audit*, Wes Correll, W9FY; Louis Wollaeger, W9ANA; G. Toppe, W9GFL. *Advertising and Publicity*, Sid Rose, W9VKC. *Exhibit*, George Bowen, W9DWI. *Decorations*, "Cy" Wysocki, W9DOS. *ARRL Booth*, Hugh Wilson, W9NAV. *MRAC Booth*, H. Devendorf. *Ladies*, Mrs. G. Toppe, W9AYX. *Awards*, Travis Baird, W9VQD. *IRE-BCE*, Joe Kircher, W9NRX. *Wouff-Hong*, Charlie Meyer, W9GVL. *Printing*, Johnny Scarvac, W9GIL. *Hidden Transmitter*, Clarence Burke, W9KEU. *Historical*, Clarence Crapo, W9VD. *Legal*, Paul Leeb, W9TKY. *Secretarial*, Les Reinmund, W9PTE. Each such committee was ably assisted by the general membership of the Milwaukee Radio Amateurs' Club.

— J. H.

## The ARRL — Your Organization

BY KENNETH B. WARNER,\* W1EH

• This is the text of a talk prepared by the late Secretary K. B. Warner for the National Convention. It was read to the assembly by Vice-President McCargar. We think all amateurs will be interested in reading the final message from W1EH.

*President Bailey, Director Richelieu, Ladies and Gentlemen:*

I am glad to find myself again here in Milwaukee. Like every other amateur, I find it good to get back into my home division, in my case the Central and good old W9, the only call area in which I have had the distinction of using amateur radio as the means of setting the same house on fire three times. I tell you about that because I would have you know that I was born and brought up about 500 miles south of here in the town of Cairo in Southern Illinois, where in the days before War One I operated 9JT, a member of the famous — or infamous — Green Ink Gang that maintained

\* Late Secretary, ARRL.

ARRL Trunkline E from Chicago to the Gulf. They say that it still sticks out all over me that I'm a W9 at heart but I like to think that, having been born right where the Mississippi River crosses the Smith & Wesson line, I'm neither North, South, East nor West, and therefore geographically neutral, a good thing for the manager of any national association.

What I'm going to talk to you about this afternoon is not a new circuit or a new scheme to reduce QRM but is something of even more importance to you: the organization which you compose and own, the American Radio Relay League, and the importance, value and dignity which you collectively possess in that organization. Our League is now in the 35th year of its existence. Thus it has been engaged, on behalf of the radio amateur, since before some of you fellows in this room were born. Despite the long life of our organization, you would be surprised how many of today's amateurs do not know the origins and purposes of their League, how it is set up, and how it works. Thirty-five years ago there were less than 2000 amateurs in this country, their reliable working range a dozen or two miles, the best DX of the best of them a few hundred miles. They were individualists, unorganized, without aim or sense of direction and with no means of looking after their interests. It hap-

pened that about that time Hiram Percy Maxim, an ardent amateur in addition to being a world authority in the field of sound, and another and younger amateur in the same city of Hartford, Clarence D. Tuska, had been talking about the desirability of a national organization to advance the interests of the hobby they both loved so much. The difficulty was that they had no central theme on which such an organization could plan for enduring success. Then occurred one of those small human experiences that sometimes lead to great things. Sitting at his station one evening in the early part of 1914, Mr. Maxim desired to send an amateur radiogram from Hartford to another station in Springfield, Massachusetts. His own transmitter not having sufficient range to reach Springfield, he conceived the idea of having it relayed by an intermediate station about half way between. It was successfully done. Now that in itself was not particularly unusual or significant but, thinking with satisfaction of the evening's successful operating, something clicked in Mr. Maxim's mind and the problem of the national organization was solved. For here, without a doubt, was the idea around which an organization could be successfully and strongly built. It would be a relay organization and would have as its object the developing of relay routes all over the country among all the amateurs, so that by this means an amateur in one part of the country could send a message hundreds of miles to an amateur in another part, perhaps some day even send a message from coast to coast. Within a week a suitable name had suggested itself and a month later it was decided to start the ball rolling. In May of 1914, then, we see Maxim and Tuska sitting down and writing a letter to each amateur listed in the Government callbook, announcing the formation of the American Radio Relay League, outlining its purposes and soliciting memberships. Response was immediate and enthusiastic. In the summer of 1914 the first ARRL publication appeared — a little blue-covered callbook listing the names, addresses, calls, power, range, receiving speed and operating hours of the League's 300 members. By letter and radio the word was spread; and meanwhile, through radio contacts and correspondence, attempts were being made to set up relay routes. It proved a real task, however, to keep the growing membership acquainted with plans and schedules by means of correspondence or the occasional circular letters which were headed "QST — General Call to All Stations." As membership was free and the callbooks were sold at cost, the League had no funds. What to do? The answer came in December of 1915 when each member received in his mail a 16-page magazine called "QST," taking its name from the heading on the old bulletins. It was announced that this was being published privately at the expense of Maxim and Tuska and was thenceforth to be the official publication of the League. It proved to be the answer. Having now a journal in which to chronicle the activities of the membership, amateur radio rolled up its sleeves, hitched its belt and settled down to business. During 1916 an organized plan for relay routes was created and half a dozen of them were in active operation by the year-end. Early in 1917 a message was actually relayed from the East Coast to the West and an answer returned to the East Coast in the record time of an hour and twenty minutes. February of 1917 also saw great organizational changes. All this while Maxim and Tuska had been acting as the self-appointed president and secretary, but now the time had come for better organization. At Mr. Maxim's invitation a group of leading amateurs assembled in New York City and in two solid days' work drafted and adopted the League's first constitution, stating its purposes, dividing the nation into six operating divisions, and electing by vote 12 directors to govern its affairs. Although it was originally organized only for relaying, other needs were being experienced and already the League was branching out to undertake these additional services for amateur radio: QST was carrying many helpful technical articles, as members reported the apparatus improvements they discovered; the humble beginnings of the League's spokesmanship in regulatory matters appeared as Mr. Maxim journeyed to Washington at his own expense to testify for the amateur at legislative hearings. By the spring of 1917, with a real organization behind it, functioning relay routes, a successful magazine and a membership of 4000, the

League was poised on the edge of great things to come.

And then came the first World War. Things stopped dead. The Navy came to the League officers with a desperate request for radio operators. How many and how soon? Five hundred and within 10 days. A last broadcast went out over the League's relay routes. Within 10 days the Navy had its 300 operators — to be followed later in the war by another 3000 League members. Then came the famous order closing our stations, directing that antennas be lowered to the ground and transmitters and receivers sealed. QST, operating at a loss in the face of a complete shutdown of amateur activity, carried on its recruiting work until September, and then the editor, too, locked up and went to war.

Eleven days after the armistice that ended War I, our old Board of Directors met in New York and started plans for reconstruction. That board had nerve and determination. It had only \$33 in the treasury and all memberships had lapsed during the war. It didn't even have the money to send a notice to the old members that the League was re-suming. But by early 1919 it had been decided to purchase QST from Tuska, to engage a salaried secretary, to revise the constitution, and to start plans to get the wartime ban on amateur transmitting lifted. To announce these developments to the membership, the directors at that early postwar meeting passed the hat and raised a hundred dollars to finance a special 4-page issue of QST. To purchase the magazine and finance the new start, the finance committee recommended that the League borrow \$7500 from former members, on its certificates of indebtedness payable in two years with interest at 5%. In June of that year the first postwar issue of QST was printed with money loaned for the purpose by the printer himself, and the ARRL bond issue was advertised to the members. No security could be offered, the League had no assets; it was a plain case of whether or not the fellows wanted the League to go on. Amateur spirit is a very wonderful thing, as you all know. That bond issue was subscribed, the League went on, and the bonds were paid off when they came due. (If you've never seen any of these ARRL documents of the earlier years of your organization, you may be interested in taking a look at them in the ARRL booth at this convention.) Well, then, with initial funds available with which to begin postwar operations, the first job was to get the prohibition on transmitting removed. It took many weary months, while amateurs fumed and swore. At last, in October of 1919, it occurred, and in a headlong rush we were on the air again for that unbelievable period of progress between Wars I and II. At first we were all on spark and in fact during the first year and a half or so, spark reached the peak of its greatness. By that time transmitting vacuum tubes were coming on the amateur market and we were in position to adopt the war-developed idea of c.w. transmission — for which the League was campaigning in the interests of extended ranges and reduced interference. Many of you old-timers will remember that our eventual conversion to tube transmission was by no means a painless process, requiring years and causing a complete revolution in our technique and thinking. With improved equipment, operating progress was extremely rapid: the smoothly-working relay routes took a message across the country and got an answer back in 6 minutes, and in the League's famous Transatlantic Tests, Paul Godley heard several dozen of us in Scotland, most of us on c.w. In a couple of years more came the really profound technical revolution, the amateurs' discovery of the value of the higher frequencies. Using these new higher frequencies, actually then only about 2600 kilocycles, the first two-way transatlantic amateur communication in history occurred in late 1923, between the United States and France. (This November will be the 25th anniversary of that famous accomplishment.) It was quickly followed by other countries, other oceans, as word flashed around the world how to do it. Increasingly higher frequencies yielded even better results and in the matter of only a few years we had the unparalleled marvel of amateur communication with any part of the country at any hour of the day, and with any country on earth. It was a period of unbelievable accomplishment, and great events followed each other with remarkable rapidity, both operationwise and organizationwise. In 1923 the League adopted its present

(Continued on page 116)

# On the Air with SINGLE SIDEBAND



One of the questions asked most frequently about the single-sideband stations is, "When are they on the air? I want to hear what the stuff sounds like." This column will report schedules and operating times of active single-sideband stations, describe operating experiences and sometimes the gear in use, and possibly discuss some of the practical operating problems and suggested solutions. Contributions from active single-sideband stations will be welcomed.

At the National Convention in Milwaukee, W2KUJ gave a splendid demonstration of single-sideband transmitting and receiving methods using his phasing system. If the resultant enthusiasm was any indication, there will be a lot of stations using the system in the very near future.

Not that there isn't a good and new crop this month. The initial Fifth District station to be heard from is W5NRP in Albuquerque, who is using the phasing system both for his transmitter and receiver. Capt. Hoffman runs a kilowatt peak to a pair of 813s on 14 Mc. Projects in the works include provision for reinserting any amount of carrier at the transmitter, exalted-carrier reception with automatic-frequency control, and some single-sideband work on 28 Mc. W5NRP is ex-W2DZM.

Apparently the demand exceeds the supply of single-sideband equipment. Latest report from W6YX is that some so-and-so broke into the shack and made off with about \$800 worth of gear, and that's why you haven't heard Mike and his gang on lately. 'Tain't funny, McGee, but that's one way to become a pioneer in this single-sideband adventure!

Dick of W3ASW had reports from two different stations that during recent magnetic storms, when the flutter fade on 75 was so bad, his single-sideband signal was the only thing on the band that was readable! This kept him happy while he had the usual difficulties with others who didn't know how to handle their receivers for the stuff, and insisted on running the r.f. gain high enough so that the receivers overloaded and gave all sorts of false effects.

Even some of the OOs might take a lesson in handling receivers for single-sideband reception. W0MNN, Fred in Kansas City — he built the filter for W0TQK and is using a somewhat similar one, but at 20 kc. — received a discrepancy report from an OO who had him clocked for splatter. The OO (and a lot of other fellows who have casually tuned in on single sideband) would be amazed to find how fast that splatter disappears when the

receiver r.f. gain is cranked down! Fred runs 150 watts peak to an 828 final on both 75 and 20, and has worked both coasts and a VE7 on 75. One unusual thing about his rig is the use of copper-oxide ring modulators in every frequency-changing stage.

Another newcomer to the single-sideband ranks is W3MBY at Riva, Md. Dave has been quite active on 20 with his filter job (a homemade filter, by the way), and he runs about 900 watts peak to a 450TH final, driven by a poor little 807. Best DX is the West Coast, but many can attest that he comes through well in Milwaukee — he was tuned in during a demonstration by W2KUJ at the National Convention!

The newest call area in the country certainly seems to have a corner on the single-sideband stations. Another new one is W0MTF, Cliff at Alamosa, Colo., who is using a very simple phasing system and a peak input of 50 watts to a Class AB 829 on 75. He has been doing quite well in bucking the a.m. QRM, but he wonders if we all could agree on spot frequencies in the 75- and 20-meter bands, where the single-sideband gang could congregate and also know where to look for each other. The nominations are open, gentlemen — what say?

All we have from the Seventh District this month is a note that W7IKY (Seattle) is on 3927 kc. with the stuff. As soon as the next Pony Express rider gets through, we'll try to have more dope on his rig.

Leave it to a W6 to come up with the DX record. W6UBB in North Hollywood is on 14 Mc. with a phasing job running a kilowatt peak to a pair of 813s. So far he has worked J3AAD, VK3RE and a couple of ZLs, which would give him four or five countries and the lead so far as we know. His note had one sentence we like: "If the reports we get are honest, then good-by a.m." Well, the book says 9 to 12 db. advantage, so maybe the reports are honest.

There are two ways to get your feet wet in this single-sideband technique, you know. One is with a transmitter, as reported in this column, but the other is by using the stuff for the reception of ordinary two-sideband a.m. Your Q5-er gives you a small taste of it, and a "selectable-sideband" receiver using still better selectivity will give you an even better bite. But if you want the full-course treatment, at blue-plate prices, take a slow and careful look at the phasing-method-plus-exalted-carrier adapter first described by W2KUJ in July, 1948, *QST*. The real meat was in that article, but it didn't tell how many ohms or how many turns. For such information, see the Nov.-Dec. issue of *GE Ham News*, which carries complete constructional and adjustment details. If you think the stuff isn't worth while on a.m. reception, just suggest that to someone who saw the thing demonstrated at Milwaukee, and then watch your ears get pinned back! — B. G.

# A VFO/Crystal Exciter

*Operating Convenience Without Complication*

BY G. L. COUNTRYMAN,\* WIRBK, W3HH

ALL amateurs have individual requirements for the exciters of their transmitters. Frequently the exciter is used as a low-powered transmitter and an amplifier is added at a later date. There is nothing particularly novel about the unit to be described, except that it provides a combination of operating conveniences in a small space. Briefly the requirements in mind may be summarized as follows:

1) Output sufficient for use as a low-powered transmitter, as a driver for medium-power triodes, or as a driver for a kw. rig using high-power beam tetrodes.

2) Stable VFO plus five crystal spot frequencies available at will from a front-panel switch.

3) The VFO should cover the 80-meter amateur band. Output was desired on the higher bands, but bandswitching in the final was not considered necessary.

4) The unit had to be complete on a 17 × 10 × 3-inch chassis and an 8¾ × 19-inch steel rack panel, with outlets for key and a.c. power leads and a coaxial output terminal on the rear chassis apron.

5) No tuning should be required over a reasonable frequency range in any given band, except switching to the desired crystal or turning one VFO dial.

The illustrations give a good idea of the completed rig. The components will be discussed later, but the tube line-up is as follows:

The output tube is an 807, driven by a 6L6 which acts as the crystal oscillator or as a buffer/doubler stage when the VFO is utilized. One 500-volt d.c. power supply using an 83 rectifier supplies voltage for these two tubes. The VFO line-up is 6SK7, 6F6, 6F6, with a VR-105 voltage regulator and a rectifier. The socket for the rectifier tube has Pins 3 and 4 connected together, Pins 5 and 6 connected together and Pins

\*Cmdr. USN; Electronics Officer, Bldg. 39, Naval Shipyard, Boston, Mass.

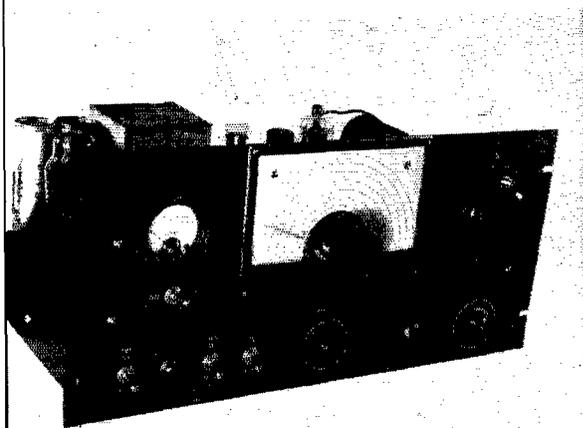
• This VFO/crystal exciter will appeal to many because the design provides operating convenience and yet sticks closely to straightforward lines. The unit is completely self-contained, including a dual power supply.

2 and 7 connected together. This permits using any of the usual octal-base rectifier tubes such as 5Y3G, 5Y4G, 5R4GY, 5U4G, etc. The construction of the VFO was patterned closely after the one described in the 1948 *ARRL Handbook* and covers the 80-meter band from 10 degrees to 90 degrees on the dial.

The panel front contains a 200-ma. meter with switch  $S_4$  below to permit reading the plate current of either the 6L6 or the 807 stage. In the center is the National ACN dial tuning the VFO. The two 6F6 isolation stages are untuned. At the right is the 807 plate tank condenser. Below, from left to right, are the a.c. line switch,  $S_1$ , pilot light, the VFO switch in the VFO high-voltage supply,  $S_2$ , and a s.p.s.t. switch,  $S_3$ , connected across the key terminals for use in tuning up if the unit is at a distance from the key or when modulation is used. In the center is the six-position rotary switch,  $S_5$ , the first five positions connecting to crystals and the sixth position picking up the output of the VFO. Next comes a s.p.s.t. switch,  $S_6$ , which shorts out half of the 6L6 plate tank coil when doubling in that stage, and lastly the 6L6 plate-tank tuning condenser. A friend with an engraving tool prettied up the panel. Millen decals would have been equally effective, if carefully applied.

One of the circuits originally tried used a Tri-tet oscillator. This was abandoned as unnecessary in favor of a simple tetrode-oscillator circuit using 3.5- and 7-Mc. crystals, as shown in Fig. 2.

Panel view of the VFO/crystal exciter. The 6L6 and 807 tuning controls are to the right.



**QST** for



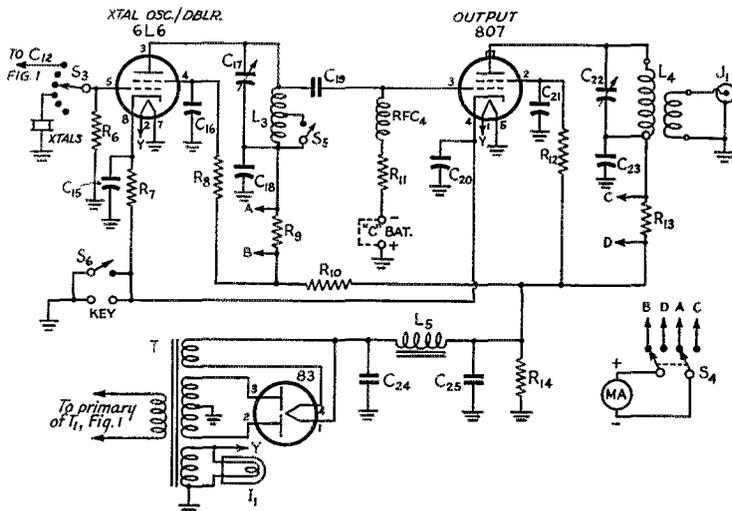


Fig. 2 — Circuit diagram of the crystal-oscillator/doubler and output stages.

- C15, C16, C18, C20, C21, C23 — 0.01- $\mu$ fd. 600-volt paper.  
 C17 — 50- $\mu$ fd. midget variable.  
 C19 — 100- $\mu$ fd. mica.  
 C22 — 100- $\mu$ fd. variable (Cardwell MR105BS or equivalent).  
 C24, C25 — 4- $\mu$ fd. 600-volt oil-filled.  
 R6 — 47,000 ohms, 1 watt.  
 R7 — 350 ohms, 5 watts.  
 R8 — 30,000 ohms, 5 watts.  
 R9, R13 — 22 ohms, 1 watt.  
 R10 — 9000 ohms, 10 watts.  
 R11 — 33,000 ohms, 2 watts.  
 R12 — 17,000 ohms, 5 watts.  
 R14 — 0.1 megohm, 2 watts.  
 L3 — 34 turns No. 18 enam., close-wound on 1½-inch diam., tapped at 17 turns. (See text for substituting manufactured coil.)

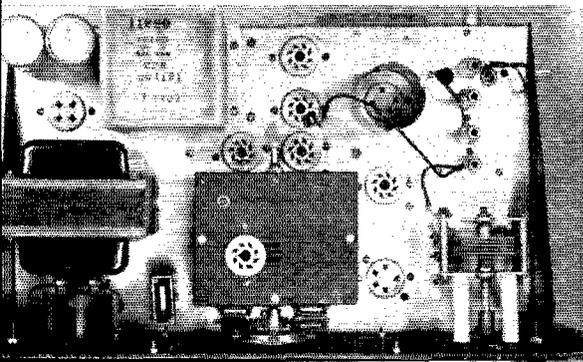
- L4 — B & W "B" series with end links removed on 80-, 40- and 20-meter coils. Push-back wire links wound directly on "cold" end of coil. Manufactured link on 10-meter coil is not removed.  
 — 3.5 — 25 turns, 2½ inches diam., 2¾ inches long, link 5 turns.  
 — 7 Mc. — 20 turns, 2 inches diam., 2¾ inches long, link 4 turns.  
 — 14 Mc. — 10 turns, 2 inches diam., 2¾ inches long, link 3 turns.  
 L5 — 12-hy. 200-ma. filter choke.  
 I1 — 6-volt pilot bulb.  
 MA — 200-ma. d.c. meter.  
 S3 — 6-position rotary switch.  
 S4 — D.p.d.t. toggle.  
 S5, S6 — S.p.a.t. toggle.  
 T — 6.3 volts, 3 amp.; 5 volts, 3 amp.; 1200 volts c.t., 200 ma.

For operation on 80, 40 and 20 meters, crystal frequencies of 3500, 3600, 3650 and 4000 kc. establish band edges and leave a spot frequency for net operation. Oftentimes it will be desirable to have all crystals on selected spot frequencies. For 14-Mc. operation, a 7-Mc. crystal is used and frequency is doubled in the 807 stage.

The rear chassis apron contains the coaxial terminal and a six-terminal feed-through unit (Millen 37306). Two of these terminals are for key leads, two for the 115-volt a.c. line and two for a bias battery, if used. Normally no external bias is required and the two terminals are shorted by a short length of wire. On 20 meters a small 45-volt C battery gives slightly better operation under certain conditions.

### The VFO Section

Before wiring the crystal-controlled section of the unit, the ACN dial and low-voltage power transformer were mounted and all VFO socket holes cut in the chassis. As soon as the crystal transmitter was operating satisfactorily, work was started on the VFO. All available data were studied and that appearing in the *Handbook* appeared to be the most promising. Almost every possible coil-condenser combination for the VFO was tried experimentally. The values shown in Fig. 1 gave by far the best results, there being no appreciable frequency drift after the heaters are warm. This is rather surprising, as the tube-element capacitance is fairly large compared to the fixed capacitance used across the coil. The



Plan view of the chassis. The VFO is in the box at the center with the sockets for the two isolating tubes located at rear. Sockets for the 6L6 tube and tank coil are to the right of the box. The 807 socket is to the rear with the output tank-coil socket and tuning condenser along the right-hand edge of the chassis. The octal socket at the rear is for the h.v. rectifier.

Rear view of the VFO/crystal exciter with tubes and coils in place.



coil used was picked up for a dime at a surplus store. It was marked "L-205" but I have no idea as to its original use. It consists of  $24\frac{1}{4}$  turns of about No. 20 wire wound on a ceramic form  $\frac{3}{4}$  inch in diameter, turns spaced the diameter of the wire and tapped  $3\frac{1}{4}$  turns from one end. The form is about  $1\frac{1}{2}$  inches long and has two tapped holes in one end which facilitate mounting on the side of the oscillator box.

This coil is tuned with the 80- $\mu$ fd. midget condenser and is also shunted by a 175- $\mu$ fd. zero-temperature-coefficient condenser and a 5- $\mu$ fd. negative-temperature-coefficient condenser. This combination spreads the 80-meter band over practically the entire dial scale. No "band-set" variable condenser is necessary, an obvious advantage. The grid condenser,  $C_4$ , and the output coupling condenser,  $C_7$ , are located within the box along with  $R_1$ ,  $C_5$ ,  $C_6$  and  $RFC_1$ . All wiring within the box was made extremely rigid and the three output leads are supported on small ceramic stand-offs mounted inside the box.

A flexible shaft coupling is fastened to the rear extension shaft of  $C_1$  and a bakelite rod connects it to the ACN dial coupling.  $C_1$  is mounted by its shaft-mounting nut on the side of the box opposite the front panel. The photograph shows the shaft protruding from the back of the box. A little careful juggling is necessary to slip the bakelite extension shaft into the ACN dial coupling and at the same time set the machine screws holding the box to the chassis, but it can be done. The rubber grommets used for cushioning the black box from the chassis were touched to the hot tip of the soldering iron and then pressed firmly to the top side of the chassis over the holes drilled there to admit the machine screws. They will stick to the chassis in that position, and fixing the black box in place is simplified.

Unregulated 220 volts is used on the plate of the last 6F6. All other plate and screen voltages for the 6SK7 and the two 6F6s are 105 volts regulated. These voltages give ample output to drive the 6L6 and make for more stable operation than was possible with higher voltages.

The cathodes of the 6L6 and 807 are keyed simultaneously and no clicks or thumps are reported. The transmitter cannot be heard in a small b.c. receiver (with no r.f. stage) located in the same room. It is best to retune the 6L6 plate tank condenser for minimum plate current when switching from crystal to VFO and vice versa to avoid slight chirps. Using the values shown in the wiring diagrams for crystal operation,  $C_{17}$ , is set at minimum capacitance (zero on

the dial). For VFO operation, the setting is about 20 degrees to eliminate all chirping. No retuning of the 807 tank condenser is necessary. Keying leads from 2 to 10 feet long have been used with no change in keying characteristics.  $S_6$ , the "test-key" switch, is a big help when tuning up an amplifier remotely located. The amplifier now used with this exciter is biased to cut-off.

### Operation

Operation of the rig is really a pleasure. At present the rig rests on the operating table alongside the receiver, although it has been mounted in the transmitter rack when the rack was located adjacent to the operating position. The rig was first used as a 75-watt transmitter on both 'phone and c.w. The coaxial output is convenient for coupling to a doublet antenna. At present this unit drives a pair of 35T tubes in push-pull at about 400-watts input with plenty of drive to permit modulation of the 35Ts if desired. The 35T amplifier is mounted in a rack with its power supply, bias supply and antenna coupler in a corner of the room and connected to this unit with a length of RG/11-U.

Initial tune-up is the same as for any rig and this unit, the amplifier and the antenna coupler should be "peaked-tuned" at about the center of the desired range of frequencies to be covered either with crystals or VFO. It is possible then to operate with no tuning other than VFO (or crystal switching as the case may be) over a range of 100 kc. in the 80-meter band, 200 kc. in the 40-meter band and on 20 meters over either the entire 'phone or entire c.w. band. Positions 1 to 5 on the selector switch,  $S_3$ , give five spot frequencies. Now suppose you hear a CQ and want to call him "on the nose" with the VFO. While he is sending, turn the crystal switch to Position 6, snap the VFO switch on and rotate the VFO dial clockwise (increasing frequency) until you just begin to detect the VFO note in your receiver. When he signs off, start your call. It's as easy as that and takes less time than it does to read these instructions. No signal has been on the air as you set your transmitter to his frequency, nor has your own VFO signal interfered with your own reception. No warm-up period is necessary — the VFO is ready to go as soon as your receiver is warm.

# • Technical Topics —

## The "Quad" Antenna

THE current fashion in antennas on the ten-meter band appears to be the "quad"<sup>1</sup> — so named, perhaps, because it is built in the shape of a square or quadrangle, or perhaps because the total length of wire in an element is four half-wavelengths. The most-used version consists of a two-turn loop,  $\frac{1}{4}$  wavelength on a side, backed up by a similarly-constructed reflector, as shown in Fig. 1. Provision is made in the reflector for inserting reactance to obtain optimum phasing.

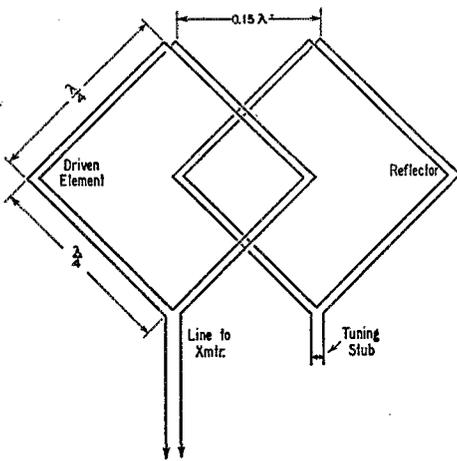


Fig. 1 — The "quad" antenna, using driven element and reflector, each consisting of a two-turn square loop  $\frac{1}{4}$  wavelength on a side.

Since the only purpose served by using two turns instead of one is to obtain an impedance step-up (as in the folded dipole), it is convenient to look on the driven element as a single-turn square loop having a total length of one wavelength. This is shown in Fig. 2-A. The only possible current distribution, if the transmission-line currents are to be equal and opposite, is that shown by the arrows. There is a current loop at the input terminals,  $B$ , and at the opposite corner,  $A$ . Current nodes occur at corners  $C$  and  $D$ . With the loop mounted vertically in the position shown, the currents in the various sides can be divided into horizontal and vertical components as shown in Fig. 2-B. It can be seen that the vertical components tend to cancel each other, while the horizontal components are all in the same direc-

tion. The result is that a square loop in this position is horizontally-polarized. If corner  $B$  is closed and the input terminals are moved to  $C$  or  $D$ , the polarization becomes vertical.

It has been pointed out by W. van B. Roberts<sup>2</sup> that loops of this type can be considered as instances of a general case that includes the folded dipole as one limit and a short-circuited half-wave transmission line as the other. If the folded dipole of Fig. 3-A is stretched out into a square as in Fig. 3-B, we have the loop of Fig. 2. Further stretching forms a shorted half-wave line, as shown at  $C$ . The input impedance of the folded dipole is known to be approximately 300 ohms, and that of the shorted half-wave line is zero. Consequently, we might reasonably expect that the impedance of any loop formed by the stretching process would have an intermediate value of input impedance. So far as we know, no analysis of this particular conformation has been published.

As a radiator, the loop of Fig. 2 can be looked upon as being equivalent to two horizontal dipoles stacked vertically, with each having a length equal to the diagonal of the square. The two are separated by the distance between what might be called the "effective centers" of current in each bent dipole. In dipole  $CAD$  the highest current is at  $A$ , but current also is distributed along  $CA$  and  $AD$ . The "effective center" is therefore below  $A$ , but it is nearer to  $A$  than it is to the center of the loop. Similarly, the highest current in dipole  $CBD$  is at  $B$ , and the "effective center" is nearer to  $B$  than to the center of the loop. Since the diagonal of the square is approximately 0.35 wavelength, the separation of the

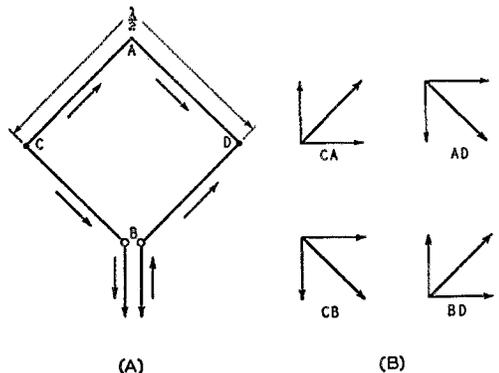


Fig. 2 — Instantaneous current flow in a square loop and resolution into horizontal and vertical components.

<sup>1</sup> This antenna system is believed to have originated at HCJB, Ecuador.

<sup>2</sup> W. van B. Roberts, "Input Impedance of a Folded Dipole," *RCA Review*, June, 1947.

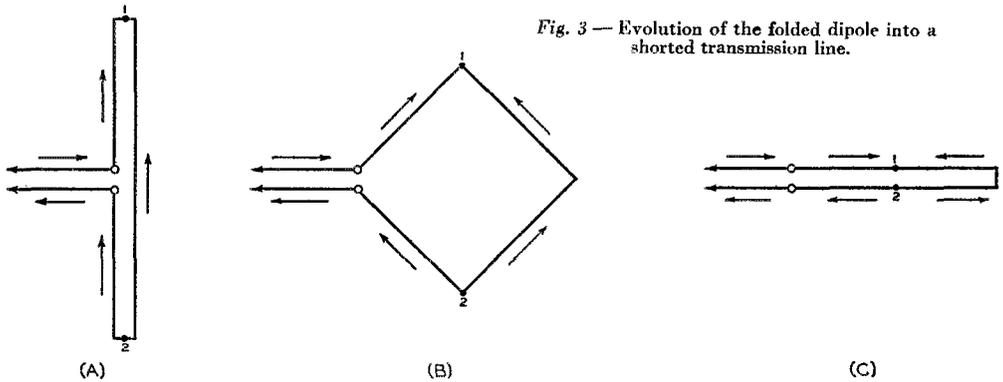


Fig. 3 — Evolution of the folded dipole into a shorted transmission line.

two equivalent dipoles is less than 0.35. It is known that the gain with broadside half-wave dipoles at 0.35 spacing is about 2 db. and drops to 1 db. with  $\frac{1}{4}$ -wavelength spacing. We might expect, therefore, that the gain from the equivalent dipoles would be between 1 and 2 db. On the other hand, the equivalent dipoles are shorter than  $\frac{1}{2}$  wavelength and the reduction in length can be expected to result in some loss. It would appear questionable, therefore, whether such a loop would have any significant gain over a half-wave dipole.

This reasoning was confirmed by measurements using model antennas at 144 Mc. Field-strength measurements comparing the square loop with a dipole showed that the loop had a gain of about 0.5 db. at a height (center of loop) of one wavelength above the flat roof on which the measurements were made. At a height of about  $\frac{3}{4}$  wavelength the two antennas gave the same field, but below this height the simple dipole showed a gain over the loop, the dipole being 1.5 db. better at a height of about 0.6 wavelength, the lowest height used. This behavior with respect to height may be the result of the fact that at a given center height the corner of one dipole in the loop is almost 0.2 wavelength below center. If so, it shows the importance of height in a stacked system.

#### Using a Reflector

There appears to be no more reason for using the folded or two-wire reflector shown in Fig. 1 than there is for using folded parasitic elements in the ordinary type of beam antenna. Folding an antenna element (folded-dipole fashion) does not change its characteristics when viewed externally; it is simply an expedient for making the input impedance as seen by the transmission line assume a desired value. The reflector used in our measurements was a single-turn loop having a closed phasing stub at the bottom corner. The

stub supplies the inductive reactance required to make the parasitic loop act as a reflector.

Measurements showed that when the stub was adjusted to optimum length the gain over the simple loop was approximately 7 db. — considerably more than is usually obtained from a reflector. This is no doubt the result of the configuration of the system, which does not have a very close physical resemblance to the customary straight-line elements. The gain over a half-wave dipole at the height at which this measurement was made — just under one wavelength — was between 7 and 8 db.

For comparison, a simple reflector of the ordinary type was tried at the same spacing (0.15 wavelength) with a half-wave dipole. The measured gain of this set-up was a little over 4 db., which is in line with previous measurements<sup>3</sup> although possibly not the maximum that could be secured by careful adjustment of spacing and reflector tuning. Wire elements, rather than tubing, were used in this case. Nevertheless, there is no doubt in our minds that the two-loop quad system shows a worth-while gain over the simple

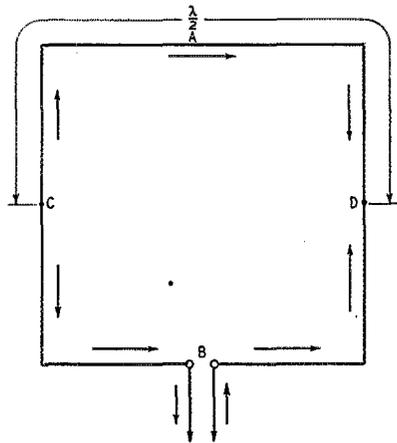


Fig. 4 — Square loop fed at center of one side.

<sup>3</sup> R. G. Rowe, "Gain vs. Element Spacing in Parasitic Arrays," *QST*, April, 1947.

form of two-element beam using a driven element and reflector. The quad gain over a dipole is comparable with that obtained from three-element beams<sup>3</sup> provided the antenna is installed at a height of at least one wavelength.

Since there appears to be little difference in gain, the choice between a two-loop quad and a 3-element beam can be made on the basis of other features. From the adjustment standpoint the quad appears to be simpler; it is only necessary to adjust the stub on the reflector as against adjusting both reflector and director in the 3-element beam — adjustments that usually interlock. Although folding the driven element does raise the impedance as seen by the transmission line, it was obvious in our tests that the terminal impedance does not match a 300-ohm line very closely. No facilities were available at the time for making a reasonably accurate measurement of either impedance or s.w.r. at 144 Mc. Constructionally, it appears to be a matter of choice. The quad is about 8 feet on a side at 29 Mc. (the wire length is figured from  $468/f$  for a half-wavelength) and

thus requires cross members a little over 11 feet in length. The spacing between the two loops is just under 5 feet at this frequency ( $492/f$  for a half-wavelength in space).

An alternative method of mounting and feeding a square loop is shown in Fig. 4. The current distribution is similar, except that the current loops occur at the centers of the top and bottom wires and the current nodes at the centers of the vertical members. The cancellation of the vertically-polarized radiation is more obvious in this case (a similar principle is used in the well-known Bruce curtain), and it is equally obvious that the horizontally-polarized components are in phase. In Fig. 4, the high-current portions of the antenna are actually horizontal and are separated by  $\frac{1}{4}$  wavelength; their length is also  $\frac{1}{4}$  wavelength. A loop of this type, without a reflector, showed a consistent gain of about 0.8 db. over a half-wave dipole at all heights except the lowest (0.6 wavelength), where the two were equal. Its behavior with a loop reflector has not yet been investigated. — G.G.

## About Antennas for 80-Meter Mobile

THE new regulations permitting mobile operation on any amateur frequency open up a tremendous field for us, particularly in the 3.5-Mc. band. Apart from the obvious opportunities to maintain operation on one's pet frequency or in one's favorite net while in transit or at some beach or mountain resort, there is the big advantage we now have in being able to prepare for emergency work simply by having a workable 80-meter rig in the car. Certainly such a station, if it is at all efficient, qualifies an operator to consider himself prepared for emergency work, possibly even to a greater degree than someone who could not so easily rush his "emergency" gear into a stricken area. But never mind all that — just suppose you want to put up an 80-meter antenna on your car, so that you can have some fun. What will it look like?

Well, if you follow your first thought and mount an 8- or 10-foot whip on the rear bumper of your car (insulating it, of course) and feed the bottom of the whip with a piece of coaxial line, you will find that the thing doesn't load very well. Oh, sure, you can couple out of your transmitter with a  $\pi$  coupler and perhaps find a tuning condition where the plate current will be increased a little, but you won't be putting out much of a signal, naturally. The longer the whip is, the better it will load, but you will never be very happy, either with the indicated loading or the signal reports. You don't have to look far for the answer. When a quarter-wavelength is 66 feet or so, a little 8- or 10-foot piece doesn't look like much of an antenna. And it doesn't act like much of one, either. To get out with your 80-meter mobile rig, you're going to need something better.

In general, the approach to this problem of a big-antenna-in-a-small-space is to get the most possible current into the exposed radiator. The simple whip falls down because it is the *end* of an antenna, where everyone knows the voltage is high but the current is low. One approach is to wrap an insulating rod with quite a bit of wire, in the manner used prewar by hams<sup>1</sup> and during the war by some of the services. Getting all the wire out gives the thing a chance to look more like a long wire and hence build up some current. We didn't try this type in some tests we made here at ARRL, so we don't know how it compares with those of Fig. 1. However, the South Texas Emergency Net reports good results with this antenna.

The antenna in Fig. 1-A is the one we had our money on, figuring that the current density would be high over the length of the wire (because the far end was grounded and would correspond to a current loop). However, it was down about two S-points compared with those of Figs. 1-B and 1-C. Perhaps the car chassis was a return path of too high resistance in our particular case, but we couldn't squeeze the best signal out of it, even though it loaded well.

The signals from the antennas of Figs. 1-B and 1-C were about the same, once the latter had been properly pruned. The top-loaded antenna used a 2-foot diameter ring of copper tubing supported by four spokes, and the inductance was mounted inside a shield can just below this capacity "hat." After pruning, the inductance ended up at around 40 turns of No. 18 d.c.c., close-wound on a  $1\frac{1}{4}$ -

<sup>1</sup> Hints & Kinks, "Low-Frequency Antenna for Emergencies," *QST*, July, 1941.

## Four-Element Beam

(Continued from page 20)

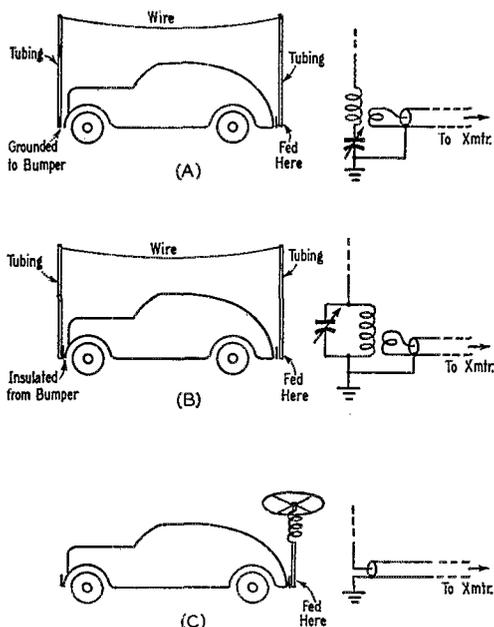


Fig. 1—Several types of antennas for 80-meter mobile operation, and the method of coupling to a coaxial feedline. The system in A was expected to be the best, but this was not confirmed by the tests. The antennas shown in B and C gave approximately equal signals at a distance, but the top-loaded antenna (C) required that the inductance be pruned carefully. In A and B, the wire cleared the roof of the car by about 2 feet.

inch diameter form. The turns were adjusted by peeling off a few at a time, while the input to the transmitter was held constant and the signal strength observed at a distance of seven miles. There was a fairly broad range of about 5 turns in which the signal strength was a constant maximum. The "hat" and shield can (with inductance inside) were mounted on the end of a 5-foot length of aluminum tubing. (Don't expect these dimensions to be right for you — they are listed only to give a starting point.) Undoubtedly the antenna effectiveness could be improved by increasing the length of the tubing support, and the maximum height would be determined by your garage dimensions and the presence of low bridges in your neighborhood.

The antennas of Figs. 1-B and 1-C are good starting points for your mobile work. The whole field, however, is very ripe for investigation, and doubly attractive because no one can claim that all of the possibilities have been investigated. Prewar *QST* had some articles<sup>2</sup> on top loading, if you want to review them, but we like to think that some fresh ideas will develop. Got any? — B.G. & J.P.

<sup>2</sup> Ferrill, "Simple Vertical Antennas," *QST*, February, 1939. Hilgedick and Morgan, "Raising the Efficiency of Short Vertical Radiators," *QST*, December, 1940.

can be at a convenient distance from the beam, and a long lead, by-passed at both ends, run to the multimeter. The meter can be set up at a convenient spot where it will be visible while adjustments are being made. Tuning thus becomes a one-man job not subject to the precise coordination required of a two-man team. The presence of body capacity can be tremendously confusing unless the person watching the meter can watch the adjustments at the same time, because in the final stages of tuning the mere presence of one's hand will make the meter go from zero to off-scale.

Adjustment of the "T"-match also becomes a one-man job with the coaxial-line standing-wave indicator described in a recent article.<sup>3</sup> It is difficult to realize how one could have gotten along without such an instrument. The matching job then merely becomes a matter of sliding the shorting straps for a minimum reading of the meter, as when resonating your final. Our meter consisted of a nondescript milliammeter lashed up to a 1N34 crystal. The omnipresent multimeter can be used for this purpose. The meter need not be a 0-1 milliammeter, nor does the device have to be calibrated, because we are interested only in relative values. If you can calibrate it, so much the better. This device helped adjustments greatly, as we were constructing a number of beams each with a different type of coaxial line and thus necessitating different settings of the "T."

With 5-inch spacing between driven element and matching bars, the best point was found to be 34 inches each side of center with a 52-ohm line, but this value is subject to variation depending on the type of transmission line and other variables.

### Results

As mentioned at the beginning of this article, operating tests with a similar beam for a period of one year gave the writer ample time to confirm the practicability of a beam of this sort. The acme of DX from Hawaii is Europe, the others being relatively easy to hear and work. After futilely trying to compete during prewar years with W6s who were calling Europeans we couldn't even hear, we now have the shoe on the other foot and can compete effectively against California Kilowatts, with the added advantage of not having them interfere as much on reception. True, S9 reports are few and far between, but one year of operating with the original beam has resulted in one shoe-box-and-a-half full of European QSL cards, not counting repeat QSOs and those that did not QSL. As to DX in other directions, over a hundred countries have been confirmed. Everything points to a similar result with this beam.

<sup>3</sup> Pattison, Morris, Smith, "A Standing-Wave Meter for Coaxial Lines," *QST*, July, 1947.

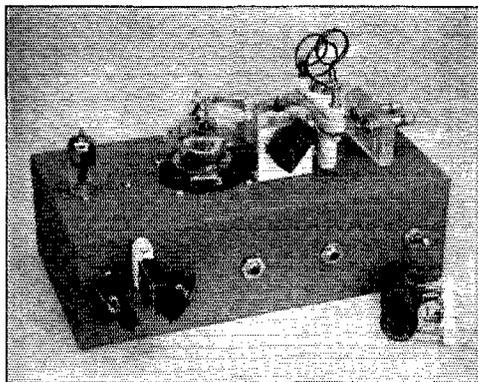
# So It's Hard To Get on V.H.F.!

*A Two-Tube Transmitter-Exciter as Simple as They Come*

BY EDWARD P. TILTON,\* WIHDQ

**T**his little rig was built primarily to test the idea of making standard crystals oscillate on their odd harmonics, as suggested by crystal experts W2PAT and W2UXA in their article describing a 2-meter rig in October, 1948, *QST*. We had been casting about for some good ideas for simple v.h.f. rigs, and the possibility of getting 24-Mc. output from a simple triode oscillator and cheap-and-plentiful 8-Mc. crystals looked like a good bet.

A haywire set-up was thrown together and several dual triodes were tested with an assortment of 8-Mc. crystals, and in each case it was found that useful power output at frequencies as high as the 12th harmonic of the crystal frequency could be obtained from a dual triode. The output on 50 Mc. was more than adequate to drive an 832 as a straight amplifier at maximum ratings, even with a mere 150 volts on the 6J6. By raising the voltage to 250 enough drive was obtained to operate the 832 as a tripler, giving more than enough output on 144 Mc. to drive another 832 or 829 amplifier on that frequency.



Front view of the 50- and 144-Mc. rig. The 2-meter coil is in place in the unit, with the 6-meter one in the right foreground.

After the circuit constants are once properly adjusted, operation of the oscillator is foolproof. It is far more stable than oscillators of similar power using 24-Mc. harmonic-type crystals, and the simplicity of the circuitry and the extremely low over-all drain make a transmitter such as this ideal for portable and mobile applications. For home-station use the 832 may be modulated, or it may be used as a driver for a higher-powered

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

• The crystal-oscillator circuit used in this 50- and 144-Mc. rig is one of those "Why-didn't-I-think-of-that?" things. Anyone who has used harmonic-type crystals extensively knows that they have a tendency to oscillate on the fundamental as well as on the harmonic frequency marked on the holder — but had you thought of trying it the other way around and working conventional crystals on their odd harmonics? Following the suggestion of Bernstein and Johnson in the October issue, it was found that every 8-Mc. rock we could lay hands on (including several purchased recently at 6 for a buck) would take off nicely at 24 Mc., giving enough output from a 6J6 triode section to make the other section multiply to frequencies as high as 100 Mc. Result: real output on 50 and 144 Mc., with two tubes and a mere handful of parts!

final. Included in this unit is a power-switching arrangement which will permit use of the rig on two bands by changing the crystal and one coil and switching the modulated high voltage from the 832 amplifier to a similar additional stage to be used on 144 Mc.

### *Circuit Details*

The rig is so simple, mechanically and electrically, as to require almost no description, other than a brief explanation of the oscillator circuit and its peculiarities. To permit easy duplication a standard 5 × 10 × 3-inch chassis was used, though much more compact design could be employed if space economy is important. The first section of the 6J6 (any other dual triode may be used) is operated as a regenerative oscillator, the crystal operating at its third harmonic. Output at 24 Mc. is capacitively coupled to the second triode section, which operates as a doubler to 48 to 54 Mc., depending on the crystal frequency. A balanced plate circuit is used in the doubler to permit capacitance coupling to the 832 amplifier. A plug-in assembly is used in the 832 plate circuit, to allow the amplifier to be operated as a tripler as well. By means of  $S_1$ , provision is made for modulating an amplifier stage to be operated on 144 Mc. at the same power level as the present 50-Mc. amplifier. If both modulated and unmodulated

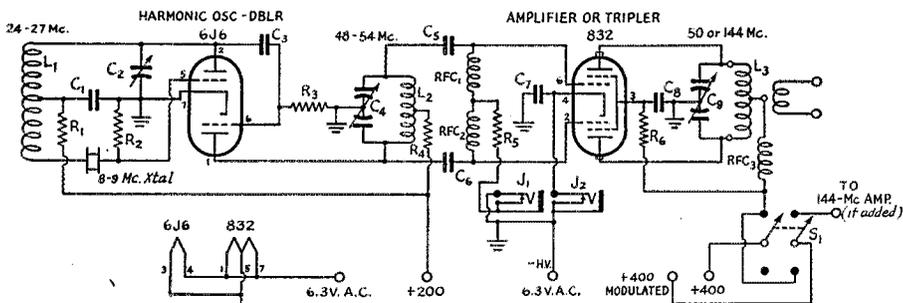


Fig. 1—Schematic diagram of the 2-tube v.h.f. rig. The power-switching arrangement shown provides for later addition of a 144-Mc. amplifier stage.

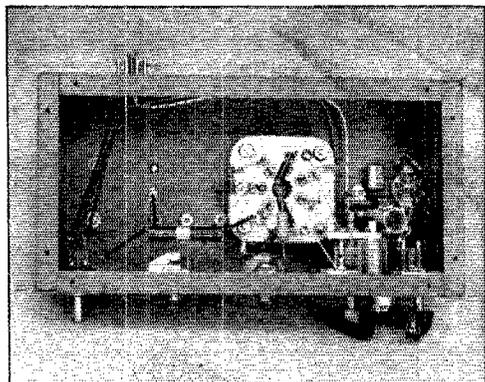
- C<sub>1</sub> — 680- $\mu$ fd. mica.
- C<sub>2</sub> — 50- $\mu$ fd. variable.
- C<sub>3</sub> — 15- $\mu$ fd. ceramic.
- C<sub>4</sub> — 20- $\mu$ fd.-per-section split-stator, made by sawing the stator bars of a Millen 21050 and removing center plate.
- C<sub>5</sub>, C<sub>6</sub> — 75- $\mu$ fd. ceramic.
- C<sub>7</sub>, C<sub>8</sub> — 500- $\mu$ fd. ceramic.
- C<sub>9</sub> — 6- $\mu$ fd.-per-section split-stator (Millen 21906D).
- R<sub>1</sub> — 4700 ohms,  $\frac{1}{2}$  watt.
- R<sub>2</sub> — 3300 ohms, 1 watt.
- R<sub>3</sub> — 47,000 ohms,  $\frac{1}{2}$  watt.
- R<sub>4</sub> — 3300 ohms, 1 watt.
- R<sub>5</sub> — 22,000 ohms, 1 watt.
- R<sub>6</sub> — 25,000 ohms, 10 watts.
- L<sub>1</sub> — 14 turns No. 18,  $\frac{1}{2}$ -inch diam., 1 inch long, tapped at  $4\frac{1}{2}$  turns.

- L<sub>2</sub> — 12 turns No. 18,  $\frac{1}{2}$ -inch diam.,  $\frac{7}{8}$  inch long, center-tapped.
- L<sub>1</sub> and L<sub>2</sub> made from Barker and Williamson "Miniductor" type 3003.
- L<sub>3</sub> — 50 Mc. — 14 turns No. 14 enamel,  $\frac{3}{4}$ -inch diam., 2 inches long. Link: 3 turns No. 20 enamel, spaghetti-covered.
- 144 Mc. — 2 turns No. 14 enamel, 1-inch diam., spaced  $\frac{1}{2}$  inch. Link: 2 turns No. 10 enamel.
- Base and plug assemblies are National XB-16 and PB-16.
- J<sub>1</sub>, J<sub>2</sub> — Closed-circuit jack.
- RFC<sub>1</sub>, RFC<sub>2</sub>, RFC<sub>3</sub> — 25 turns No. 24 enamel on 1-watt resistor, or Millen 34300.
- S<sub>1</sub> — D.p.d.t. toggle switch.

voltages are applied through the power cable as shown in the schematic diagram, switch S<sub>1</sub> makes possible the modulating of the proper stage.

The crystal-oscillator circuit is similar to that described by W7AMQ in *QST* last fall<sup>1</sup> except that a continuous coil is used instead of a separate tickler coil to control regeneration. The principal critical factor in the operation of the oscillator is the amount of inductance in the tickler portion of the oscillator coil, L<sub>1</sub>. This will vary somewhat with different types of tubes; e.g., it was found necessary to change the tap position considerably when changing from a 12AT7 to a 6J6.

<sup>1</sup> "V.H.F. Crystal Oscillators," Sells, *QST*, November, 1947, page 44.



Bottom view of the two-tube v.h.f. transmitter.

If too much inductance is included below the tap the tube will oscillate on a frequency determined by the portion of the coil above the tap and the tuning condenser, C<sub>2</sub>. The position of the tap should be set at approximately one-third up from the crystal end for the initial check if a 6J6 is used. With about 150 volts applied to the oscillator, C<sub>2</sub> should be rotated through its range. If there is a tendency toward oscillation on other than the desired frequency it will be heard in a receiver set at any point near the third harmonic of the crystal frequency. A simple check is provided by inserting a low-range milliammeter in series with R<sub>2</sub> and ground. When the tube oscillates grid current will appear, and the frequency should then be checked to make certain that it is being controlled by the crystal. When operating properly, the first triode section will oscillate over a small portion of the tuning range of C<sub>2</sub>, and at no other point.

If there is insufficient inductance in the tickler winding the 6J6 will either refuse to oscillate entirely, or the output will be low and the crystal will not start when C<sub>2</sub> is tuned near the point of maximum output. The criticalness of tuning in this respect will vary with the activity of the crystal being used, but it is possible to hit an average setting of the coil tap that will take care of almost any crystal, without there being danger of oscillation on other than the proper frequency. It should be noted that pulling the crystal out of the socket is *not* a satisfactory

(Continued on page 158)

# Results, 14th ARRL DX Competition

**T**HE LURE of radio contact with far-off places is a factor that keeps our DX bands heavily populated the year round. There are always periods when unfavorable propagation effects a decrease in the noticeable activity on these bands. A constant factor, however, is responsible each February and March for a burst of activity on amateur frequencies that swells to a mighty crescendo unlike anything to be heard elsewhere in the short-wave spectrum! That factor is the annual ARRL DX Competition. The 14th such competition held was met by its participants with vigor and enthusiasm surpassing that shown in any previous battle of DX skill and equipment. New records were made by DXers intent on bettering past performances and winning awards. Additional countries or states to add to their totals for DXCC, WAS, and other awards were worked by operators possessing less skill than that required to place in the top positions. Like all contests, it was one where the honors went to those who had developed through practice the ability necessary to win.

Good sportsmanship and clean-operating tactics prevailed in general. Carelessness in setting VFOs or intentional cycle-splitting near band edges brought penalties to a considerable number of operators. A word to the wise is sufficient. We'll wager there will be more careful use of VFOs next February and March!

There were fifteen entries under the multi-operator classification, these scattered between domestic and foreign participation. Of these, six represented entries placed in this classification by the Award Committee following interpretation under Contest Rules 6, 7, 8 and 9 that operator arrangements involving assistance by local radio intercommunication warranted a multioperator classification.

Now, let's take a look at the vital statistics of the most keenly-competitive and bitterly-contested DX activity of all time:

## The Winners

Competition in the contest was confined to participants within each ARRL Mainland section and in each country outside the W/VE area submitting qualifying entries. Separate awards are being made for c.w. and 'phone in each case. The total number of c.w. entries received was 1023 (732 W/VE, 291 foreign). 'Phone entries numbered 573 (381 W/VE, 192 foreign). Medallions are being awarded to 65 c.w. operators and 65 'phone operators in the W/VE area; 73 c.w. awards and 60 'phone awards go to participants outside the U. S. and Canada. A special tabulation credits the scores of all award winners.

Hearty congratulations and a big hand to each victor!

## C. W. High Scores and Records

Highest score in the W/VE category was chalked up by Henry M. Bach, jr., W2GWE, who finished the contest to the very pretty tune of 302,574 points in 84 hours of operation. Henry, you will remember, took top honors last year, too, and apparently has been letting no grass grow underfoot! He had 422 contacts, a multiplier of 239, and worked 104 *different* countries (more than enough to qualify for DXCC if the cards came through)! Hamdom congratulates you, Henry, on a top-flight operating performance that shatters all previous DX Contest score-contacts-multiplier-countries-worked records for W/VE! The contest rig at W2GWE utilized p.p. 250THs at 1-kw. input on 3.5, 7, 14, 27 and 28 Mc.; antennas were 4-element rotaries on 14 and 28 Mc., long wires on 7 Mc., and an 80-meter Zepp and long wires on 3.5 Mc.; receivers were a homebuilt job for 28 Mc. and a modified Super-Pro.

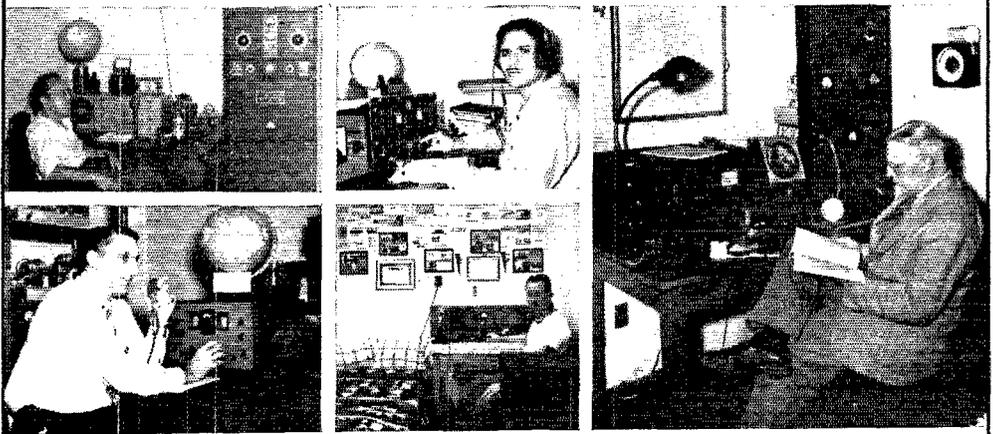
Second-highest W scorer was Jerry Mathis, W3BES, who needs no introduction to any regular reader of contest reports. Jerry bettered his third-place 1947 standing by a considerable margin, and in 85 hours made 406 QSOs with 91 countries for a multiplier of 232 and a final score of 280,720 points.

Gus Browning, W4BPD, deserves a big hand for bringing his call area back into the DX Contest limelight. Without intending to reflect in the slightest on the ability of the gang down that way, we note that W4 has been strangely missing in the "big-three" listing since 1936 when W4DHZ led the pack on c.w. Gus scored 243,072 points from 384 contacts and a multiplier of 211. At least part of the secret of his success lies in the multifarious assortment of skywires that seem to grow in such profusion on that antenna farm in Orangeburg, S. C.!

Other high c.w. scores worthy of special mention: W6SZY 240,006, W2IQG 235,752, W4KFC 226,170, W2BXA 212,160, W3LOE 211,090, W8WZ 198,403, W6GRL 188,928, W4FU 178,002, W2AQW 176,490, W6HZT 170,170, W1BPX 170,100.

Leaders in number of contacts: W2GWE 422, W3BES 406, W2IQG 388, W4BPD 384, W6SZY 370, W2BXA 366, W4KFC 359, W3LOE 353, W8WZ 330, W6GRL 328, W4FU 324, W2AQW 318, W6HZT 319, W1BPX 305.

Leaders in multipliers (total of countries worked on each band used): W2GWE 239, W3BES 232, W6SZY 221, W4BPD 211, W4KFC 210, W2IQG 209, W3LOE 202, W8WZ 199,



Top row: left, Ben Holloman, W5ENE, Northern Texas c.w. award winner; right, J. Cardoso De Almeida, PY2AC, 4th-high foreign 'phone scorer, Brazil 'phone winner. Middle row: upper left, Pedro J. Piza, KP4ES, 5th-high 'phone scorer outside W/VE, winner Puerto Rico 'phone award; upper center, Sergio Rubio, CM2SW, 2nd-highest c.w. scorer outside W/VE, winner Cuba c.w. award; lower left, James W. Knapp, W2AFO, highest 'phone scorer in W/VE, winner Western New York Section 'phone award; lower center, Jewell Knott, TG9JK, 3rd-highest c.w. scorer outside W/VE, winner c.w. award for Guatemala; extreme right, R. D. Carter, VE3QD, 2nd-highest Canadian c.w. scorer, winner Ontario c.w. award. Bottom row: left, Bob Cheek, W3LOE, 8th-high c.w. scorer in W/VE, winner Western Pa. Section c.w. award; center, David H. Duff, VK2EO, winner Australia c.w. award; right, Edmond R. von Ruethi, HB9CX, highest-scoring European on c.w., winner c.w. award for Switzerland.

W2BXA 195, W6GRL 192, W1BPX 189, W4FU 186, W2AQW 185, W6HZZ 182, W1VDY 177, W8BHW 174, W4OM 172.

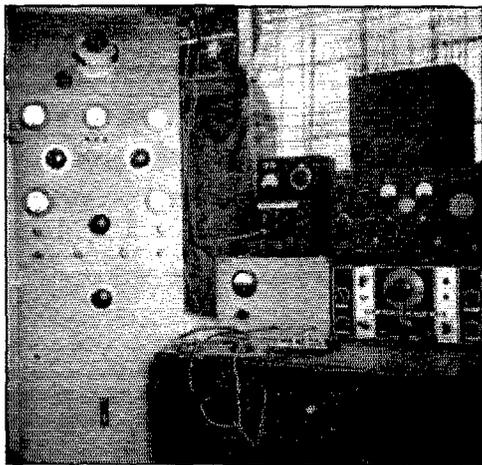
Top c.w. score among contestants outside W/VE has been made each year since 1938 by Juan Lobo y Lobo of Mexico under the calls XE1A, XE2N or XF1A. And each year his

total has grown greater. Juan's 41-QSOs-per-hour record of last year seemed like all it was humanly possible for one operator to accomplish. Imagine our amazement when XF1A's 1948 log showed 55.5 QSOs/hour -- an even 3000 QSOs, multiplier of 85 and final score of 765,000 points in 54 hours of operation!! Juan's most successful hour

brought contacts with 70 stations and his best minute of operation resulted in 4 QSOs! His multiplier of 85 also set a new record, topping last year's high figure by 10 points. Working on 3.5, 7, 14, 27 and 28 Mc., XF1A missed only VE5 on 3.5 Mc., VE8 on 3.5, 7, 27 and 28, to fall 5 points short of the perfect multiplier. We again salute you, Juan, on as commendable a demonstration of operating ability as it has ever been our pleasure to acknowledge!

CM2SW produced the second-highest foreign score — 493,280 (2066 contacts, multiplier 80) and third-place honors go to ZS2A, who had 2444 QSOs and a multiplier of 65 for 476,580 points.

Other outstanding scorers: TG9JK 368,368, VP7NG 360,893, KZ5OJ 330,448, KS4AI 318,237, KV4AA 301,988, KH6IJ 276,480, CE3HG 221,971, KH6FF 192,780, VK2EO



ZS2A, the station of Reg Henwick, third-highest foreign c.w. scorer and winner of the c.w. award for the Union of South Africa.

182,634, HK3CK 175,080, ZL1MB 169,491, VK2VA 163,176, KL7NA 157,743, KL7LE 156,096, HB9CX 150,452.

Leaders in number of contacts: XF1A 3000, ZS2A 2444, CM2SW 2066, KS4AI 1739, VP7NG 1697, TG9JK 1604, KV4AA 1493, KZ5OJ 1452, KH6IJ 1280, ZL1MB 1153, CE3AG 1107, ZS6CZ 1105, ZS6GO 1098, VK2VA 1046, KL7NA 1033, OA4AK 1014.

Highest multipliers: XF1A 85, CM2SW 80, TG9JK 77, KZ5OJ 76, KH6IJ 72, VP7NG 71, KH6FF 70, KV4AA 68, CE3AG 67, ZS2A 65, GI6TK 64, KL7LE 64, KS4AI VK2EO 61, HK3CK PY2AC 60.

#### *'Phone High Scores and Records*

'Phone scores in the W/VE category generally ran much higher in the 14th DX competition than in the previous fray. Last year only one

operator managed to place in the six-figure bracket. In this contest six voice specialists qualified in that class. Heading the list is the 141,840-point score of James W. Knapp, W2AFQ. Operating a total of 80 hours, Jim had 394 contacts and a 120 multiplier. An enduring voice plus an efficient station layout enabled him to outclass the rest of the mike gang. Gear used at W2AFQ consisted of a rig running 700 watts to a pair of 4-125As, a Collins 75A receiver and a 14-Mc. 3-element rotary beam (mounted on a 60-foot windmill tower) with a switching device for converting to six elements on 28 Mc. Mighty fine talking, Jim!

W8KML finished up a healthy second place with 135,509 points (357 QSOs, 127 multiplier). Third-high 'phone score, 122,086, was made by W8KML's brother, W3NJE. The boys each used the two-band switchless rotary beam described by the latter in October QST. Next in line among the top 'phone scorers: W3DHM 118,560, W6SA 103,880, W8BKP 101,760, W2RGV 97,440, W9HEI 86,040, W6ITA 82,160, W2BXA 80,840, W1JCX 80,325, W1ATE 75,272.

Leaders in number of 'phone contacts: W2AFQ 394, W3NJE 366, W8KML 357, W6SA 328, W6DI 320, W3DHM 304, W8HUD 301, W4KWY 296, W2BXA 291, W2RGV 290, W4OM 276, W8BKP 265, W6ITA 264, W6TT 263, W1ATE 260, W1JCX 258, W4DQH 252, W3NX 250.

High 'phone multipliers: W3DHM 130, W8BKP 128, W8KML 127, W2AFQ W9HEI 120, W4OM 119, W9REU 117, W3NJE 114, W4LAY 113, W2RGV W4KWY 112, W6DI 108, W6SA 106, W1JCX 105, W3HFD W6ITA W9EWC 104, W8HUD 103.

Leading all 'phone contestants outside W/VE, XF1A produced new records for score, multiplier and QSOs per hour. Juan spent 37 hours in the contest, scored 314,364 points with a multiplier of 68, and had 1541 contacts made at an average rate of 41.6 per hour! Using 3.5, 14, 27 and 28 Mc., he missed only VE1 on 3.5, and VE5, 6 and 8 on 28 Mc. A neat performance in any ham's language!

Following XF1A's top score was that of HH2CW, 195,615 points, 1039 contacts. Other highs: VP6CDI 142,662, PY2AC 107,400, KP4ES 102,084, EL5A 86,934, ZS6DW 82,960, G2PU 67,431, G4JZ 64,232, PY2CK 63,580, EL2L 63,-350, HC1JW 58,840, G6PD 57,696, KP4CL 57,447, VQ4ERR 52,256.

Leaders in number of W/VE 'phone contacts: XF1A 1541, HH2CW 1039, ZS6DW 814, VP6CDI 779, KP4ES 724, PY2AC 716, EL5A 658, PY2CK 652, EL2L 606, G6PD 601, G4JZ 600, G2PU 583, KG6AW/VK9 555, VQ4ERR 549, PA0GN 505.

High multipliers: XF1A 68, HH2CW 63, VP6CDI 62, PY2AC 50, KP4ES 47, VK2ADT 46, VK7AJ 42, EL5A 41, HC1JW 40.

### Disqualifications

The following are deemed ineligible for DX-score listings, or awards, in the 1948 DX Competition. In each case disqualification is for off-frequency operation as confirmed by a single FCC citation or advisory notice or two accredited official observer measurements.

C.w.: W1s BB ME, W2s DJT GKE QCF UFT WZ, W3HXA, W4LHQ, W6s ANF ETJ ITA VBX, W7s CJB VY, W9s CRX LM LNM, W0RSL, VE2WW, HH2BL, OK1AW, ON4CC, VK2QL, YU7LX. 'Phone: W6EJC, W91T, VE5OM, CO21W, I1LW.

In addition to the above, the following stations that did not submit contest entries were also reported off frequency by two or more observers or by FCC during the period of the competition:

C.w.: W1s AJO ASU BLO BTE CEG CLX DLC ENE GA IOZ KMY NAK NXX QF RCQ, W2s AIU BOX CJX CR DQH DXB FAB FLD GB GGN JXQ PEO POG QKJ RDE UK WVB YDN, W3s BEN CPS HOX HTO HRD ITW KDF KZM LW MGI NVO VX, W4s DHZ GFW JBT LFD LOM LVV NFO RBQSI, W5s HOT KOT MNR, W6s HB NRZ OEG SSA VWF, W7s EYS JCI, W8s BUM CNM DDS DFQ IIA ONK ROX SUZ, W9s ALI AUC BMV CQS CXY IBC JAN QM WWT, W0s BFY CMH NIM TTR YYO, VE3FN, CMs 2AZ 2BT, CN8BK, EA7AV, F8JI, FT4AN, Gs 2LU 3CAO 6YQ, GW8HGZ, HB9HK, HK1AM, I1ADW, ON4GU, PY1HQ, VK2ZH, VO2R, VP2DC, ZC6WF. 'Phone: W1ARV, W3BL, W5JSS, W6s GNS PJ, W7KWV, W9TJ, VE1EK, CN8AB, CN8AW, G8AU, G18GK, HK3HZ, PA6JG, VP2DC.

### Club Scores

Winner of the gavel offered to the amateur radio club that submitted the highest aggregate score of members is once again the Frankford Radio Club of Philadelphia. Spurred by their success last year in winning their first DX Contest award, the boys went all out and brought home the bacon once more. The FRC score — 2,089,704 points — was almost a full million points higher than their 1947 total! Club-certificate awards: W3BES c.w. and W2SAI 'phone.

The South Bay Amateur Radio Association of Los Angeles (certificate awards: W6SZY c.w. and W6SA 'phone) took second place with 1,328,168 points and the Northern California DX Club (W6RM c.w., W6TT 'phone) maintained their third-place position of last year by scoring 1,123,253.

Other groups submitting entries in the club competition are listed below in order of scores. Calls given in parentheses are those of club-certificate winners; unless otherwise stated, certificate was won in the c.w. section: Greater Cincinnati Amateur Radio Club (W4FU c.w., W4DQH 'phone) 853,291; Rochester DX Association (W2FBA c.w., W2AFQ 'phone) 506,419; Manchester Radio Club (W1NMP c.w., W1ATE 'phone) 275,392; Northwest Radio Club (W9LM c.w., W9BDV 'phone) 240,267; Potomac Valley Radio Club (W4KXN) 213,901; Columbus Amateur Radio Association (W8FJN c.w., W8NXXF 'phone) 164,413; El-Ray Radio Club (W1VDY) 147,561; North Suburban Radio Club (W9GRV)

142,397; Dade Radio Club (W4FPK) 88,079; South Lyme Beer, Chowder and Propagation Society (W1DX) 87,586; Connecticut Wireless Association (W1FTX) 44,165; Calgary Amateur Radio Association (VE6MZ) 20,662; K.B.T. Radio Club (W2CLO) 15,861; Canton Amateur Radio Club (W8AL) 12,279. Individual club awards are made only in cases where three c.w. and/or three 'phone entries were received from club members.

— — —

And so the 14th ARRL International DX Competition becomes part of the interesting history of amateur operating activities. The achievements recounted herein indicate the ham's ability to improve operating skill and increase the effectiveness of equipment necessary to successful long-distance communication. They should furnish inspiration for new champions to rise next year and strive for even higher score and contact records. We have yet to see an operating contest that has reached the saturation point in this respect! Make your plans *now* to take part in the 15th DX Competition, February 11th-14th and March 11th-14th (c.w.), February 18th-21st and March 18th-21st ('phone).

### WINNERS, FOURTEENTH A.R.R.L. INTERNATIONAL DX CONTEST

#### Radiotelegraph

Section or Country	Winner	Total Score — Multiplier — Contacts
E. Penna.	W3BES	280,720-232- 406
Md.-Del.-D. C.	W3IYE	107,004-148- 241
So. New Jersey	W2AQW	176,490-185- 318
W. New York	W2FBA	120,105-157- 255
W. Penna.	W3LOE	211,090-202- 353
Illinois	W9FJB	122,925-149- 275
Indiana	W9IU	128,324-162- 264
Wisconsin	W9RQM	38,376- 78- 164
No. Dakota	W0PHR	4185- 22- 54
Minnesota	W0YCR	40,673- 89- 153
Arkansas	W5LUY	1716- 22- 26
Louisiana	W5KC	93,160-136- 237
Mississippi	W5CKY	50,904-101- 168
Tennessee	W4DQH	45,008- 97- 163
Kentucky	W4FU	178,002-186- 324
Michigan	W8LEC	85,172-136- 209
Ohio	W8WZ	198,403-199- 333
E. New York	W2AWF	57,996-108- 179
N. Y. C. & L. I.	W2GWE	302,574-239- 422
No. New Jersey	W2IQG	235,752-209- 388
Iowa	W0SGO	79,950-130- 206
Kansas	W0DAE	69,936-124- 188
Missouri	W0DU	15,045- 59- 85
Nebraska	W0BBS	11,424- 48- 80
Connecticut	W1NMP	139,892-164- 287
Maine	W1BPX	170,100-189- 305
E. Mass.	W1VDY	137,529-177- 259
W. Mass.	W1ZD	55,770-110- 169
New Hampshire	W1BFT	102,760-143- 240
Rhode Island	W1CJH	59,187-109- 181
Vermont	W1KRV	3552- 32- 37
Idaho	W7DV	32,076- 81- 132
Montana	W7KVV	8844- 44- 67
Oregon	W7GBV	37,080- 90- 142

Section or Country	Winner	Total Score — Multiplier — Contacts	Section or Country	Winner	Total Score — Multiplier — Contacts
Washington	W7KEM	51,480-110- 158	Barbados	VP6AT	738- 9- 28
Nevada	W7ONG	41,124- 92- 149	Bermuda	VP9E	57,834- 27- 736
Santa Clara Valley	W6MLY	66,783-113- 197	British Honduras	VP1AA	6831- 11- 207
East Bay	W6RM	140,415-165- 285	Canal Zone	KZSOJ	330,448- 76-1452
San Francisco	W6WB	62,581-117- 193	Costa Rica	T2KPK	31,240- 44- 248
Sacramento Valley	W6EFM	5250- 35- 50	Cuba	CM2SW	493,280- 80-2066
San Joaquin Valley	W6KEV	104,192-148- 240	Guatemala	TC9JK	368,368- 77-1604
No. Carolina	W4AIT	103,353-141- 247	Iceland	TF3EA	14,336- 18- 271
So. Carolina	W4BPD	243,072-211- 384	Jamaica	VP5AO	26,611- 23- 418
Virginia	W4KFC	226,170-210- 359	Mexico	XF1A	765,000- 85-3000
W. Virginia	W8AZD	35,028- 84- 139	Newfoundland & Labrador	VO6EP	67,509- 39- 596
Colorado	W4FYF	53,235-105- 169	Nicaragua	YN1AA	3774- 17- 82
Utah-Wyoming	W5PGS	5088- 32- 53	Panama	HPAQ	6280- 20- 106
Alabama	W4RIJ	41,613- 97- 143	Puerto Rico	KP4BC	76,161- 53- 481
E. Florida	W4BRB	135,956-164- 277	Swan Island	KS4AI	318,237- 61-1739
W. Florida	W4JV	127,980-158- 270	Virgin Islands	KV4AA	301,988- 68-1493
Georgia	W4DCZ	29,520- 82- 121	Martinique	FM3AD	25,606- 36- 278
Los Angeles	W6SZY	240,006-221- 370	Australia	VK2EO	182,634- 61- 998
Arizona	W7JPY	14,112- 56- 84	Hawaiian Islands	KH6J	276,480- 72-1280
San Diego	W6ITY	106,448-153- 232	New Zealand	ZL1MB	169,491- 49-1153
No. Texas	W5ENE	122,460-157- 260	Tonga	VR5PL	34,848- 32- 363
Oklahoma	W5CPI	61,218-114- 179	Argentina	ZL3EL	28,980- 36- 271
So. Texas	W5GEL	30,576- 78- 132	Brazil	PY1DH	119,593- 59- 689
New Mexico	W5FKP	2904- 24- 42	Chile	CE3AG	221,971- 67-1107
Maritime	VE1EA	34,445- 83- 141	Colombia	HK3CK	175,080- 60- 978
Ontario	VE3QD	102,304-139- 246	Ecuador	OC1ES	52,668- 28- 632
Quebec	VE2BV	9660- 46- 72	Peru	O4AAK	97,344- 32-1014
Alberta	VE6MZ	11,613- 49- 79	Uruguay	CX1FB	59,840- 34- 596
British Columbia	VE7HC	119,952-153- 269			
Manitoba	VE4RO	102,366-141- 244			
Saskatchewan	VE5MQ	2178- 22- 33			
Algeria	FA8IH	136,950- 50- 918			
Anglo-Egyptian Sudan	ST2FU	750- 6- 43			
Egypt	MD6KW	77,080- 40- 629			
Eritrea	W3ZJ	33,912- 24- 471			
French Cameroons	FQ3AT/FE	44,641- 39- 373			
French Morocco	CN8AG	1920- 8- 80			
Kenya	VQ4EHG	20,425- 25- 275			
Liberia	EL3A	80,771- 37- 728			
Libya	MD1E	5424- 16- 134			
Mozambique	CR7AF	2761- 13- 209			
So. Rhodesia	ZE2JN	7718- 17- 162			
Tanganyika	VQ3HJP	67,386- 33- 692			
Tangier	EK1AA	29,095- 23- 423			
Tunisia	FT7AB	6948- 12- 197			
Union of So. Africa	ZS2A	476,580- 65-2444			
China	CTFP	301- 7- 15			
Hong Kong	V86BA	60- 4- 5			
India	VU2BX	53- 7- 19			
Iraq	YI2AM	7644- 21- 126			
Japan	J3AAD	72,693- 41- 589			
Palestine	ZC6AA	165- 5- 11			
Belgium	ON4QF	132,550- 50- 904			
Czechoslovakia	OK1FF	87,312- 48- 623			
Denmark	OZ9Q	50,143- 41- 417			
Eire	EI9J	32,328- 38- 289			
France	F8EO	84,384- 48- 602			
Germany	D4AVW	39,748- 38- 351			
Great Britain	G8BQ	53,568- 48- 373			
Greece	SV1RX	4147- 13- 107			
Hungary	HA5X	8052- 22- 122			
Italy	I1PL	56,232- 36- 522			
Luxembourg	LX1JW	130- 5- 10			
Netherlands	PA8UN	100,200- 50- 678			
Northern Ireland	G16TK	121,728- 64- 634			
Norway	LA4P	7820- 20- 133			
Rumania	YR6C	1120- 10- 40			
Scotland	GM2LQ	4590- 17- 90			
Spain	EA1A	14,118- 13- 362			
Sweden	SM5UN	4369- 17- 86			
Switzerland	HB9CX	150,452- 58- 890			
Trieste	11NZ	738- 9- 29			
Wales	GW3ZV	53,946- 37- 486			
Alaska	KL7NA	157,743- 51-1033			
Bahama Islands	VP7NG	360,893- 71-1697			

Radiotelephone		
Section or Country	Winner	Total Score — Multiplier — Contacts
E. Penna.	W3NJE	122,086-114- 357
Md.-Del.-D. C.	W3FUV	42,408- 76- 186
So. New Jersey	W2RGV	97,440-112- 290
W. New York	W2AFQ	141,840-120- 394
W. Penna.	W3AER	10,488- 46- 76
Illinois	W9BU	25,256- 77- 110
Indiana	W9HEI	86,040-120- 239
Wisconsin	W9BCV	59,220- 94- 210
No. Dakota	W8VSK	7560- 36- 70
So. Dakota	W8PRZ	26,656- 56- 160
Minnesota	W8EEA	12,150- 46- 90
Arkansas	W5FPD	1827- 21- 29
Louisiana	W5CEW	3540- 30- 40
Mississippi	W5BDQ	5208- 31- 57
Tennessee	W4DQH	64,347- 89- 252
Kentucky	W4YNQ	11,797- 47- 85
Michigan	W8KML	135,509-127- 357
Ohio	W8BKP	101,760-128- 265
E. New York	W2RYT	55,675- 85- 220
N. Y. C. & L. I.	W2IRV	12,495- 51- 83
No. New Jersey	W2BXA	30,840- 94- 291
Iowa	W6SQO	26,718- 73- 122
Kansas	W9OTV	6936- 34- 68
Missouri	W9NCG	5371- 41- 44
Nebraska	W8JED	13,100- 50- 88
Connecticut	W1ATE	75,272- 97- 260
Maine	W1MCW	20,445- 47- 145
E. Mass.	W1JCX	30,325-105- 258
W. Mass.	W1ZD	32,856- 74- 148
New Hampshire	W1BFT	33,345- 65- 171
Rhode Island	W1BFB	56,072- 86- 218
Vermont	W1QNM	784- 16- 21
Idaho	W7VD	15,600- 52- 100
Montana	W7IVY	144- 6- 8
Oregon	W7HTB	41,535- 65- 213
Washington	W7ESK	46,992- 88- 178
San Francisco	W6MUF	234- 6- 13
Sacramento Valley	W6WTL	84- 4- 7

Section or Country	Winner	Total Score— Multiplier— Contacts
Nevada	W7JUO	624- 13- 16
Santa Clara Valley	W6MLY	47,424- 76- 208
E. Bay	W6TT	71,010- 90- 263
San Joaquin Valley	W6PYM	7320- 40- 61
No. Carolina	W4LAY	60,681-113- 185
So. Carolina	W4BFD	32,260- 69- 180
Virginia	W4KPY	99,456-112- 296
W. Virginia	W8VAN	18,095- 47- 129
Colorado	W6AZT	216- 6- 12
Utah-Wyoming	W7PA	7254- 39- 64
Alabama	W4HA	17,700- 50- 118
E. Florida	W4FUM	39,360- 82- 160
W. Florida	W4EGR	10,434- 47- 74
Georgia	W4EWY	46,170- 81- 190
Los Angeles	W6SA	103,880-106- 328
Arizona	W7PUM	2148- 24- 34
San Diego	W6ITY	37,114- 77- 161
No. Texas	W5BGP	43,845- 79- 185
Oklahoma	W5JME	9240- 40- 77
Southern Texas	W5LWV	38,844- 83- 158
Maritime	VE1ET	40,824- 63- 216
Ontario	VE3HC	68,816- 88- 264
Quebec	VE2OG	19,125- 45- 142
Alberta	VE6FK	10,086- 41- 82
British Columbia	VE7VO	6402- 33- 62
Manitoba	VE4GE	14,832- 47- 103
Saskatchewan	VE5JG	3105- 23- 45
Algeria	F43JY	413- 7- 20
Anglo-Egyptian Sudan	ST2FU	7322- 14- 175
Eritrea	M13ZJ	10,647- 21- 169
French Morocco	CN8BA	20,462- 26- 287
Gold Coast	ZD4AH	2820- 10- 100
Kenya	VQ4ERR	52,256- 32- 549
Liberia	EL5A	86,934- 41- 658
Southern Rhodesia	ZE2JN	2864- 16- 61
Tanganyika	VQ3HGE <sup>2</sup>	3003- 13- 77
Union of So. Africa	ZS6DW	82,960- 34- 814
China	C1CH	24,370- 30- 278
Japan	J3GNX	34,947- 33- 353
Korea	HL1AA	4431- 21- 73
Palestine	ZC6LA	5040- 14- 120
Transjordan	ZC1AL	84- 4- 7
Belgium	ON4CC	16,896- 22- 256
Czechoslovakia	OK1BM	869- 11- 27
Denmark	OZ9Q	23,730- 30- 269
Eire	EI2L	63,350- 35- 606
England	G2PU	67,431- 39- 583
France	R3WV	40,170- 30- 455
Germany	D44LN	5508- 17- 108
Greece	S1WE	1980- 12- 55
Hungary	HA4AB	1080- 10- 36
Italy	11RM	17,040- 24- 252
Luxembourg	LX1JW	35,873- 29- 425
Netherlands	PA9GN	48,480- 32- 505
Norway	LA8C	18,044- 26- 232
Portugal	CT1IP	41,064- 20- 499
Scotland	GM2UU	40,176- 36- 376
Sweden	SM5LU	4797- 13- 123
Switzerland	HB9CX	31,449- 33- 319
Wales	GW2UH	42,786- 21- 264
Alaska	KL7NA	11,490- 30- 128
Barbados	VP6CDI	142,662- 62- 779
Bermuda	VP9P	2412- 12- 67
Cuba	OM9AB	14,850- 33- 150
Greenland	OX3BD	3- 1- 1
Guatemala	TG9AD	33,046- 31- 360
Haiti	HE2CW	195,615- 63-1039
Mexico	XF1A	314,364- 68-1541
Newfoundland & Labrador	VO4T	23,928- 21- 337
Puerto Rico	KP4ES	102,084- 47- 724
Virgin Islands	HV4AD	18,941- 31- 205
Windward Islands	VP2GE	6286- 14- 150
Australia	VK2ADT	47,886- 46- 347

Section or Country	Winner	Total Score— Multiplier— Contacts
Hawaiian Islands	KH6FF	16,020- 36- 151
Marianas	KG6CJ	2445- 13- 65
New Guinea	KG6AW/VK9	47,473- 29- 555
New Zealand	ZL2RP	19,372- 29- 224
Sumatra	PK4VD	102- 2- 17
Argentina	LUIDH	19,910- 22- 303
Brazil	PY2AC	107,400- 50- 716
British Guiana	VP3LF	1080- 9- 40
Chile	OE2AX	7710- 15- 172
Ecuador	HG1JW	58,840- 40- 493
Paraguay	ZP8AC	100- 5- 8
Peru	OA4AK	42,816- 32- 446
Uruguay	CX1FB	19,808- 32- 209
Venezuela	YV5ABZ	4536- 14- 100

## SCORES

### Fourteenth International DX Competition

Operator of the station first-listed in each section and country is winner for that area, unless otherwise indicated. . . . Asterisks denote stations not entered in contest, reporting to assure credit for stations worked. . . . The multiplier used by each station in determining score is given with the score — in the case of W/VE entrants this is the total of the countries worked on each frequency band used; in the case of non-W/VE participants it is the total of the W/VE districts worked on each frequency band. . . . The number of contacts established is next listed. . . . Example of listings: W3BES 280,720-232-406, or final score 280,720; multiplier 232; 406 contacts. . . . Stations manned by more than one operator are grouped in order of score following single-operator station listings in each section or country tabulation; calls of participants at multiplier operator stations are listed in parentheses.

## C.W. SCORES

### ATLANTIC DIVISION

<i>E. Pennsylvania</i>		W3MZT	9660- 46- 72
W3BES	280,720-232- 406	W3SIS	4935- 27- 47
W3BHD	139,966-162- 288	W3HTK	2392- 27- 32
W3FGB	129,270-155- 278	W3JHW	1596- 19- 27
W3CPV	71,355-135- 191	W3AFU*	1350- 18- 25
W3FUF	66,759-119- 187	W3IL*	1296- 18- 24
W3EQA	46,545-107- 146	W3NB	1014- 13- 26
W3PN	34,974- 87- 114	W3JJB	210- 7- 10
W3OCU	28,725- 75- 131	W3DWK	108- 6- 6
W3ARK	25,116- 69- 167	W3HDV*	105- 5- 7
W3FLH	24,948- 77- 108	W3HB	46- 4- 4
W3GHH	23,214- 73- 106	W3BVO	40- 4- 4
W3AFN	20,435- 61- 111	W3NPZ (W3s FYS NPZ)	3564- 27- 44
W3GRS	19,110- 65- 98		
W3JBC	12,654- 57- 74		
W3MLW	10,241- 49- 73		
W3EER	8442- 42- 67		
W3MZY	4756- 29- 61		
W3HIA	3690- 30- 41		
W3NOH	3570- 30- 30		
W3CGS	2280- 19- 40		
W3IPK	2205- 21- 35		
W3EAN*	945- 15- 21		
W3CGN	616- 11- 20		
W3ADE*	594- 11- 18		
W3RJK	216- 8- 9		
W3QLW	60- 4- 5		
W1CDZ/*	12- 2- 2		
W3BZ	12- 2- 2		
W3HFD (W1AXA W3s EKK HFD)	112,738-156-241		
W3IXN*	49,878-102- 163		
<i>Md.-Del.-D.C.</i>		W2FBA	120,105-157- 255
W3IYE	107,004-148- 241	W2PUB	83,460-130- 214
W3JFC	74,778-121- 206	W2DSB	66,997-119- 189
W3BVN	65,608-119- 184	W2AAU	30,876- 83- 124
W3JKO	59,230-104- 190	W2AW	24,921- 71- 117
W3EIV	58,512-116- 169	W2BJH	22,776- 73- 106
W3DRD	50,160-114- 148	W2RPP	22,311- 67- 111
W3GZH	42,864- 94- 152	W2DS	20,280- 65- 104
W3KO	29,944- 82- 114	W2MA	17,424- 66- 88
W3DPA	26,850- 75- 121	W2OH	16,445- 65- 86
W3QB	22,464- 72- 105	W2SYV	12,789- 49- 87
W3VLJ	17,112- 62- 92	W2CLO	11,055- 55- 67
W3LUL	12,992- 56- 79	W2UVE	10,176- 48- 71
W3RJS	12,168- 52- 78	W2RWE	7104- 37- 64
		W2CNT	5250- 35- 50
		W2EWT	4590- 30- 51
		W2KEL	3906- 31- 42
		W2QCP	4515- 35- 43
		W2QEW	3225- 25- 43



WHIB 9636-44-73  
 WIAOE 9372-44-72  
 WILYL 6438-37-58  
 WHIOB 5746-34-159  
 WIMMD 2205-21-40  
 WIGDY\* 1764-21-28  
 WILQO 324-9-12  
 WIDID\* 217-7-11  
 WIMRQ 189-7-9  
 WIMCR\* 12-2-2

**W. Massachusetts**  
 WIZD 55,770-110-169  
 WJIJH 47,565-105-151  
 WJIJT 31,242-82-127  
 WIAZB 9849-49-67  
 WIEQB 7267-43-57  
 WIMUN 6090-35-58

WILJT 4089-29-47  
 WIFK\* 630-10-21  
  
**New Hampshire**  
 WIBFT 102,760-143-240  
 WIJYJ 1953-21-31  
 WICDX 1200-16-25  
  
**Rhode Island**  
 WICJH 59,187-109-181  
 WIAWE 7676-38-73  
 WIPQM 3564-27-44  
 WIKOF 2600-25-38  
 WIBBN 363-11-11

**Vermont**  
 WIKRV 3552-32-37  
 WIQMM 2688-28-32  
 WZFFN/1 182-7-9

**E. Florida**  
 W4BRB 135,956-164-277  
 W4FPK 59,400-120-167  
 W4IZ 55,512-108-177  
 W4JN 48,706-98-163  
 W4ON 35,862-96-144  
 W4BYF 17,135-65-95  
 W4MVG 16,470-61-90  
 W4GOG 11,544-52-74  
 W4FNR 5772-37-52  
 W4AWS 3276-28-39  
 W4WVY/4 1490-28-26  
 W4CY 1102-19-21  
 W4GIP 928-14-22

WACRF 420-10-14  
 W4FZW\* 168-7-8  
  
**W. Florida**  
 W4JV 127,980-158-270  
 W4CDE 10,914-51-72  
 W4HZ 5244-38-47  
 W4AXP\* 3-1-1  
  
**Georgia**  
 W4DCZ 29,520-82-121  
 W4EV 13,908-61-76  
 W4DXI 754-44-58  
 W4KV 3240-27-42  
 W4AOB 75-5-5

**SOUTHWESTERN DIVISION**

**Idaho**  
 WTDV 32,076-81-132  
  
**Montana**  
 W7KVU 8844-44-67  
 W7EVR 1190-17-27  
 W7LJD 840-14-20  
 W7IVY 189-7-9

W7AZK 1020-15-23  
 W7FPK 360-8-15  
 W7OAU/7 315-7-15  
 W7BTH 237-0-11  
 W7GUP\* 36-3-4  
 W7LPE\* 12-2-2  
 W7GXA\* 3-1-1

**Washington**  
 W7KEM 51,480-110-158  
 W7OBE 45,200-90-160  
 W7GUT 42,566-93-181  
 W7GHB 20,907-69-101  
 W7JNR 17,766-63-282  
 W7CFA 14,404-52-93  
 W7CNM 1560-20-26  
 W7EAL 360-8-15  
 W7ETO\* 9-1-3

**Oregon**  
 W7GBW 37,080-90-142  
 W7ATJ 31,728-75-141  
 W7AHX 16,992-59-96  
 W7ENW 7728-42-62  
 W7DIS 3770-29-46  
 W7HAK 1644-18-31  
 W7AMX 1071-17-21

**PACIFIC DIVISION**

**Nevada**  
 W7ONG 41,124-92-149  
 W7BED 1104-16-23

**Santa Clara Valley**  
 W6MLY 66,783-113-197  
 W6OMC 56,784-104-182  
 W6JWT 48,216-98-164  
 W6CIS 36,376-86-141  
 W6AOD 1350-18-25  
 W6ZZ 972-18-18  
 W6DZE 144-6-8  
 W6CEM (W6s GTI BET CEM) 132,356-163-272

W6NJ 9946-42-71  
 W6EJA 5487-31-59  
 W6LMZ 5049-33-51  
 W6VDB 4650-31-59  
 W6QDE 3780-28-45  
 W6NJJ 1767-19-38  
 W6RVU 1122-17-22

**San Francisco**  
 W6SBI-117-193  
 W6ATO 19,398-61-106  
 W6MUF 11,280-47-80  
 W6LV 10,368-54-64  
 W6EY 6985-35-59  
 W6ERS 2592-24-36  
 W6BY 360-10-12  
 W6ASL 210-7-11  
 W6WBU\* 6-1-2

**East Bay**  
 W6RM 140,415-165-285  
 W6MEK 107,136-144-248  
 W6TT 100,962-142-237  
 W6MVQ 87,584-136-215  
 W6MTZ 29,280-80-122  
 W6DIB 28,914-79-122  
 W6CTL 28,512-72-132  
 W6LDD 18,126-57-106  
 W6PB 17,574-58-101  
 W6TI 11,178-46-81  
 W6KEK 11,074-49-75

**Sacramento Valley**  
 W6EPM 5250-35-50  
 W6CCM 27-3-3

**San Joaquin Valley**  
 W6KEV 104,192-148-240  
 W6SRU 45,552-101-146  
 W6BVM 37,488-88-153

**ROANOKE DIVISION**

**North Carolina**  
 W4AIT 103,353-141-247  
 W4FVR 75,141-121-207  
 W4MR 68,676-118-194  
 W4ZF 52,323-107-183  
 W4G 8928-48-62  
 W4OG 6216-37-56  
 W4CCH 2880-30-32  
 W4CXB 840-14-20  
 W4DQ 336-8-14

W4KXN 120,480-160-251  
 W4IWB 65,844-118-186  
 W4JFE 37,845-87-145  
 W4RI 26,296-76-116  
 W4LUE 19,805-71-93  
 W4UO 11,760-48-83  
 W4IWO 9246-46-67  
 W4LAP 3964-32-39  
 W4FV 1200-16-25  
 W4KJH\* 243-9-9  
 W4IP\* 120-5-5  
 W4LOH (W3MIP W4LFY WSHB) 114,972-67-868

**West Virginia**  
 W8AZD 35,028-84-139  
 W8JM 24,975-75-111  
 W8PQ 24,975-75-111  
 W8VAN 13,254-47-94  
 W8JJA 1596-19-28

**South Carolina**  
 W4BPD 243,072-211-384  
 W4AIS 42,454-94-148  
 W4MRJ\* 24-2-2  
  
**Virginia**  
 W4KFC 226,170-210-359  
 W4OM 141,308-172-280  
 W4KWY 121,506-154-263

**ROCKY MOUNTAIN DIVISION**

**Colorado**  
 W6FFY 53,235-105-169  
 W6SBE 52,632-102-172  
 W6ZT 27,528-74-124  
 W6JGF 2664-24-37  
 W6CDP 2016-21-32  
 W6GKW 162-6-9

**Utah-Wyoming**  
 W7PGS 5088-32-53  
 W7PA 2046-22-31  
 W7HRM 1456-16-31  
 W7TI 1188-18-22  
 W7PJS 770-14-20

**SOUTHEASTERN DIVISION**

**Alabama**  
 W4FIJ 41-613-97-143  
 W4CYC 37,142-86-146

W4MGD 9585-45-71  
 W4KX 9372-44-71  
 W4HA 507-13-13

**Los Angeles**  
 W6SZY 240,006-221-370  
 W6GRL 188,928-192-328  
 W6HBT 170,170-132-313  
 W6GAL 115,824-152-254  
 W6KRI 92,016-144-215  
 W6PBD 67,440-120-188  
 W6LE 64,498-118-186  
 W6AM 60,420-106-190  
 W6ANN 58,136-104-187  
 W6GHO 44,190-95-152  
 W6IBD 39,512-88-150  
 W6QD 34,611-83-139  
 W6TEU 30,336-79-128  
 W6TZO 19,467-63-103  
 W6RDR 14,022-57-82  
 W6ACL 13,209-51-87  
 W6WKL 13,000-52-84  
 W6UCX 11,250-50-75  
 W6SRF 9073-43-71  
 W6POT 9045-45-67  
 W6AKI 7326-37-69  
 W6WVQ 7264-36-69  
 W6SN 4104-36-38  
 W6ID 3159-27-40  
 W6EKC 3120-24-44  
 W6VAQ 2530-22-42

W6DOZ 882-14-21  
 W6VAT 720-12-20  
 W6TKX 510-10-20  
 W7AB/6 480-10-16  
 W6GTE 470-10-17  
 W6LVQ 48-4-4  
 W6WXX 18-2-3  
 W6ZU\* 3-1-1  
 W6LHN (W6s LHN LDJ) 206,427-201-349  
  
**Arizona**  
 W7JPY 14,112-56-84  
 W7JYZ 1212-16-26  
  
**San Diego**  
 W6ITY 106,448-153-232  
 W6EPZ 72,721-121-201  
 W6BAM 46,624-94-166  
 W6LRU 16,680-60-94  
 W6WFO 12,376-52-80  
 W6AMO 10,454-47-75  
 W6KBD 8487-41-69  
 W6NH 6903-39-59  
 W6RLQ\* 363-11-11  
 W6BYC 80-5-6  
 W6TVB\* 12-2-2

**WEST GULF DIVISION**

**Northern Texas**  
 W6NEA 122,460-157-260  
 W6SGE 10,305-45-91  
 W6JJD 2823-23-41  
 W6LIU 2232-24-31

W6CXS 9785-45-73  
 W6DAA 8366-47-60  
 W6SFA 6966-43-54  
 W6SEW 6786-39-58  
 W6SLG 5832-36-54  
 W6JKB 4448-32-47  
 W6JPC 2574-26-41  
 W6CD 2236-26-41  
 W6SAL 495-11-19  
 W6SPM 462-11-18  
 W6SHL 75-5-5

**Oklahoma**  
 W6CPI 61,218-114-179  
 W6SLW 11,327-47-81  
 W6FFW\* 660-11-20

**Southern Texas**  
 W6GL 30,576-78-132  
 W6LBC 10,865-53-109  
 W6NIY 10,404-51-69

**New Mexico**  
 W6FKP 2904-24-42  
 W6LGS 588-14-14

**CANADA**

**Maritime**  
 VE4AE 34,445-83-141  
 VE1PQ 33,538-82-143  
 VE1AQ 29,260-76-135  
 VE1OK 22,508-68-111  
 VE1HG 6552-36-63  
 VE1EK 2782-26-41  
 VE1IM 2625-25-35  
 VE1FB 2461-23-48  
 VE1CU 1189-29-47  
 VE1EY 525-11-16  
 VE1QX 27-3-3  
 VE1DD 12-2-2

VE3AKO\* 24-2-4  
  
**Quebec**  
 VE2BV 9660-46-72  
 VE2OL 3120-26-40  
 VE2HP\* 65-4-5  
  
**Alberta**  
 VE6MZ 11,613-49-79  
 VE6AO 4998-34-45  
 VE6FK 3799-29-45  
 VE6FE 480-10-17  
 VE6PY 252-9-10

**Ontario**  
 VE3OD 102,304-139-246  
 VE3KE 94,809-143-225  
 VE3BB 11,700-50-79  
 VE3AF 5724-36-58  
 VE3DT 1722-21-29  
 VE3DQ 1200-18-25  
 VE3AGC\* 5097-13-13  
 VE3ADV 432-12-12  
 VE3AW 279-9-11  
 VE3ANO\* 216-8-9  
 VE3BPW 147-7-7  
 VE3ACB 147-7-7  
 VE3AMK\* 147-7-7  
 VE3XY\* 48-4-4

**British Columbia**  
 VE7HC 119,952-153-269  
 VE7AX 32,712-87-126  
 VE7FC 12,240-48-87  
 VE7SB 1608-14-24  
 VE7AIT 96-4-8  
  
**Manitoba**  
 VE4RO 102,366-141-244  
 VE4MJ 6020-35-59  
 VE4HK\* 330-10-11  
  
**Saskatchewan**  
 VE5MO 213-22-33  
 VE5OZ 1500-20-25  
 VE5JV 1387-19-25

**AFRICA**

**Algeria**  
 FA8IH 136,950-50-918  
 FA3WW 18-2-3  
  
**Anglo-Egyptian Sudan**  
 ST2FU 750-8-43  
  
**Egypt**  
 MD5KW 77,080-40-629  
  
**Eritrea**  
 MI3ZJ 33,912-24-471

IGUSA 1395-9-53  
  
**Ethiopia**  
 ETHIR\* 7434-14-177  
  
**French Cameroons**  
 FQ3AT/FE 44,641-39-373  
  
**French Morocco**  
 CN8AG 1920-8-80  
 CN8BN 464-9-20  
 CN8AU 352-8-16



# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD

## How:

"SA OM PSE LISTEN FER A BUDDY  
OF MINE NW ON MY FREQ"

Sound familiar?

Well, so much of this buddy-buddy business has been going on lately that many people have been behooved to express themselves to us either pro or con. Let's briefly examine their respective arguments and try to reach a conclusion as to the ethics of the case.

On the affirmative we have two protruding points. Firstly: "If the DX station is willing to listen for Joe Blow, it's up to him." Secondly: "Many stations running QRP are enabled to contact DX they would otherwise miss."

The negative: "Why shouldn't all stations take their fair chance of raising DX with their own skill and signal?" And: "Many of these QSOs aren't legit, anyway — the QRO station often relays intelligence both ways while his protegee still may worm an unearned QSL with an R1 signal."

Well, gang, this DX business has often been likened to the manly sport of Izaak Walton. When a point of etiquette such as that brought up in the preceding paragraphs arises, it is often quite enlightening to seek an analogy in the field of angling. Doing this, then, we find that it is not necessarily taboo to have somebody else put the bait on one's hook, if one is allergic to worms. However, it will be realized that it's a sad species of fisherman who requires some one down in the water to tie the fish to his line! (Even if the fish agree.)

Jeeves, have the lease canceled on that house adjacent to W1FH — we won't be using it. . . .

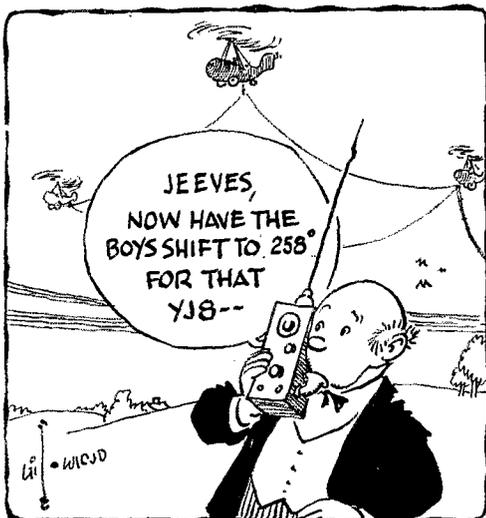
## What:

*Eighty* is still pretty dormant at this writing but activity should be stepping up in a month or so. W11IM has been getting across the pond on 75, mostly to G8VB. G8VB has been keeping busy by hooking PYs 1AGR, IRC, 4DW, 4NS, 4OF, 4QE, 4RJ and 4ZI all around 3755 kc. He's also been hearing many other South and Central American countries and reports conditions amazingly good for the time of year. . . . VQ8AY heard W4MRJ, and W4BRB was copied by ZD2RGY, says W4BRB via W9LM.

*Forty* has a juicy one in KJ6AB (7060), mentioned by W1QIS. . . . W1QMJ accounts for many Europeans as well as YV1AE (7080 A2), VP2KS, VP9CC and some South Americans.

ZS2CR (7085) has been working Ws very consistently through the slow months. . . . A card from OK1ZW recounts communication with many Ws, PY2AFS (7005), PY1LQ (7002), UF6AA (7010), and UF6AC (7008).

*Twenty* enthusiasts have turned up some interesting stuff. W1FH snared VU4AC in the Laccadives (14,045) who tells about his schedules with TT1KY (Tannu Tuva) on the same QRG. . . . HDPP in the Galapagos (14,130) has been the subject of many reports, having been widely worked. . . . A station signing XF1A, operating airborne in the ZC6 area, has been poking through. He is not to be confused with Mexico's famous XE1A-XF1A but is legit insofar as he is where he claims he is. . . . W2UFT made off with VP2GE (14,082), VQ8CB (14,120 t9x), J9ATT (14,065), VS7PH (14,058), W8WEA/Truk (14,160), ZP3AW (14,000) and IS1AHK (14,010). . . . Don and others are curious about I8PAP but he impresses most as being just another ship station (14,060 A2). . . . Besides calling his head off for VQ4SGC every week-end, W2HMJ crossed off as worked VQ2GW (14,061), EK1GW (14,015), TR1P (14,078), VP6PX (14,050), IS1AHL (14,050), ZB1FK (14,081), VP1AA (14,052), J2ANT (14,105), ZD9AA (14,078), FE8AB (14,032), SV0WA (14,011), YN1FTB (14,025) and UA9CC (14,085). . . . Conditions aren't to be sneezed at in Hawaii where KH6PM's 807 snapped up CN8BK (14,065 t9), CR7BC (14,072), FO8AA



\* DX Editor, QST; 1517 Fargo Ave., Chicago 26, Ill.



IISN puts out one of the more potent European signals heard on 14 Mc. Operator Marino ("Sandy") Miceli is president of the Bologna Ham Gang club and prefers 20-meter 'phone. The transmitter, not shown, has an 813 final at full ratings and the receiver is a Super-Pro.

(14,005 t9), PZ1WK (14,060 t9), TI8CM (14,025), VP4TAN (14,020), VQ2DH (14,020), VR2BD (14,045), WIEEC/KW6 (14,025), ZP3BL (14,015) and YV5AE (14,060) . . . . . W8KPL moved the rig up into the attic for W3KIF/VQ3 (14,090), VQ8AD (14,020), TF3EA (14,040) and ZBIAS (14,025) . . . . . W4IYT wonders about FH1X but is certain about YN1AA (14,110), W4FVI/KX6 (14,040), FT4AN (14,038), and heard AR1WW (14,056) . . . . . Bent on making his DXCC with no more than 100 watts, W6LRU populated his log with EL7A (14,046), ZD1LQ (14,093), VQ4SGC (14,068), VQ5JTW (14,085), ZS3B (14,062), F18AB (14,054), OE1AD (14,033), FA8JO (14,048), CP1AQ (14,032), ET3AH (14,020), OQ5AV (14,001), OQ5RA (14,092), YR5I (14,000), ST2GH (14,119), PK2KK (14,053) and UD6AH (14,037) . . . . . VS4RS, portable-Brunei (14,040), was welcomed at W4BPD. Gus also rustled up ZK1AM (14,100), M13AB (14,001), ZB1AR (14,005), P10X (14,080 t7) and VS7CR (14,060 t8). Heard were F18ZZ (14,030), VS7AD (14,125), ZC6UN (14,065), PK4PQ (14,048) and PK3XIN (14,100) . . . . . The Vee at W5ACL crept up on W0MCF/C1 (14,100), ST2CH (14,025), YV1AI (14,095), KA1ACJ (14,090), KW6AK/KX6 (14,085), W7KMV/Iwo (14,085), OA8B (14,105), KG6CT (14,115), HL1BE (14,125) and HL1BG (14,070) . . . . . Former ARR.L director W4EV is now off the air rebuilding (his house, not the rig) but previously worked EA5BS (14,140), HP1BR (14,050), YS1AE (14,070), UR2KAA (14,050), FM8AD (14,010), J2CDJ (14,100), J3KBE (14,020), J9ABW (14,065) and others . . . . . W4VE doesn't think his new beam is working right but he isn't feeling too bad about it — Doc works stuff like VS9AL, CR6AQ and ZC6UN off the dead end! . . . . . In the 'phone department, W2MPA's list is a whopper: HL1AB (14,150), ZS3G (14,320), ZD3A (14,370), KX6AF (14,195), ZD2A (14,310), HP1LB (14,280), ZC6XY (14,380), VQ4NSH (14,140), 4UN/Rhodes (14,150), ZC6LA (14,330), CN8EM (14,310), MB9AD (14,195), CT1NT

(14,195), FA9OW (14,380), LA7Y (14,140), UB5KEG (14,380), HA2C (14,380), TA3FAS (14,160), VK9DC (14,150), VK6KE (14,130), KA1AI (14,150), HR1CE (14,140), VR3A (14,130), W2EJV/PK3 (14,370) and HA4AB (14,380) . . . . . W9BBS beat his chops for GD6LA, VQ4ERR and CR7AH, while W9IU dropped the key for a moment and chatted with J9AKG, VP3LF and many others . . . . . We hear that MP4BAB (14,140) is VS9GT's new call.

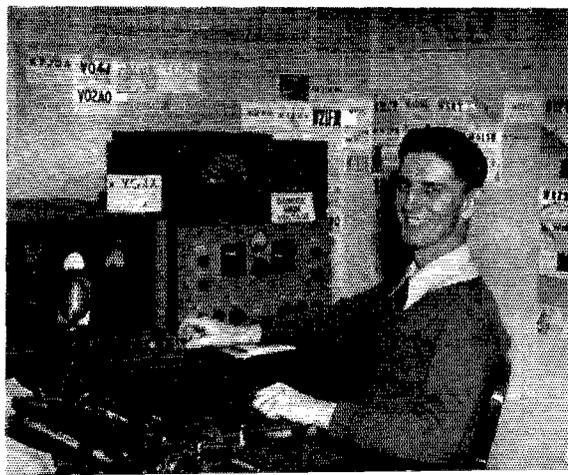
Ten is being watched closely and is getting pretty interesting, but we haven't much to go on. W5LPG's voice efforts resulted in VR2AQ (28,140), VQ4GWB (VFO), VU2CQ (28,325), VP8AD (28,310) VS7PS (28,200), VQ2DH (28,310), YR5W (28,480), MI3ZJ (VFO), FA8DX (28,156), KJ6AA (28,760), OQ5BR (28,300) and CT1QA (28,172) . . . . . That HDPP is also reported by W5LPG, sounding like n.f.m. on 28,395 kc. . . . . W6LRU used the mike to the tune of ZS8A (28,300) and VP4TO (28,152).

#### Where:

Cards for OE1 stations, other than OE1AW, may be sent through VERON. Try these on for size:

- |       |  |
|-------|--|
| C1RO  | AP0 909, % PM, San Francisco, Calif.                                   |
| C3EA  | Sgt. Al Hattestead, AAG, Nanking, APO 909, % PM, San Francisco, Calif. |
| CN8EQ | George Dixon Navy 214, % FPO, New York, N. Y.                          |
| CR7BA | (ex-EL4A) Cliff Evans, Polana Hotel, Lourenco Marques, Mozambique      |
| EA2AC | Luis Alfaro, P.O. Box 88, Vitoria, Spain                               |
| EA3SL | Francisco Peris, Calle Balmes 230, Barcelona, Spain                    |
| EA7AU | Cala 94, Palmas, Seville, Spain  |
| EA7CA | Box 1312, Barcelona, Spain   |
| EK1MM | Licudi Telegraph Office, Tangiers                                      |
| EPIJ  | (via W4IYT)  |
| FA8CR | Eugene Pinon, Domaine du Haouch-Chourfa, Chebli par Alger, Algeria     |

This businesslike affair was quite prominent on DX bands as VO4X until it QRT recently. Operated by W5LFN, VO4X accumulated 1050 QSOs with 41 countries in limited operating time. One hundred per cent QSL was attempted but any cards which might have gone astray will be replaced by W5LFN.



FA90W (via REF)  
G3DEZ/AP (via RSGB)  
HDPP Les Henson, % Columbia River Packers Assn., Astoria, Ore.

HL1AG Capt. N. K. Maxwell, XXIV Corps, APO 235, % PM, San Francisco, Calif.

HL1AH Lt. W. E. Rubin, 7th Sig. Co., 7th Inf. Div., APO 7, % PM, San Francisco, Calif.

HL1AJ Lt. Col. C. A. Stanley, Dept. of Comm., USAMGIK, APO 235-2, % PM, San Francisco, Calif.

HL1AN Maj. E. A. Parrish, 39th MG Co., APO 59, % PM, San Francisco, Calif.

HL1AT Pfc. R. L. Keenan, Hq. & Hq. Co., 20th Inf. Reg., APO 6-2, % PM, San Francisco, Calif.

HL1AX T/5 L. E. Gaskell, Hq. Co., XXIV Corps, APO 235, % PM, San Francisco, Calif.

HL1AY Lt. R. Spunk, 34th Gen. Hosp., APO 1054, % PM, San Francisco, Calif.

I1AXE British Forces Radio Station, Free Territory of Trieste

MD1H R. K. Burbidge, Cyrenaica Royal Signals, Benghazi, M.E.L.F. 6, Cyrenaica

MD2KP 14182106, Sgt. Mackintosh, 1st Sqdn., 1st Inf. Div. Signals Reg., Tripoli (via W2NFR)

OE1AW A. Lippens, P.O. Box 129, Leopoldville 2, Belgian Congo

OQ5LL Box 222, Soerabaja, Java

PK2KK APO 206, % PM, New York, N. Y.

SV0WA (via VE3BCR)

VP3MBC Terry Randall, Port Stanley, Falkland Islands

VP8AM Box 20, Mangrove Bay, Bermuda

VP9CC RNZAF, Laucala Bay, Suva, Fiji

VR2BD K. Clayton, 15 Carrvale Avenue, Urmoston, Manchester, Lancs., England

VS1BG P.O. Box 161, Calcutta

VU2EV Larry Kinney, 344th Troop Carrier Sqdn., Ramey AF Base, Puerto Rico

W4MBY/KP4 APO 86, % PM, San Francisco, Calif.

W7KMW/Iwo Francis T. Brown, % American Embassy, Managua, Nicaragua (via W6AY)

YN1FTB A. Hinam, % P.T.T., Poste Restante, Tirana, Albania

YR5T Bert Smith, Cannon Lane, Gibraltar

ZA2B J. C. Torr, 4 AMQ, RAF New Camp, Gibraltar

ZB2D J. Swain, 16 Kings Bastion, Gibraltar

ZB2E (via W9CFT)

ZB2F (ex-VS1AK) Thos. A. Dineen, P.O. Box 6406, Johannesburg, South Africa

Those responsible for the above catalog: W1s IKE, LFE, QMI; W2s CJX, HAZ, HMJ, TXB, UWK, VMX; W3s BET, LTC, MLW; W8s MGQ, WWU; W9s CIA, CIU, SYZ; D4AVN; HC2KJ; KH6PM; PA0BK; VS7PH; ZB2E.

#### Tidbits:

There are quite a few Ws now acting as QSL bureaus for certain overseas stations and they are to be commended for shouldering their respective burdens. Some of them are finding the postage bill somewhat of a tribulation. So how about enclosing a stamp or two along with your cards to help foot the bill? . . . . . We regret to note the passing of VQ3TOM, one of the pioneers of amateur radio on the Dark Continent and an active G in the early days. . . . . VS7PH is really knocking them off with celerity. Harry will QSL all contacts in due time. . . . .

W2NFR is taking care of OE1AW QSLs, while PA0BK will do the honors for OE1s AD, AS, AX, FF and DF. . . . . Another walking man is VS1BG. Ken closed down in Singapore and may be back on by now with his G call. . . . . VU2EV is a new one in Calcutta. Just licensed, he's already running schedules with AC4YN with eight watts! . . . . . W50JH wrote us a long lament on the QSL situation, having twiddled his thumbs for months awaiting his African card for WAC. While his XYL was in town mailing the gripe, VQ3HGE's card plopped into the mailbox! [Pretty fast, aren't we, boss? — Jeeves] . . . . . EAXXX is out in the clear now and wants cards sent to EA8AN. EA activity is rapidly building up because of easing of regulations there. This from W1PKL who also has it that EQ2L is back home for a few months but will return to EQ. . . . . W4JFE thought he had received a summons or something when he received a letter from the Trieste Civil Police. However, it was merely the prefix lowdown: Italian civilians in Trieste use II followed by two or three letters; British military use MF2 followed by one, two or three letters; U.S. military in Trieste use AG2 followed by one, two or three letters; I5s and all others are buccaneers. . . . . Here's another rare one that has shut down — EP3H. Philip, who is ex-G3LK, hopes to own an even more exotic call in the near future. . . . . W2SHZ agrees that the AC3GG mentioned recently was undoubtedly phoney but hearing J3AAD in the background at the same time helped to confuse the issue. . . . . W3JTC has the pitch on recent activity in San Marino. I1HR and I1PL did the VP7NG trick and passed out many welcome contacts as portable M1. These boys have a few more tricks up their sleeves so watch out for a portable HV! . . . . . W4MR also reports on the San Marino deal. Alva wishes people like PX2A, PX2B, HV2B, YS1DS, FB3AC, OY3L, CZ2AC, etc., would either put up (QSLs) or shut up. . . . . Regarding T18RB, W2HMJ's card says nothing about Cocos activity and Aug thinks the TI might have been on shipboard near the islands but that's about all. . . . . G3DYY is none other than ex-VS9ET, according to W1FH. Chas also heard that CR9AN has left the hospital and is back on 20. . . . . D4AVN states that HZ1AB is now being operated by ex-D4ANF who was also W5BYO. He wants info on ZA1CB — so do we.

— — — — —

Jeeves is in a huff again, mad as the proverbial wet hen. He had his usual favorite dream last night — that he was Superman. He says that in his dream he'd call CQ NEPAL, then zoom there in nothing flat, set up a station, and answer himself — a neat way of snagging a fast DXCC. But after shooting back and forth a few times in the course of the QSO he found he couldn't read his own punk fist!

# A Rack-Top Operating Table

Compact Convenience for the "Cliff-Dweller"

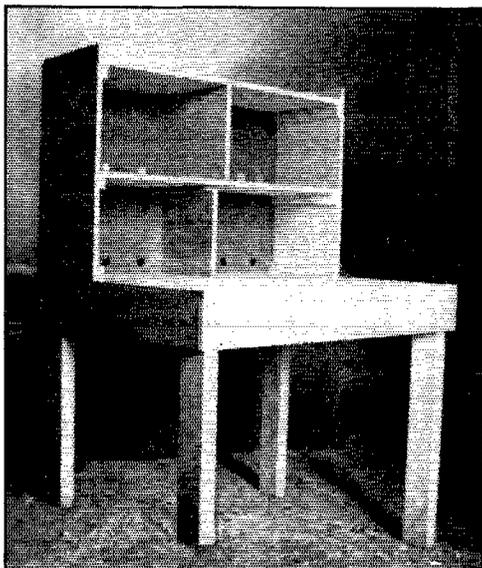
BY NEIL A. JOHNSON,\* W2OLU

HERE at W2OLU, the "shack" is located in the living room, part of a three-room apartment. Something definitely better than the desk, already overcrowded, was needed for an operating position. In the process of design, it was decided to incorporate some simple structure that would enable the radio gear to be held securely in a rack, or on shelves, over the table. How this was done, at a total cost of only ten dollars, is the theme of this article.

At this point, it should be mentioned that several alternative designs were worked out with pencil and paper, before the final plan was evolved. But all of them were eventually discarded. They were either too expensive or too

• Apartment hams are always up against it when it comes to space for the rig. Not only must the equipment take up a minimum space, but it must present an appearance acceptable to the aesthetes of the household who may not appreciate the subtle beauty lying in a heap of breadboard haywire. In this article, W2OLU suggests an inexpensive solution.

having it in the living room. Incidentally, the whole job was completed in the aforementioned three-room apartment, over the week-end, without disturbing any of the other tenants. (Cliff-dwellers, please take note.)



The finished operating position, ready for occupancy.

difficult to construct; or else they took up too much room without providing enough working space. The combined table and rack finally built gives a man room enough to pound a key and still rest his arm on the table top — it's 36 inches wide and 30 inches deep. Over this there is space for six standard-sized relay-rack chassis, 12 × 17 inches. While the whole affair is home-constructed and is hardly a "glamor" job (cost precluded this), it is definitely presentable — sufficiently so that the XYL did not object to

## The Operating Table

The key to the whole construction is the use of standard-size plywood panels. This "ham" application of the module principle definitely pays off in this case. It cuts down on labor and construction time, and there is no waste involved. Every piece of wood paid for is utilized 100 per cent. The sketch shown in Fig. 1 will enable any amateur to cut the lumber to size after obtaining it from the local lumber yard. I cut all the pieces to size in the bathroom, and sanded them down; only when ready for the final assembly did it become necessary to move into the living room.

Standard-size  $\frac{3}{8}$ -inch 5-ply fir plywood panels, 2 × 4 feet, were utilized to make up the table top, the sides and the shelves of the rack structure. In order to add an extra six inches of depth to the operating table, without involving waste or additional expense, a piece of pine, 6 inches wide and  $\frac{3}{8}$  inch thick, was joined to the 24 × 36-inch piece of fir plywood, using corrugated fasteners or "wiggie nails" as they are sometimes called. I used a dozen, spaced every 3 inches, to tie the two pieces of wood securely together. This brings the top up to 30 × 36 inches in size. Around the edge, under the top, is a rail made from so-called 1 × 5-inch board (actually 4½ inches wide and  $\frac{3}{4}$  inch thick). One six-foot length was cut exactly in two, at 36 inches. This provides the front and back rails. Allowing  $\frac{1}{4}$  inch at each end, the side-rail pieces were cut 1½ inches short of 30 inches, or 28½ inches. Flat-head wood screws, 1½ inches long, are screwed through the table top to hold the rail in place. This gives a smooth working surface. Three inches in from each corner, and spaced 6 inches apart, a total of 22 screws holds the table

\* 2 North Tenth Ave., Mt. Vernon, N. Y.

top to the rail, five in each side and six along the front and the rear. This makes the whole assembly quite rigid.

To make the table top 30 inches from the floor, four legs, 29½ inches long, were cut from finished 2 × 4-inch stock. They are securely held to the rails by six wood screws, using three on each surface. The sketch of Fig. 2 should make this clear. The two rails are also butt-joined by three wood screws where they meet. Staggering the wood screws in the corners makes for greater strength, and there is less chance of splitting the wood. The use of screws makes for more work than nailing, it is admitted, but the resulting job is exceptionally rigid, without a trace of shimmy even though the legs are not crossbraced. Furthermore, the legs can be removed for transporting and a loose screw can be tightened while a nail can't — a point worth considering in steam-heated buildings, for furniture has a bad tendency to dry out, especially in the winter months. Also, I might add, using screws instead of nails kept peace in the family — the jr. operator slept through the entire project — and with the folks in the next apartment who like to sleep late on Sunday.

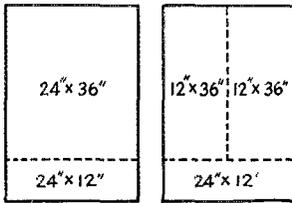


Fig. 1 — Two 2 × 4-foot plywood panels are cut as shown in this sketch to form the rack.

### The Rack

The two 12 × 24-inch pieces are used for uprights in the superstructure and the two 12 × 36-inch pieces form the shelves. The 12-inch remnant from the 6-inch pine board is sawed into four pieces 1½ × 12 inches. These are used to support the shelves between the uprights. I used 10½-inch spacing between the shelves, and it worked out fine, but this could be modified to suit the builder.

The whole rack structure was a trifle shaky when mounted on top of the table, but adding a sheet of ½-inch Presdwood to the back really tied things down! This sheet overlaps the rear of the table to permit its being fastened to the rear rail as well as to the shelves and the uprights. This brings the top edge of the sheet about one inch above the top shelf of the rack. This works out fine in practice since it is high enough to hold the top chassis in place and yet does not interfere with leads out of the rear. In the back of the lower spaces, holes were drilled where necessary to pass plugs and cables through the Presdwood back. As the table-rack is being

### List of Materials

2 fir plywood panels, 2 ft. × 4 ft. × 5/8 in.	\$ 4.80
2 pcs. clear fir, 2 in. × 4 in. × 6 ft.	1.92
2 pcs. clear fir, 1 in. × 5 in. × 6 ft.	1.50
1 pc. pine, 5/8 in. × 6 in. × 4 ft.	.75
1 tempered Presdwood panel, 2 ft. × 3 ft. × 1/8 in.	.66
4 doz. No. 8 flat-head wood screws, 1½ in. long.	.20
(for table top and shelf tops)	
6 doz. No. 8 round-head wood screws, 1¼ in. long.	.30
1 box 3/8-in. "wiggles" nails	.10
5 doz. small screws, 1/2 in. long (or 1/2-in. brads)	.20
(for fastening Presdwood panel)	
<b>Total</b>	<b>\$10.43</b>

used here, it houses four 11 × 17-inch chassis, plus a homemade superhet on the left of the table top, with keys, control switches and Variac on the right-hand end of the table. However, it could be utilized to hold up six 12 × 17-inch chassis, as it stands, or modified to suit almost any desired arrangement.

Because the table-and-rack is in the living room, the whole affair was given a coat of clear lacquer, which ran up the cost another 75 cents. The material shown in the list was bought in the suburban New York area. I doubt if prices could be much higher in any other locality; but this still amounts to the best ten dollars I have ever invested in ham radio.

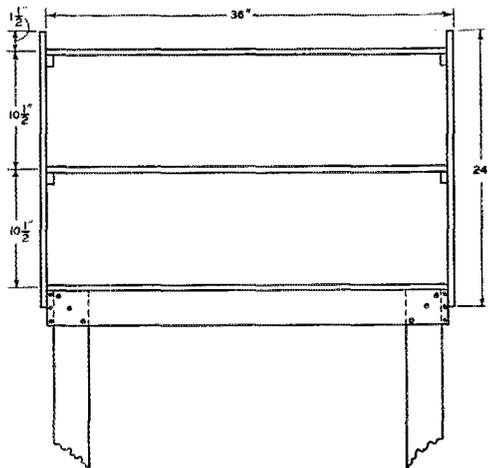


Fig. 2 — Sketch showing dimensions of operating table and method of assembly.



# The World Above 50 Mc.

CONDUCTED BY E. P. TILTON,\* WHDQ

THE week-end of September 25th was just like any other, as far as quite a few of the v.h.f. gang were concerned. "Didn't know anything about it until I got home from the movies and heard a lot more guys on than usual." "I'm not in the contest, but I'm just seeing how many stations I can work now that I've got started." These and similar remarks heard on the v.h.f. bands over the contest week-end indicate that, though many stations are taking part, the v.h.f.-contest idea still misses quite a few of those at whom it is aimed.

Like its predecessors, the September V.H.F. QSO Party was carried on the ARRL Activities Calendar, published regularly in *QST*. It was publicized in the OES bulletins and in the various other news sheets mailed out from Headquarters, including material sent to all affiliated clubs. It was the subject of a special bulletin transmitted by WIAW and all other OBS stations a week or more before the event, and September *QST* carried a full-page story detailing the contest rules. Still an appreciable percentage of v.h.f. operators didn't know about it!

Quite a few *did* know about it, however, and those who didn't soon joined in the fun. It is too early to make any guesses as to the results, deadline for this department coming up immediately following the contest week-end, but we do know that some hefty scores were being piled up. Perfect weather in the eastern U. S. brought out a goodly number of mobiles, a short burst of aurora provided some hard-to-get sections for 50-Mc. enthusiasts, there were moments of quite good tropospheric conditions to boost the 144-Mc. scores, and utilization of 220 and 420 Mc. reached a new high. It was a lively party as preliminary results herewith show.

The contest was the principal operating highlight in September, a month marked by little unusual in the way of propagation phenomena, as far as most of the country's v.h.f. men were concerned. Though the predictions show a considerable falling-off in the potentialities for  $F_2$  DX on 50 Mc. this fall, the Mexico-to-Argentina 50-Mc. circuit opened up almost a year to the day from the first break over this path in 1947. On August 30th, XE1KE, Mexico City, heard his first South American signals, and since that time has worked LUs almost daily, just as he did last year in the same period.

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

## Preliminary Report, September V.H.F. QSO Party

Nearly 100 claimed scores for the September V.H.F. QSO Party are in as we go to press, the majority being from the eastern part of U.S. and Canada. Top score, to date, is the three-band total of W1FZ/1, who operated from the top of Blue Job Mountain in Farmington, N. H. W1CTW, a leader in the May party, also used three bands in the fall workout, and is running second. W2NSD has the highest one-band score, having worked 146 2-meter stations from a 37th-floor location in New York City. W21QQ/2 and W1QXE used two bands to run up the only other scores over 1000 points thus far received. Some early scores in the higher brackets:

Call	Section	Bands	Contacts	Section Multiplier	Score
W1FZ/1	New Hamp.	50,144,220	138	15	2070
W1CTW	E. Mass.	50,144,220	105	13	1690
W2NSD	N. Y. C.-L. I.	144	146	10	1460
W21QQ/2	N. N. J.	50,144	104	12	1248
W1QXE	W. Mass.	50,144	92	13	1196
W1HDQ	Conn.	50,144,220	58	17	946
W1AQE	E. Mass.	144	74	6	444
VE3AIB	Ontario	50,144	71	6	426
W1QYV/1	W. Mass.	144,420	45	9	405
W9OBW	Illinois	50,144,220	59	6	354
W8UKS	Ohio	144	49	6	294
W2QNA	W. N. Y.	50,144	48	6	288
W2HNN	W. N. Y.	144	55	5	275
W3RUE	W. Pa.	144	55	4	234
VE3IZ	Ontario	50,144	55	4	220

On the 9th XE1KE worked LU6DO, who was also in contact with OA4BG and W5VY. On the 13th W5VY was worked by sharp-angle rebound, indicating an m.u.f. well above 50 Mc. OA4BG was worked the same evening, and HC1JW, Quito, Ecuador, was contacted the following night. XE1KE reports that the band opens daily around 4 P.M. CST, remaining open for one to two hours. Occasionally it reopens around 7:30, at which time the signals usually have a bad flutter which impairs the readability of those stations using voice. The automatic bandscanner in use at XE1KE is proving to be a big help in catching these openings.

### Here and There on 6 and 2

London, England— Word from G6CL, RSGB general secretary, breaks the good news that 50-

Mc. permits (88 in number) are being renewed until January 1st. The Gs also received 420 Mc., effective October 1st.

*South Devonshire, England* — The Gs are losing no time in warming up the 2-meter band, having received permission to operate there Sept. 1st. A message from G5BY, via W8MNM, reports that Hilton has worked up to 287 miles on 145 Mc. Between the 9th and 17th G5BY worked G6LK, 146 miles, G5MQ, 228 miles, G3APY, 236 miles, G2IQ, 245 miles, and G6OS, 287 miles. The last is believed to be the current European 144-Mc. record.

G6LK made his first contact on the new band one minute after the deadline, with G2XC, working G2BMZ, 149 miles, later the same day. These calls, and others mentioned in the reports of 2-meter activity in England, are well known to the fellows on this side of the Atlantic who were in on the European 50-Mc. DX last fall.

*Stockholm, Sweden* — Swedish amateurs are allowed to operate in the 50-Mc. band temporarily, according to SM5VL, who says that he and SM5AI have equipment and antennas ready to go, if the m.u.f. goes high enough to make DX contacts possible. There was extensive activity on 5 during the summer months, and quite a few of the stations will shift to 6 if fall conditions warrant. There is interest in 420 Mc. also, and SM5YS, Uppsala, has been heard in Stockholm, 45 miles, by SM5GQ, SM5IQ and SM5ABC. He uses a 32-element array with a screen reflector.

*Palembang, Sumatra, N.E.I.* — Arie Bles, PK4DA (ex-PA0UM), who recently visited this country, is now all set for operation on 28 and 50 Mc. in the Netherlands East Indies. The wartime ban on amateur operation, imposed by the commander-in-chief of the armed forces there, has not yet been lifted, but it is hoped that it may be before too long, so that the propagation possibilities of this interesting portion of the earth's surface may be exploited.

*Anchorage, Alaska* — Representation for Alaska on 50 Mc. is assured for this fall by the arrival of W5LIV/KL7, who has worked 6-meter DX from Iwo Jima and San Antonio, Texas. Bob asks the assistance of the W gang in warning him of possible 50-Mc. openings.

*New York City* — A dominant reason for the continuance of vertical polarization for 144-Mc.

work in the New York area is advanced by W2ER. At a recent meeting of the V.H.F. Institute of New York, Charlie reported tests wherein TVI in a near-by receiver appeared only when horizontal polarization (matching that of the TV array) was used on a 2-meter rig. He urges the use of sharp arrays, as high in the air as possible, to minimize interference to television reception.

*Robbinsdale, Minn.* — An easy way to work both 6 and 2 meters is suggested by W0KPY. He has two 522s, one converted for each band, and both operating from a common power supply. It is merely necessary then to energize the heaters in whichever unit is to be used.

*Sacramento, Calif.* — While on vacation in a heavily-wooded canyon 70 miles east of Sacramento, W6PIV decided to try working out on 144 Mc. from a seemingly hopeless location. Though his elevation was 3500 feet he was surrounded by hills 1500 feet higher. With his antenna below the tree level only one contact was made, at a distance of four miles. Raising the antenna to the top of a 100-foot tree permitted consistent work with W6MYL and W6PEI, even though they were on the other side of the 1500-foot ridge. W6BVK near Sacramento was worked and W6YLO and W6AUO were heard. The power was low (a 522) and the antenna only a folded dipole, but Ken feels that this demonstrates that one can get out of such holes, even with low power and simple antennas, provided that the stations to be worked have good locations and high-gain beams. The Sacramento arrays peaked on the normal bearing, but appeared to be broader than normal in working W6PIV/6.

*Burton, Ohio* — Most of the bale of QSLs received by W8UKS after his mass workout with the vertically-polarized Eastern stations contained notes asking why more of the 144-Mc. stations in the Great Lakes area do not also use vertical polarization. Sam wants the Eastern gang to know that he and W8WJC have long made a practice of using both polarizations in attempts to work over the Alleghenies, but the wild session of Aug. 26th was the first instance when the vertical arrays have paid off. For several nights previous to the 26th their horizontal arrays had been effective in making contacts with Pennsylvania, Maryland and Virginia stations, and some careful listening had been done

◆

No talk about frequencies lower than 50 Mc. is permitted at meetings of the Amateur V.H.F. Institute of New York. Well-known v.h.f. men from three call areas, from Philadelphia to southern Connecticut, are represented in this group.



on vertical on these and many other evenings. He hastens to assure the vertically-polarized Easterners that he will continue to use his vertical array whenever conditions warrant, and he hopes that the more progressive stations along the Atlantic Seaboard will extend the Middle West a similar degree of cooperation and put up some adequate horizontal arrays.

*York, Penna.* — One of the Eastern stations to be ready with either polarization is W3BLF, who has 16-element arrays in either plane. The horizontal went up in the latter part of August, and it has already accounted for many QSOs with Pittsburgh-area stations. This is a distance of about 200 miles over extremely rough terrain. He has also worked W8WSE, W8WJC and W8UKS on horizontal. With the vertical array he has been able to maintain consistent contact with W2BAV/2 at Bedford, N. Y.

*Louisville, Ky.* — More recruits in other parts of Kentucky are needed for the KYE 144-Mc. emergency net. W4BPE reports that coverage on 2 meters is working out very satisfactorily, and this band would be ideal for emergency purposes if more stations outside the Louisville area could be lined up.

*Brattleboro, Vt.* — Having provided Vermont contacts for many of the 50-Mc. gang, W1LAZY is now ready to do the same on 146.94 Mc. He would be glad to arrange skeds with interested parties.

*Galveston, Texas* — After being on vertical for some time, W5SM, Beaumont, and W5DDJ, Galveston, have gone over to horizontal and are now heard in Houston only by W5NZX, who is also horizontal. W5FSC reports that he and W5ON (vertical) have been heard in New Orleans on several occasions, but no two-way work between the two cities has yet been reported.

#### Those States-Worked Awards

Though the V.H.F. Marathon was discontinued in 1948, the bronze-medallion awards for the amateurs who work the greatest number of states on each of the v.h.f. bands were continued. With this issue we start a record of the standings of 144-Mc. stations in this respect, but the listing is only a fraction of what it should be. Dig out January, 1948, *QST*, and turn to page 150 for the details. Then drop us a card listing at least one contact for each state you've worked on 50, 144 and 220 Mc., giving both your 1948 and all-time totals. Many of you have impressive 144-Mc. records — how about sending in the details and getting your call on the list?

#### V.H.F. DX via Lunar Reflections?

When the story of the success of the Signal Corps in obtaining radar echoes from the moon was first published there was considerable speculation as to the possibility of amateurs doing the same thing. The frequency used was in the old

### 2-Meter Standings

	States	Call Areas
W8UKS.....	14	7
W8WJC.....	14	6
W3KUX.....	12	5
W3RUE.....	11	5
W2WLS.....	10	4
W0NFM.....	9	6
W0IFB.....	9	6
W3BLF.....	9	5
W1HDQ.....	9	3
W4FBJ.....	8	5
W8WRN.....	8	5
W0HAQ.....	8	—
W3HB.....	7	4
W0WGZ.....	6	4
W0BZE.....	6	3
W0GOK.....	6	—
W8RDZ.....	6	4

112-Mc. band — why not do it on 144 Mc.? Then the news got around about the equipment employed, and enthusiasm over the amateur's chances of duplicating the feat cooled abruptly. That high-powered pulse transmitter, the tremendous billboard array, and the complex receiver didn't look like amateur stuff.

The idea still gets tossed around now and then, and some fellows feel that it can be the means of extending v.h.f. coverage far beyond that obtainable under the most fortunate tropospheric conditions. At least one man has definite ideas as to a workable basis for achieving lunar-reflection DX on 144 Mc. W2RH, Port Chester, N. Y., has it figured out that 500 watts output, a 32-element array, and a highly-selective receiver might turn the trick. Extremely-exact control of frequency, in both the transmitter and receiver, would be necessary, and cooperating stations would have to be exactly synchronized. Not a project for a beginner, or a fellow with limited resources, but still not entirely beyond the realm of possibility for a few fellows in the advanced-amateur category. Do we have any takers?

#### 420-Mc. News

At the National ARRL Convention there was quite a bit of talk about 420 Mc. Everyone agrees that enough surplus gear for this frequency has been sold so that, if it were all put to use, the band would sound like our low-frequency 'phone bands on a busy night. The problem seems to be to get everyone in a given area lined up on an operating schedule. Make it one night each week, at first, setting aside an hour during which everyone interested in promoting activity will get on and make some noise.

In portions of W6, and a few other areas, work on 420 has reached the stage where fellows work out without prearrangement on some other band. The same could be true in almost any populous area. If we are to have any simple-equipment

band at all, 420 is certainly it; let's make a determined effort to get it rolling. The Chicago area, for instance, might well be supporting a considerable amount of activity on 420. W9CWH, Mt. Prospect, Ill., tells us that he and W9BSH are working regularly with converted BC-788s. They will be glad to arrange operating schedules with interested parties.

W9UIA, Evansville, Ind., has an APS-13, a BC-788, and a BC-645 all set to go, and has been working his home station within a 5-mile radius with one of the rigs in his car. Five-element horizontal arrays are used for both stations.

From Los Angeles, W6RJS lists 21 stations as active regularly on 420 in the stretch from Los Angeles to San Diego. The best DX is Mt. Frazier to Point Loma, San Diego, about 150 miles. He is able to work San Bernardino, about 60 miles, regularly, and he suggests that, with the aid of reflections from various mountains, 420 provides a very good field for fellows who like to work over a reasonable radius with low power and simple equipment.

Tests with various New Jersey stations are still being conducted by W1PBB, Stratford, and W1IYO, Milford, Conn. Early in September W2UCD, Belmar, N. J., was heard four nights in a row by the Connecticut stations, the distance being about 85 miles. None of the New Jersey fellows has yet been able to hear the W1s to make it two-way, however. It is reported that several stations are on in the region around Philadelphia, and the 9:30 P.M. schedules are being continued by W1IYO, W1PBB and W1JW in the hope of getting through to that area. Several fellows on Long Island, just across the Sound, are reported to be getting started, and a considerable amount



### Standings as of Sept. 30th

	All-Time 1948		All-Time 1948		All-Time 1948
W9ZHB	48	W5AJG	43	W9DWU	46
W9ZJB	48	W5ML	42	W9QUV	44
		W5VY	40	W9PK	43
W1CLS	44	W5HLD	40	W9ZHL	43
W3CIR/1	42	W5JLY	39	W9ALU	42
W1LL	40	W5FRD	38	W9QKM	37
W1HDQ	39	W5F8C	37	W9JMS	36
W1CGY	38	W5DXB	35	W9UIA	36
W1HMS	36	W5ZZF	34	W9AB	26
W1JLK	35	W5GNQ	32		
W1NF	35	W5IOP	30	W9USI	47
W1KHL	34	W5LIU	24	W9NFM	46
W1LSN	33	W5LWG	19	W9QIN	45
W1CLE	32			W9BJV	45
W1CJL	30	W6UXN	47	W9CJS	45
W1AF	27	W6OVK	40	W9KYF	44
W1ELO	24	W6ANN	38	W9DZM	43
W1HIL	21	W6BPT	35	W9KPK	42
		W6AMD	35	W9TQK	42
W2BYM	39	W6IWS	37	W9SV	42
W2AMJ	38	W6FPV	31	W9INI	42
W2IDZ	38	W6BWG	18	W9HXY	41
W2QVH	37			W9YUQ	39
W2RLV	37	W7BQX	45	W9HJS	38
W2RGV	26	W7ERA	43	W9PKD	36
		W7DYD	41	W9GSW	29
W3OJU	38	W7HEA	40		
W3OR	35	W7FDJ	36	VE1QY	28
W3RUE	34	W7FFE	35	VE3ANY	27
W3MKL	33	W7KAD	35	VE1QZ	26
W3MQU	25	W7JPA	34	G5BY	24
		W7QAP	32	XE1KE	23
W4GJO	46	W7ACD	28	VE4GQ	19
W4EQM	41	W7JPN	19	VE2KH	19
W4QN	40	W7OWX	15	G6LK	16
W4GIY	40			XE2C	14
W4EID	40	W8QYD	43	VE2GT	14
W4DRZ	38	W8RFW	25	XE1QE	10
W4FBH	34	W8TDJ	22		
W4GMP	34	W8LBH	10		
W4WMI	33				
W4FNR	33				
W4HVV	29				
W4FJ	26				
W4LNG	19				

Note that standings are given for the period March 1, 1946, through the present, and for 1948 only. Medallion awards are offered to the amateur working the most states during 1948 on 50, 144 and 220 Mc., and up. See January QST, page 150, for details.

### RECORDS

#### Two-Way Work

- 50 Mc.: CE1AH — J9AAO
- 10,500 Miles — October 17, 1947
- 144 Mc.: W3GV — W9WZ
- 660 Miles — September 18, 1947
- 235 Mc.: W1CTW — W2HWX
- 210 Miles — October 12, 1947
- 420 Mc.: W6VIX/6 — W6ZRN/6
- 186 Miles — July 27, 1947
- 1215 Mc.: W3MLN/3 — W3HFW/3
- 12.5 Miles — September 24, 1947
- 2300 Mc.: W6IFE/6 — W6ET/6
- 150 Miles — April 25, 1948
- 3300 Mc.: W6IFE/6 — W6ET/6
- 150 Miles — October 5, 1947
- 5250 Mc.: W2LCF/2 — W7FQF/2
- 31 Miles — December 2, 1945
- 10,000 Mc.: W4HPJ/3 — W6IFE/3
- 7.65 Miles — July 11, 1946
- 21,000 Mc.: W1NVL/2 — W9SAD/2
- 800 Feet — May 18, 1946

of activity should be under way soon in the New York area.

Results in 420-Mc. mobile work have been the subject of widely-differing reports. It appears that in areas where buildings or heavy foliage obstruct the path in the immediate vicinity of one or both stations, the operating range is very restricted, but in open country the "service area"

(Continued on page 136)



RESULTS of the Dempsey-Firpo fight . . . word of the great Japanese earthquake . . . these were the choice bits of news relayed by amateur radio in September, 1923, to the Mac-Millan Arctic Expedition, frozen in for the winter at Refuge Harbor, Greenland. *QST* for November of that year reports that all is well with the adventurous party, IANA, 7DC and Canadian 9BP maintaining dependable communication lifelines to the *Bowdoin*. And has ARRL Operator Don Mix of the expedition been busy! Witness his "Calls Heard" listing of 546 stations logged during the past two months.

The ever-increasing international stature of amateur radio has been recognized by the Second ARRL National Convention, just concluded in Chicago. In his keynote message, President Maxim calls for the formation of a world league of radio amateurs. Befitting the occasion, the Convention's honored guest, Leon Deloy, French SAB, predicts, ". . . I feel confident that two-way communication between American and French amateurs will take place before many months."

Traffic Manager Schnell takes opportunity this issue to call attention to the Fourth — and, it is hoped, last — Transatlantic Test. "This time we expect to establish two-way communication."

We have intriguing technical reading in C. D. Tuska's description of the Miner "reversed-feedback" Superdyne receiver, in John H. Miller's discussion of vacuum-tube characteristics, in Department Editor Mason's "Points on Tube Transmitters," and in Ralph Brown's "Measurements of Radio Signals." For the amateur who wants to put the finishing touches on his wavemeter calibration, a new WWV standard-frequency schedule down to 176 meters is announced.

The new autumn operating season has seen two transcontinental operating records established. Canadian amateurs — 1AR, 2BN, 3NI, 4ER, 5CT — have rung up a one-hour-and-ten-minute coast-to-coast relay; and in the United States, an attempt at a *daylight* Transcon — 4FT, 5PB, 6AWT, 6BQA — was foiled because the message beat the early-morning sun across the country!

*QST*'s "Who's Who" section pays tribute to four stalwarts of the ARRL Publicity Department, namely Royal V. Howard, 7LR, L. B. Laizure, 9RR, L. S. Hillegas-Baird (first president of the Milwaukee Radio Amateur's Club), and Howard Williams, 9BXQ. Other prominent amateurs and stations highlighted this issue are A. B. Chism, 3SU, Washington, D. C., R. B.

Bourne, IANA, Chatham, Mass., and B. Molinari, 6AWT, San Francisco.

Random gleanings: Paul M. Segal, 9EEA, newly-elected Colorado ADM, is hard at work reorganizing the traffic-handling set-up of that state. . . . Wayland M. Groves, 5NW, Denton, Texas, has installed a "bottle set."

## WWV Schedule

STANDARD-FREQUENCY transmissions are made continuously, day and night, as a public service by the National Bureau of Standards over its standard-frequency station, WWV, on the following frequencies:

Mc.	Power (kw.)	Audio Freq. (cycles)
2.5	0.7	1 and 440
5.0	8.0	1 and 440
10.0	9.0	1, 440 and 4000
15.0	9.0	1, 440 and 4000
20.0	8.5	1, 440 and 4000
25.0	0.1	1, 440 and 4000
30.0	0.1	1 and 440
35.0	0.1	1

A 0.005-second pulse may be heard as a faint tick every second, except the 59th second of each minute. These pulses may be used for accurate time signals, and their one-second spacing provides an accurate time interval for physical measurements.

The audio frequencies are interrupted at precisely one minute *before* each hour and each five minutes thereafter (59th minute; 4 minutes past hour, 9 minutes past hour, etc.), resuming after an interval of precisely one minute. This one-minute interval is provided to give Eastern Standard Time in telegraphic code and to afford an interval for the checking of radio-frequency measurements free from the presence of the audio frequencies. Ionospheric-disturbance warnings applicable to the North Atlantic path are given at 19 and 49 minutes past each hour. If a disturbance is in progress or is anticipated within 12 hours, the time announcement is followed by 6 Ws; if conditions are quiet or normal, the time announcement is followed by 8 Ns. The announcements of the station's services and call are given by voice at the hour and half hour.

The accuracy of all the frequencies, radio and audio, as transmitted, is now better than a part in 50,000,000. Transmission effects in the medium may result in slight fluctuations in the audio frequencies as received at a particular place; the average frequency received, however, is as accurate as that transmitted. The time interval marked by the pulse every second is accurate to 0.000001 second. The beginnings of the periods when the audio frequencies are resumed are synchronized with the basic time service of the U. S. Naval Observatory.



# Hints and Kinks

## For the Experimenter



### SUPPRESSION OF ELECTRICAL NOISE FROM PROPELLER PITCH-CHANGING MOTORS

ONE of the few faults of the propeller pitch-changing motors currently obtainable in surplus, when used to drive beam antennas, is that motor noise prevents accurate beam positioning on received signals. In some cases, this noise level is so high as to interfere with broadcast receivers in the neighborhood. Many amateurs have found that shielding the leads to the motor and grounding its frame have not materially reduced the noise level.

At a recent Frankford Radio Club meeting, W3GHD demonstrated a means for suppressing this noise that is so effective, so simple, and so inexpensive that I wish I had thought of it first. The method is applicable to either the 12- or 24-volt motors, and although it is necessary to remove the motor from the gear box, it is not necessary to remove the entire mechanism from an existing antenna installation.

Materials and tools necessary include six mica capacitors, 0.002 to 0.01  $\mu$ f., three 6-32 screws, three shakeproof solder lugs to clear a No. 6 screw, a No. 35 drill, a 6-32 tap, and a husky soldering iron or small torch. The capacitors should be of the smallest possible physical thickness consistent with the requisite capacity. Centralab ceramic "Hy-Kaps" are ideal.

Remove the thin-aluminum motor cover. Most motors are held to the gear box by a threaded ring located at the joint between the motor cover and the gear-box housing, although a few motors are

held by cap screws. Loosen the ring or the cap screws, supporting the motor with one hand before disengaging the last few threads. A straight axial pull will disengage the motor from the gears. Looking at the top surface of the motor, you will note six copper-surfaced brush holders symmetrically arranged around the motor shaft and its gear. Clean the top of these brush holders carefully. Midway between brushes 1 and 2, 3 and 4, 5 and 6, counting around the circle from any point, drill three holes through the threaded ring which attaches the motor to the gear box, using the No. 35 drill. Tap these holes for 6-32 screws. Insert the screws with the heads inside, with the shakeproof soldering lugs under the screw heads. Now solder the capacitors between the individual brush holders and the grounds just provided as shown in Fig. 1. Thus, each brush holder is bypassed to ground. File the screw points off flush with the threads, taking care not to damage same. Reassemble the motor to the gear box, and go down in the shack prepared for a very pleasant surprise.

I have seen several motors quieted by this procedure to the point where no noise at all was audible on 14 Mc. with the receiver gain wide open, and it was thus possible to orientate the beam very accurately on signals that were just above the receiver noise level.—*C. C. Miller, W2RDK*

### A BATTERY-SAVER

IF YOU are like most amateurs, you probably run a big bill for batteries principally because you neglect to turn the switch off after some piece of incidental gear is used. By employing a timer switch made for gas-engine model aircraft, I really saved on batteries and cuss words. The switch can be adjusted for a 5- to 10-minute period, and then wired in series with the usual filament switch. The price is low, about \$1.25 prewar, and it surely pays for itself in saving batteries, which come rather high these days.—*"By" Henry, WSQBJ*

### HINT FOR DECAL USERS

WHILE the Millen panel-marking decals work well on almost all finishes, difficulty is sometimes experienced where a poor grade of lacquer has been used in painting the panel. The solution supplied with the decals acts almost like a paint remover with the cheap lacquer, ruins the finish, and makes applications of lettering impossible.

(Continued on page 138)

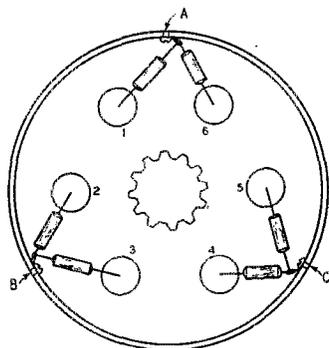


Fig. 1—Noise created by propeller-pitch beam rotators can be eliminated by by-passing the brush holders to the case of the motor as shown. Points A, B and C are grounds made by drilling and tapping the rim of the motor case.



# Correspondence From Members-

**VALE, WIEH!**

Federal Communications Commission,  
Washington 25, D. C.

Editor, *QST*:

Word of the death of Kenneth B. Warner has been received at the Commission's offices with deep official and personal regret.

As the veteran and able managing secretary of the American Radio Relay League and editor of its official organ, *QST*, Mr. Warner contributed much to developing and knitting amateur operations to their present high plane. In so doing, he helped to advance radio in general. His passing is a distinct loss to both the operating and regulatory fields.

The Federal Communications Commission and its staff, individually and collectively, are particularly cognizant of Mr. Warner's untiring service to the advancement of radio. Ever understanding and cooperative, he leaves a unique and important post that will be hard to fill.

The Commission joins in mourning our mutual loss.

— *Rose H. Hyde,*  
*Acting Chairman*

Office of the Chief Signal Officer, Washington, D. C.  
Editor, *QST*:

From the Chief Signal Office on behalf of myself and of the Signal Corps personnel, please accept deepest sympathy in your great loss. Ken has long been a key figure in amateur radio as well as in telecommunications generally. His passing has grieved a host of friends all over the world.

— *Spencer B. Akin, Major-General,*  
*Chief Signal Officer*

Navy Department, Washington, D. C.

Editor, *QST*:

The news of the death of K. B. Warner, secretary of the American Radio Relay League, comes as a great shock to me personally, and I know what a personal loss his death must mean to you. I know that he has always devoted himself fully to the work of the ARRL. But that he also managed somehow to give some of his time and energy to our Navy problems in communications.

As the chief of naval communications, and on behalf of the Naval communications service, I wish to extend to the ARRL, and particularly to his family, our heartfelt sympathy.

The ARRL has indeed lost an outstanding member and an inspiring leader, and we have lost a personal friend of long standing.

— *Earl E. Stone, Rear Admiral,*  
*Chief of Naval Communications*

U. S. Air Force, Washington, D. C.

Editor, *QST*:

The communications personnel of the entire United States Air Force, together with the many amateur radio operators of the Airways and Air Communications Service, join the ARRL in mourning the untimely death of K. B. Warner who was an amateur in the true and best sense of the word and a faithful friend to all communicators in the armed forces.

My own association with him takes us back over a period of many years, and I desire in these few words to pay tribute to his many helpful contributions to the advancement of communications, both civil and military.

— *Harold M. McClelland, Major-General, USAF*

Department of State, Washington, D. C.

Editor, *QST*:

On behalf of Francis DeWolf, now in Europe, and the entire Telecommunications Division, Department of State, I express our most sincere sympathy and deep sense of loss in the passing of your secretary.

— *Harvey B. Otterman, Acting Chief,*  
*Telecommunications Division*

Ottawa, Ontario, Canada

Editor, *QST*:

On behalf of colleagues and myself here in the Canadian Administration who knew and worked with Ken at international conferences, I wish to express our deep sympathy in your sad bereavement. He will be long remembered both as a personal friend and for the happy official relationship which he fostered between our respective offices.

— *G. C. W. Browne,*  
*Controller of Radio*

Washington, D. C.

Editor, *QST*:

The Interdepartment Radio Advisory Committee, while in session September 2, 1948, was shocked to learn of the sudden death of your beloved secretary. His valued contribution to the field of world telecommunications, his charming personality, and his untiring efforts in working for ideals he believed in have endeared him to the hearts of all who knew him. The Committee extends its deepest sympathy.

— *S. L. Windes, Chairman*

3304 Cleveland Ave., N. W., Washington, D. C.

Editor, *QST*:

It is difficult to realize that so remarkable a personality has suddenly ceased to exist. It leaves a memory extraordinarily vivid and extensive; how best to monument it is doubtless among the many questions that will now make demands on your thought and time.

— *J. B. Beadle*

P. O. Box 739, North Hollywood, Calif.

Editor, *QST*:

It is with deep regret that the members of this organization learned of the death of K. B. Warner. It would have been much better had we expressed our gratitude for all that he did for amateur radio while he still lived. It would have been only fair had we written a line or two of appreciation on a few of the many occasions when he deserved it instead of taking the good for granted and writing only when we disagreed.

But we never did any of that. Most of us just sat back and let ARRL look out for our interests until something happened which we didn't like. Whatever that something was, because of his *QST* editorials — because he was spokesman for the League — K. B. Warner was the one who heard our objections.

So it's really too late to say 'well done' to a man who has done more, probably, for amateur radio than any man since Hiram Percy Maxim. But we can say to those of you at Headquarters who knew him and worked with him that we know you will miss K. B. Warner and find it difficult to replace him. We will miss him too as will all the rest of the amateur fraternity.

— *San Fernando Valley Radio Club*  
*James L. Russell, Secretary*

Post Box 634, Brussels, Belgium

Editor, *QST*:

... Amateur radio throughout the world is greatly indebted to Kenneth B. Warner, and his name and call will remain in our memories forever.

— *Union Belge des Amateurs-Emetteurs*

— *Unie Van de Belgische Amateur-Zenders*

Toronto, Ontario, Canada

Editor, *QST*:

It is with regret and a deep sense of loss we learn of Ken Warner joining the ranks of silent keys. Through the years he had become a symbol of amateur radio, and was an outstanding exponent of the Amateur's Code. To him and his efforts at international conferences belongs much of the credit for our continuing privileges. His editorials, especially of recent writing, have displayed a breadth of vision unsurpassed since the days of Maxim.

All members of the Canadian Amateur Radio Operators' Association join me in this expression of sympathy to his family and associates. Amateur radio, and every radio amateur, has lost a friend.

— *The Canadian Amateur Radio Operators' Ass'n*,  
T. G. E. Powell, President

Postbox 125, Hilversum, Netherlands

Editor, *QST*:

... By his important international work in the sphere of amateur radio, the hams all over the world have to be thankful for all he has done for them. You may be sure that we shall never forget our good friend Kenneth B. Warner.

— *Vereeniging voor Experimenteel Radio Onderzoek in Nederland*

London, England

Editor, *QST*:

The President and Council of the Radio Society of Great Britain are deeply grieved to learn of the passing of your beloved Secretary. His work for amateur radio will never be forgotten.

— *Jack Clarricoats, Secretary*

17 Norval, N. Wembly, Middlesex, England

Editor, *QST*:

You will know how deeply shocked I have been to hear of Ken's sudden passing. Last year, in Atlantic City, he seemed so full of energy that it is almost impossible to believe that he has gone. We all knew, of course, that he worked hard — maybe a bit too hard — but then, who could imagine Ken running away from hard work!

I am proud to have known him and to have worked with him, but even if I had not had the privilege of coming to Atlantic City I should have felt the shock deeply, like so many others to whom Ken was someone they knew only through *QST*.

Please convey my sympathies to the Headquarters staff. Ken set a high standard which his successor will find hard to follow, and I venture to suggest that no one has ever worked harder than Ken for amateur radio.

— *Stanley K. Lever, G6LJ*

RFD 7, Dayton, Ohio

Editor, *QST*:

The sudden passing of Kenneth B. Warner is a definite loss to amateur radio. Ken's whole life was wrapped up in amateur radio. He served with me in the Air Corps during the first world war. Then, and in later years, I became very much aware of his keen interest in amateur radio. He was a deep thinker and a keen seeker after facts. He was a quiet chap, but a good fighter when aroused. As secretary of the League, he made it his business to become thoroughly acquainted with the proper people in Washington and elsewhere, who could be influential in protecting our hobby. When occasion warranted, he was able to use these contacts to excellent advantage. Under his guidance, the League grew from a "squalling infant" to a highly-effective world-wide protector of amateur radio.

— *Dan McCoy, W8CBI*

854 Main St., Danville, Va.

Editor, *QST*:

... KB, with his untiring efforts and splendid management, will, I am sure, be sorely missed at Hq. and by the fraternity at large. From observation and experience I am well aware of the fact that, on various occasions, it has required great patience and skillful steering in the handling and disposition of League affairs, but KB and his aides have done a swell job, as well as did Mr. Maxim until his death. And now that KB is gone I know that the same old fighting spirit of the ARRL will keep alive. My best wishes are with you. . . .

— *W. Tredway Gravelly, W4CB*

1201-1204 Merchants National Bank Bldg.  
Cedar Rapids, Iowa

Editor, *QST*:

... While I have never met the man personally, I have greatly admired and respected him for, according to what information I have, what he has done for the League and amateur radio in general. . . . It is my impression that Mr. Warner and the other executive officers of the ARRL have never sacrificed principle in dealing with any so-called minority pressure groups. I am confident that you will continue the same attitude in these matters. There is a substantial number of amateurs in my acquaintance who will continue to support that kind of an administration and, if necessary, conduct an active campaign for it. . . .

— *A. G. Keyes, W0KTQ*

P. O. Box J, Upper Montclair, N. J.

Editor, *QST*:

Ken Warner's untimely death has been much on my mind since I learned of it. Although I saw little of Ken the last few years, it was always gratifying to know that he continued to be active in League affairs and that, whenever the mood so dictated, I could call and talk with him on the telephone. I shall miss him greatly. And I know full well how much the gang at Hartford will miss him — and what a challenge it will be to carry on, to climb to still greater heights.

— *Paul F. Godley*

9428 Hobart St., Dallas 18, Texas

Editor, *QST*:

When I tuned across the 3.5-Mc. band and learned of K. B. Warner's death, I was shocked and grieved. Although I didn't know him personally, I felt, no doubt as many another amateur, as though I did — reading *QST* all these years. The most outstanding thing about Mr. Warner, it appeared to me, was his sincerity. I believe he gave amateur radio all he had.

— *Leroy May, W5AJG*

4511 So. 3rd St., Louisville, Kentucky

Editor, *QST*:

It is in deepest sorrow we send this message of sympathy upon hearing of the passing of Mr. Warner. His loss to amateur radio can never be replaced. He shall not be delegated a silent key because his good works will continue forever in the hearts of amateurs throughout the world.

— *Amateur Radio Transmitting Society*

2485 West 7th St., Cleveland, Ohio

Editor, *QST*:

With the passing of K. B. Warner, we are reminded of the fact that the world is moving forward. It is up to all of us to attempt to carry out the work that is yet unfinished and to appreciate the job done by those who have gone before.

— *Cleveland Brass Pounders Association*

[EDITOR'S NOTE: We acknowledge, with sincere thanks, the receipt of many dozens of additional letters of condolence and tribute from government and military officials, amateur clubs, IARU societies, individual amateurs and friends.



# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
J. A. MOSKEY, WIJMY, Asst. Comm. Mgr.  
ALBERT HAYES, WIIN, Natl. Emerg. Coordinator

GEORGE HART, WINJM, Communications Asst.  
A. F. HILL, JR., WIQMI, Communications Asst.  
LILLIAN M. SALTER, Communications Asst.

**New W1AW Sked Stresses General Operating.** For many years W1AW time has been divided between traffic schedules, bulletins, frequency-measuring tests, code-proficiency periods, and the general-operating periods during which the station was open for a call from any amateur. Elsewhere in these columns we present a completely-revised schedule in which we have emphasized the "general-operating" opportunity for contacts with your Maxim Memorial Station. All of the other activities are still provided for in our schedules. However, more *night-time* hours have been set up for general contacts, and W1AW will now specify the band on which the station will stand by at the end of ARRL bulletin transmissions. Note the times when W1AW uses your favorite band and give us a buzz. Amateurs interested in any possible opening as a W1AW attendant are invited to drop Hq. a line for a personnel form on which to indicate availability and other data. This does not mean that we expect immediately to expand operations but is "just in case."

**Staff Notes.** Our best wishes to Jim White, W1PHW, who leaves W1AW to return to college under the GI Bill of Rights. Robert E. Morrison, W3LRK, whose operator sine is "LR," will take over Jim's shift at the station. Bob served as a radioman in the Navy during the last war, receiving two bronze stars in the course of his service. Since completing his three-year hitch he has become Class A. Give him a call at W1AW.

**ARL-CK Messages for Holiday Traffic.** A list of numbered-text messages appears on the back of the number sheet in each ARRL logbook. This list of 60 ARL-CK texts will be sent free of charge by ARRL on receipt of radioed or mail request — ask for Form 3. These texts have both the second stage of emergencies and the needs of Thanksgiving and Christmas in mind. You will want to send some amateur radiograms on each holiday occasion and this may simplify your message writing. Recourse to organized section nets and brother amateurs who specialize in handling traffic is suggested to assure best service on amateur radiograms.

**Operating Proficiency.** Present band conditions place a heavy premium on operating ability. The good operator is known for his uniform practices and standard procedure; also for his ability and the know-how developed through experience

which permits him to copy a weak signal through heavy interference. Accurate spacing and character formation and a steady transmission pace are part of his stock-in-trade. Proficient brass-pounding and voice operation can be developed best, we believe, by practice and joining organized nets, by emergency and traffic exercises, or by participation in code-proficiency programs. No amount of expensive gear or chromium plating on the station can take the place of operating savvy.

**Portable and Mobile Logging.** The new opportunities for engaging in mobile and portable operation granted by a recent FCC order responsive to the ARRL Board's recommendation will be utilized increasingly in individual planning for ham communication. We wish to emphasize that the responsibility in connection with keeping a log is in no way lessened when operating portable or mobile. Admittedly, it is more of a chore to keep an accurate log when operating afield, both from the standpoint of convenience and additional logging requirements. We accordingly caution amateurs that such records are definitely FCC-required and invite attention to the ease with which such records can be checked by ordinary FCC monitoring and the calling-in of fixed-station logs for cross-checking. Keep a log!

**Logging Recommendations.** We have found it convenient to keep our record of mobile or portable work in the full-sized standard ARRL log. When operating portable or mobile there always appear to be more experimental antenna-loading adjustments and other data. The large blank left-hand pages are most convenient for this. Also, those large pages have been found useful for making accurate message copy and preserving same for the permanent record. There are less opportunities for carrying message blanks around in mobile quarters! Of course, it is most convenient merely to continue "home-station" log entries using the same book when mobile or portable work is infrequent. If one has a regular installation for such work, however, he is likely to use it to such an extent that a separate logbook is justified. In connection with long trips, our logbook also serves as a radio diary, in addition to being an FCC record, and therefore contains interesting notes covering radio for the trip period.

**FCC Revokes Amateur Licenses.** Initial decisions of the FCC were handed down in August (A) suspending the amateur operator and station licenses of R. E. Gross, W2ONR, for a period of six months in view of his "engaging in coded international correspondence in violation of Sec. 2 Art. 8 of the General Radio Regulations (Cairo Revision, 1938); failure to identify the station with which he was communicating in violation of Sec. 12.82(a); and transmission of deceptive signals contrary to Sec. 12.158." Failure to keep a full and accurate log as required by Sec. 12.136 while in contact with SV9CD was also cited by FCC. (B) Operator and station licenses of J. A. Jurkowski, W2VGW, and M. C. Grossman, W2PJJ, were ordered suspended for a period of three months for the use of profane and obscene language as cited on five different dates covering contacts between Caldwell, N. J. and W2PJJ/1, Bethlehem, N. H. The FCC release reported, "Their conduct has not only been violative of the law but reflected unfavorably on the entire amateur fraternity. In a service comprehending women as well as men, the dictates of common decency as well as provisions of law should deter this type of conduct."

**Unlicensed Operation Stopped.** An Illinois member also reports that after having received due warning by local amateurs, an unlicensed operator, Don Beach, of DeQuoin, Ill., operating an unlicensed station in the 7-Mc. amateur band, was apprehended by representatives of FCC on Aug. 26th. The Commission, it was reported, has taken appropriate measures to protect the interests of the amateur service. With liberal arrangements for taking FCC amateur examinations there is certainly no excuse for such violations, and FCC cordially invites reports from amateurs of such misuse of their frequencies.

**15th ARRL Sweepstakes.** Here's an old friend in the contest-operating field coming up again. This year's "SS" follows the tested formula for successful and enjoyable work. See the full announcement, pages 24-25, October *QST*. Give your station a real workout on the week-ends starting Nov. 13th and 20th and report your results, great or small. — *F.E.H.*

#### BRIEF

Bill Cowles, KL7AN, of Fairbanks, Alaska, built and owns the farthest-north mobile rig in North America and possibly the world. In making his first attempt to work the States with the mobile outfit, he offered a gold nugget mined in Alaska to his first contact. He was immediately called by Larry Wolfe, W6BNN, Los Angeles. Larry received the nugget and in return Bill received a QSL card confirming the contact. KL7AN works mobile 29.2 Mc. and would welcome more QSOs with ten-meter hounds. (He doesn't promise to send a gold nugget in confirmation of each contact, however! — *Ed.*)

#### CODE PRACTICE ON 28 MC.

The following amateurs are transmitting code practice on 28 Mc. in the ARRL Code Practice Program:

W7JKZ, R. E. Sechler, 2853 Louisiana St., Longview, Wash., 29 Mc., Tuesday, Thursday and Sunday, 7:50 to 9:00 P.M. PST.

W9FQB, AK-SAR-BEN Radio Club, A. R. Gaeth, secretary, 6105 North 37th, Omaha, Nebr., 27-Mc. band, Monday, Wednesday and Friday, 7:30 P.M. CST.

W9OAO, Kilian Dosberry, 315 So. Fifth St., Leavenworth, Kans., 29 Mc., Monday and Thursday.

Additional volunteers are needed to send code practice by radio. Schedules may be arranged to suit your convenience. Suggestions for conducting code lessons are available from the Communications Department. A combination of voice and code transmissions is most effective. If you are operating on 28 Mc. and would like to help in the ARRL Code Practice Program, drop us a postal indicating your interest and we'll send details.

Those using the available practice are urged to correspond with the amateurs making the transmissions so that those who give this useful service may plan their lessons best to aid their listeners.



One of the unscheduled attractions at the National Convention in Milwaukee was a look at W9UAM, believed to be the tallest ham in the world. Bernard Wright, of West Allis, Wis., shown above with W9FPB, received his license in June of this year, and has been active on 14 and 28 Mc. This "vertical radiator" is 21 years old, and tops the six-foot-nine-inch mark in his stocking feet. A member of the Milwaukee Radio Amateurs' Club, Bernard makes a living working on TV gear for Westinghouse, and is an active participant in the AEC program. [Photo by WIHIN (p. 70, Mar., 1947, *QST*), the second-tallest ham in the world!]

**WITH THE A.E.C.**

Amateur radio proved its worth to public safety in late May and early June when British Columbia's worst flood since 1894 swept the Fraser Valley. Between May 27th and June 13th virtually the only communication within the affected area, and all communication between the affected area and the outside world was by amateur radio. Amateurs in New Westminster, Dewdney, Deroche, Mission, Fort Langley, Chilliwack, Abbotsford, Vancouver and Cloverdale handled traffic for nearly every civic and relief official within the area. "Operation Overflow," as the Vancouver gang refers to the effort, will long be remembered as one of the toughest jobs ever handed to the amateurs of VE7.

Although the Atlantic hurricane which threatened the Eastern Seaboard during the closing days of August veered out to sea without doing appreciable damage, the gang in North Carolina, where the severest damage was anticipated, did a bang-up job of mobilizing their resources in short order. Local 28-Mc. circuits, 7-Mc. long-haul nets, and 3.5-Mc. coastwise nets went into action when the U. S. Weather Bureau advised, at 11:00 a.m., that it appeared certain that Cape Hatteras was in for a stiff blow. A few messages connected with the impending emergency were handled. W4CFL, standing by on the North Carolina frequency, 3605 kc., received a request from the Weather Bureau office in Charlotte for a report on the weather at Hatteras. This request was passed to W4NUO, who obtained the weather report and relayed it back to Charlotte via W4JPY and W4CFL. A number of such important bulletins were handled rapidly and efficiently.

The National Emergency Net, a stand-by facility that goes into action during periods of communications emergency, offers a high-speed and dependable facility for handling the mass of long-haul inquiry traffic which materializes at



such times. Guarding the three National Emergency Frequencies, 3550 kc., 7100 kc., and 3875 kc., these operators — among the best in the

traffic game — are at your service. The roster of the net, as of the date we go to press, is as follows: W1BB, W1BVR, W1FBJ, W1HRC, W1NY, W2ANW, W2ITX, W3ECP, W3KWL, K3NRW, W3QV, W4BAZ, W4BOL, W4CFL, W4DXI, W4FDF, W4FWZ, W4IA, W4IQV, W4KDE, W4KV, W5DEJ, W5JO, W5IGW, W5KTE, W5LAK, W5LSN, W5ZM, W6AD, W6CIS, W6IOX, W6RBQ, W6REB, W6TT, W7ACF, W7CPY, W7EMT, W7FRU, W7FWD, W7GTN, W7JU, W7KIY, W7RU, W7WJ, W8DAQ, W8DPE, W8EBJ, W8GBF, W8KWI, W8SCW, W9BUK, W9DKH, W9DUA, W9EVJ, W0AUL, W0BLK, W0BNQ, W0FP, W0HMM, W0NCV, W0TQD, W0OUD, W0YSM.

**DX CENTURY CLUB AWARDS**

DXCC Certificates based on postwar contacts with 100-or-more countries have been issued to the amateurs listed below. The countries-worked totals indicated have been certified by examination of written evidence under the award rules as published in March, 1947, QST.

**HONOR ROLL**

W1FH.....202	W6VFR.....182
G2PL.....186	W4BPD.....181
W3BES.....185	G6ZO.....175
W2BXA.....184	W3GAU.....174
W8HGW.....184	W2AQW.....173

**NEW MEMBERS**

ZL2GX.....120	IIAY.....106
SV1RX.....119	W6RM.....105
OK1CX.....111	W3IXN.....104
HB9J.....111	W3KDP.....102
GSYV.....110	G6XY.....101
W9LNM.....110	W6RW.....101
W5ADZ.....107	G4GI.....101
W2JB.....106	W1EQ.....100

**ENDORSEMENTS**

W1TW.....171	G8KP.....134
W3JNN.....171	W6MX.....134
W6SAI.....170	OK1FF.....132
W3GHD.....162	W1BIH.....131
W3DPA.....161	CE3AG.....131
W8BKF.....161	W6RBQ.....131
ZL1HY.....160	W1ENE.....130
W1ME.....160	W4AIW.....130
W3KT.....160	OZ7CC.....128
W6EBG.....160	W4KXN.....125
VE7ZM.....154	W3LNE.....121
W6SN.....152	W8CPI.....121
W2HZY.....152	W9DAE.....121
W1AXA.....151	W1WK.....120
W5KC.....150	VE7HC.....120
W6TT.....150	W2PUD.....120
W3KQF.....148	G4JZ.....117
W9RBI.....140	W1RY.....113
W2CWE.....140	W7GBW.....111
W6NNV.....138	W1BDS.....110
W2ALO.....138	KH6II.....110

**RADIOTELEPHONE**

**HONOR ROLL**

W1FH.....164	XELAC.....130
W1JCX.....138	W1HKK.....127
W4CYU.....137	W2BXA.....126
W6DI.....135	G2ZE.....125
G2PL.....133	W2AFQ.....123

**NEW MEMBERS**

W3JNN.....107	W2UAT.....101
W1LMB.....105	W1HRI.....100
LX1SI.....104	

**ENDORSEMENTS**

W1NWO.....120	W1GOU.....110
ZL1HY.....113	

## REVISED WIAW OPERATING SCHEDULE

Effective Nov. 1, 1948

(All Times Given Are Eastern Standard Time)

The new and completely-revised WIAW operating schedule is designed to give more emphasis to general operation, for contact with *any* amateur station. The new schedule should permit more Mountain and West Coast contacts without eliminating any of the other services performed by the Headquarters station.

The 24-hour time, which is used for convenience, is an experiment, subject to your approval or disapproval. Amateurs not familiar with this streamlined method of time telling can convert times after 1300 to P.M. by subtracting 1200.

### Operating-Visiting Hours:

Monday through Friday: 1130-0600 (following day).

Saturday: 1900-0230 (Sunday)

Sunday: 1600-2200

A mimeographed local map showing how to get from main state highways (or from Hq. office) to WIAW will be sent to amateurs advising their intention to visit the station.

**General Operation:** Use the chart below for determining times during which WIAW engages in general operation on various frequencies, 'phone and c.w. Note that since the schedule is organized in EST, certain morning operation periods may fall in the evening of the previous day in western time zones. Mimeographed master schedules showing complete WIAW operation in EST, CST, MST or PST will be made available to any amateur upon request.

WIAW is not open on national holidays. On Saturdays and Sundays during which official ARRL activities are being conducted, WIAW

will forego general-contact schedules in favor of participation in the activity concerned. Similarly, on Friday, November 5th, an FMT for OOs only will be scheduled 2130-2200, also Saturday, November 6th, 0030-0100.

**Official ARRL Bulletin Schedule:** Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:

**Frequencies:** C.W. — 3555, 7215, 14,100, 28,060, 52,000, 146,000 kc.

'Phone — 3950, 14,280, 29,000, 52,000, 146,000 kc.

**Times:** Sunday through Friday, 2000 by c.w., 2100 by 'phone.

Monday through Saturday, 2330 by 'phone, 0000 by c.w.

**Code-Proficiency Program:** Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. are made on Tuesdays and Thursdays on the above-listed frequencies, starting at 2200, and on Monday, Wednesday and Friday at 9, 12, 18, 25 and 35 w.p.m. Approximately ten minutes of practice is given at each speed. Next certificate qualifying run is scheduled for Wednesday, November 17th.

The station staff:

T. F. McMullen, W1QVF, "fm"  
Richard N. Eidel, W2MHW, "re"  
R. E. Morrison, W3LRK, "lr"

### BRIEF

Effective January 1, 1949, the Canal Zone Amateur Radio Association will discontinue issuing the certificate for ten KZ5 contacts and in its place will issue a new and better certificate which will require twenty-five KZ5 contacts. As previously required, a simple list of stations worked, with dates and times, is all that need be submitted to claim the new certificate.

### WIAW GENERAL-CONTACT SCHEDULE

WIAW conducts general operation, open for contact with *any* amateur station, welcoming calls in accordance with the following time-frequency chart.

EST	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0015-0200	7215 *	.....	7215 *	3555 *	14,100 *	3555 *	7215 *
0200-0300	.....	.....	← -- 3950- or 14,280-kc. 'phone ** (Tues. through Sat.) -- →				
0300-0400	.....	.....	← - 3555-, 7215- or 14,100-kc. c.w.** (Tues. through Sat.) - →				
1130-1230	.....	←-----	29,000-kc. 'phone (Mon. through Fri.)	-----→			
1230-1300	.....	←-----	28,060-kc. c.w. (Mon. through Fri.)	-----→			
1530-1600	.....	←-----	14,280-kc. 'phone (Mon. through Fri.)	-----→			
1600-1700	.....	←-----	29,000-kc. 'phone (Mon. through Fri.)	-----→			
1700-1800	.....	←-----	14,100-kc. c.w. (Mon. through Fri.)	-----→			
1800-1830	.....	14,280	← ---	7215-kc. c.w. (Tues. through Fri.)	-----→		
1830-1900	.....	3950	←----- (ditto) -----→				
2015-2100	14,100 *	3555 *	7215 *	14,100 *	14,100 *	7215 *	.....
2110-2200	3950 *	14,280 *	52/146 Mc.**	3950 *	14,280 *	3950 *	.....

\* Starting time is approximate. General-contact period on stated frequency immediately following transmission of Official Bulletin which begins on the hour

\*\* Operation will be on one of frequencies stated, depending on propagation conditions, expediency and general activity.



## BRASS POUNDERS LEAGUE

(August Traffic)

Call	Orig.	Del.	Rel.	Extra Del. Credit	Total
W7CKT	13	121	2760	114	3008
W6REB	8	12	1226	8	1254
W7CZY	127	65	893	27	1112
W0HMM	6	91	506	85	688
W6FDR	27	38	468	37	570
W7FRU	27	6	534	2	569

The following made the BPL with over 100 "deliveries plus extra delivery credits":

W6NL 116                      W6RAD 106  
W7ZU 107                      W6DDE 101

A message total of 500 or more or 100 "deliveries plus extra delivery credits" will put you in line for a place in the BPL. The Brass Pounders League listing is open to all operators who qualify for this monthly "honor roll."

### TRAFFIC TOPICS

The October Simulated Emergency Test should have given the networks an opportunity to check their efficiency and outlets. How did your net make out?

Did anyone notice the traffic totals that members of the Pioneer Net ran up during and after the Vanport disaster? W6REB with 2048 and W6FDR with 1496 appear to have led the flock, but there is little doubt that Pioneer Net once again proved that theirs is one of the slickest traffic organizations in the country. Who said you must have the term "emergency" in a net name in order to be top-notch emergency traffic handlers?

The North Texas Traffic Net (NTX) is going great guns on 3657.2 kc. on a three-night-per-week schedule. The net is combining its facilities to cover both traffic and emergency work for North Texas.

The trunk lines are now in full swing. See that your local net is tied into one or more of these lines to insure speedy, accurate service to all parts of the country and possessions. A few trunk-line station appointments are still available for those ORSs who are qualified. If you are interested, drop a postal or letter to Headquarters requesting information and vacancies that may be available for you.

Here's where the well-known signal of W6RBQ originates. Op Bill Ladley is ARRL Pacific Division director, a member of the Pioneer Net, holder of ORS, RCC, A-1 Operator and DXCC certificates. He's a "regular" in all ARRL operating activities. Station receivers are a Super-Pro and Collins 75A. Transmitting gear consists of a 32V exciter, an 800-watt Techrad rig, and a 100-watt 829B crystal job for 2 meters.

November 1948

The Rebel Net is back in business at the old stand, 3635 kc. The net meets five nights per week, Monday through Friday, and covers "Dixie" like a blanket.

A new net has been formed to cover the Maritime Division in Canada. It is called the Eastern Traffic Net, meets on 3545 kc., Monday through Friday, at 7:00 P.M. AST, and covers Nova Scotia, New Brunswick and Prince Edward Island.

The Mount Baker Amateur Radio Club did a bang-up job of traffic handling from the Northwestern Division Fair at Lynden, Washington. The call used was W7KWC, and some 1000 messages were handled. Traffic was cleared to all points through the WARTS and Pioneer nets. A fine job of operating was done by W7BLP, W7KVA, W7KWC and W7MBY.

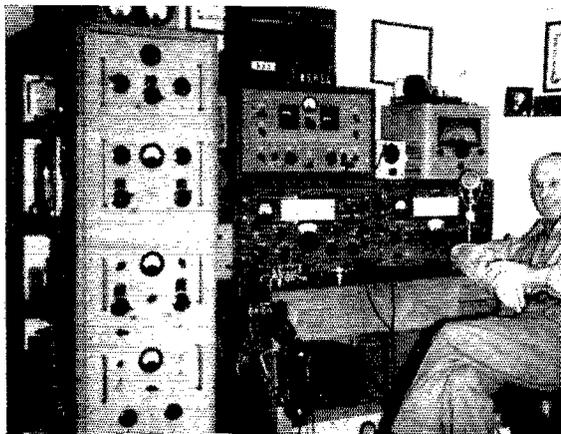
The Iowa 75 Phone Net is going along in fine shape and handling traffic for all major localities in Iowa. There are still some spots that are not covered. Those interested are invited to check into the net on 3970 kc. at 12:30 P.M. CST daily.

North Dakota has divided its traffic net into two sections with the eastern section meeting on 3525 kc. and the western section on 3550 kc. Both sections meet Monday, Wednesday and Friday at 8:30 P.M. CST.

The South Dakota Net is meeting on 3720 kc. at 8:00 P.M. CST Monday, Wednesday and Friday. New members are needed in some localities. Those interested are cordially invited to check into the net or contact W0GCP.

The newly-formed Jersey Net, JN, meets on 3630 kc., Monday through Friday, at 9:00 P.M. EST. This net is the clearing house for overseas traffic to be routed through W2OEC and traffic to be placed on TLAP.

This is your column, and it is hoped that each net will send in news of its activities each month so that we may be able to keep all informed of anything of interest in the traffic line. Appoint one member of your net to take the responsibility for passing such information to your SCM and to Headquarters.



## CODE-PROFICIENCY AWARDS

The next Code Proficiency Qualifying Run will be made on November 17th at 10:00 p.m. EST. Identical texts will be transmitted simultaneously from W1AW, W6OWP and W6CO. Frequencies of transmission from W6CO will be 3534, 7053 and 14,040 kc., from W6OWP 3590 and 7248 kc. W1AW will use the frequencies listed in the schedule elsewhere in this section. Any one of the three stations may be copied. Mail your copies of the qualifying run to Headquarters no later than November 27th. Please indicate the call of the station whose transmissions you copied. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsements indicating progress above the first certified speed.

Code-practice transmissions are made from W1AW each evening, Monday through Friday, at 10:00 p.m. EST. References to texts used on several of the transmissions are given below.

*Date* Subject of Practice Text from September QST

- Nov. 3rd: A *Surplus-Parts Bandswitching Transmitter*, p. 11  
Nov. 5th: A *Peaked Audio Amplifier for Communication Receivers*, p. 16  
Nov. 9th: The "Monitone," p. 22  
Nov. 11th: *Accurate Frequency Measurement*, p. 28  
Nov. 15th: *Some Thoughts on 10-Meter Mobile*, p. 33  
Nov. 17th: Qualifying Run, 10:00 p.m. EST  
Nov. 19th: "QRR . . . the Dike Is Broken!," p. 38  
Nov. 23rd: *Hidden-Transmitter Hunts for Everyone*, p. 40  
Nov. 25th: *On the Air with Single Sideband*, p. 42  
Nov. 29th: "How's My Modulation?," p. 49

## PIONEER AND MISSION TRAIL NETS TURN TO DURING VANPORT DISASTER

Highly commendable performances were turned in by the Pioneer and Mission Trail nets during the recent Vanport, Wash., flood disaster, originally reported in September QST. Members of both nets spent long hours in clearing outgoing north-south and east-west traffic, and Pioneer maintained constant communication with the Pacific Regional Office of the Red Cross in Oakland, through W6FDR and W6OT.

In recognition of their accomplishments, ARRL Public Service Certificates have been awarded the following amateurs: W6s DDE, FDR, IOX, QXN, REB, WJM; W7s FRU, RAO, UTM, WJ; W9YOS.

## A.R.R.L. ACTIVITIES CALENDAR

- Nov. 13th-11th, 20th-21st: Sweepstakes Contest  
Nov. 17th: CP Qualifying Run  
Dec. 17th: CP Qualifying Run  
Jan. 13th: CP Qualifying Run  
Jan. 15th: V.H.F. Sweepstakes  
Jan. 22nd-23rd: ARRL Member Party  
Feb. 11th-14th: DX Competition (c.w.)  
Feb. 15th: CP Qualifying Run  
Feb. 18th-21st: DX Competition (phone)  
Mar. 11th-14th: DX Competition (c.w.)  
Mar. 16th: CP Qualifying Run  
Mar. 18th-21st: DX Competition (phone)

— — — — —

- Jan. 1st-Dec. 31st: Most-States V.H.F. Contest  
First Saturday night each month: ARRL Officials Nite (get-together for SCMs, RMs, SECs, ECs, PAMs, Hq. Staff, Directors, Alt. and Asst. Dirs.)

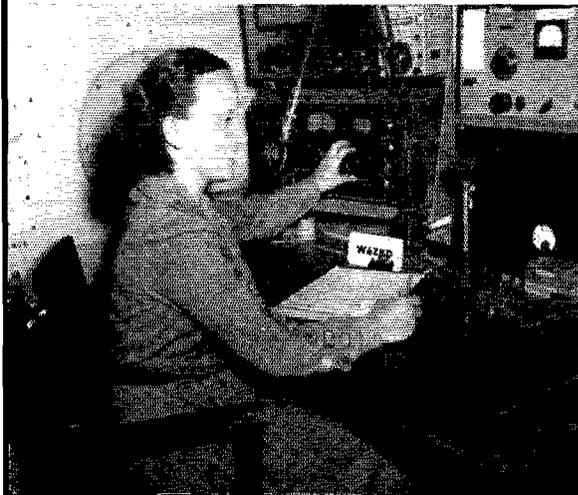
## WPR AWARD RULES

The Puerto Rico Amateur Radio Club issues two types of certificate awards, the WPR-25 and WPR-50, to operators who can prove contacts with the required number of Puerto Rican stations. Applicants must comply with the following rules:

- 1) Basically, to obtain a WPR Certificate of the 25 or 50 type, it is necessary to have confirmation cards from either 25 or 50 bona fide KP4 stations. Cards must be mailed to: Puerto Rico Amateur Radio Club, P.O. Box 73, Hato Rey, Puerto Rico. All cards must be accompanied by a self-addressed and stamped envelope for their return. The Club assumes no responsibility for loss in the mails.
- 2) Specifically, bona fide KP4 stations are defined as follows: (a) all land stations operated from a permanent and fixed QTH in Puerto Rico; (b) all portable or mobile stations operating at any location in Puerto Rico or on any highway within Puerto Rico; (c) amateur stations of the U. S. and Possessions which have been moved to Puerto Rico and have not yet received KP4 calls. Such stations will sign as "portable" after their "W" or other federally-assigned call letters, in accordance with existing FCC rules and regulations.
- 3) Contacts with or by maritime/mobile or aeronautical/mobile stations are not entitled to count as contacts for WPR Certificates.
- 4) Contacts made with bona fide KP4 stations, as defined in paragraph (2) above, may be counted for WPR Certificate, regardless of whether made with fixed, portable or mobile equipment. This gives a possibility of three (3) separate confirmations from the same KP4 station.
- 5) WPR Certificates issued by the Club will normally bear no endorsement for contacts made on any or all bands. However, if a station submits either 25 or 50 confirmations indicating his Puerto Rico contacts were all on any one band, a special endorsement to that effect will be entered on the certificate, if requested.

Girl Scout Betty Shirkey, W6ZKD, is the San Joaquin Valley Section's youngest amateur. Just turned 15, this young lady received her ticket when she was only 12. Single-handed, she set up a ham station that was a notable success at a Boy Scout Jamboree in Fresno last spring. W6ZKD is RCC, OBS, and operates 7 or 28 Mc.

QST for



# May V.H.F. QSO Party Results

**T**HE May V.H.F. QSO Party brought out a goodly number of amateurs to try their hand at making as many contacts as possible on the frequencies above 50 Mc. Unfavored by any special breaks in propagation conditions, the v.h.f. gang nevertheless produced a fine batch of high scores and indicated their enjoyment of the affair. A detailed report on band conditions that prevailed has already been presented by W1HDQ in "The World Above 50 Mc."

As in the January V.H.F. Sweepstakes, certificate awards were offered to the high scorer in each ARRL section. A total of 162 participants sent logs to Hq. and 34 certificates are being awarded, one to the high scorer in each section from which reports were received.

The contestant submitting the highest score for the party was W1CTW, Arlington, Mass., who had 126 contacts and 14 sections for a grand total of 2044 points — no mean achievement for a station operated exclusively on v.h.f.! Cal used 50, 144 and 220 Mc. Runner-up was W1OOP/1, operated from Hogback Mountain in Vermont by W1OOP and W1OUN; a score of 1998 points was obtained through 103 QSOs with 18 sections. The boys took along an imposing collection of equipment (described by W1HDQ in July QST) and provided many participants with their first opportunity to work Vermont on 50, 144 or 220 Mc. Fourteen other contestants scored more than 700 points: W1PEA 1632, W2PWP 1440, W1IQZ 1352, W2OHE 1001, W2IQQ/2 963, W2WAI 959, W9PIV 920, W2QVH 888, W1PBB 884, W1HIL 820, W2SYW 790, W1DHX 783, W2COT 730, W2DZA 715.

Greatest number of contacts in the party was made by W2OHE — 143. Others leading in this category were W2WAI 137, W1CTW 126, W1PIV 115, W2IQQ/2 107, W1IQZ 104, W1OOP/1 103, W1PEA 102, W1JSM 93, W2WPH 91, W2PWP 90, W6VZA 88, W1DHX 87, W1HIL 82, W2SYW 79, W1BAQ 78, W1AQE 76.

The Vermont expedition, W1OOP/1, took the honors for working the greatest number of sections — 18. In the ten-or-more-sections-worked class we find the following: W1PEA W2PWP 16, W2AMJ 15, W1CTW 14, W1IQZ W1PBB W8SFG 13, W1HDQ W2QVH 12, W2DZA W2RGV 11, W1HIL W2COT W2RLV W2SYW 10. It is interesting to note that ten entrants topped the sections-worked record of the V.H.F. SS, in spite of the seemingly smaller degree of activity.

As we go to press, the September V.H.F. Party has just finished. See "The World Above 50 Mc." this issue for early reports on that activity. Mean-

while, get ready to take part in the Second Annual V.H.F. Sweepstakes, scheduled in the contest calendar for January 15th.

## SCORES

(Scores are grouped by divisions and sections. . . . The operator of the station first-listed in each section is winner for that category. . . . The number of stations and number of sections worked by each participant are given following the score. . . . Letters indicate band or bands used: A for 50, B for 144 and C for 235 Mc.)

### ATLANTIC DIVISION

<i>E. Pennsylvania</i>	
W3MZU	392- 7- 58-B
W3NSI	246- 6- 41-A-B
<i>Md.-Del.-D. C.</i>	
W3GKP	196- 7- 28-A-B
W3HB	140- 5- 28-B
W3LZZ	100- 4- 25-B
W3MIR	10- 2- 5-B
<i>W. Pennsylvania</i>	
W3RUE	264- 6- 44-A-B
W3KWH	120- 3- 40-B-C
W3CJF	40- 2- 20-B
W3LJQ/3	18- 2- 9-B
W3QCQ	12- 2- 6-B
<i>Southern New Jersey</i>	
W2PWP	1440-16- 90-A-B
W2QVH	888-12- 74-A-B
W2BZX	278- 8- 72-B
W2RGV	242-11- 22-A
W2BAY	40- 5- 8-A-B
W2WI	6- 2- 3-B
<i>W. New York</i>	
W2RLV	170- 10- 17-A
W2GWW	20- 3- 7-B
W2TJB	14- 2- 7-B
W2RUY	14- 2- 7-B

### CENTRAL DIVISION

<i>Illinois</i>	
W9PK	364- 7- 52-A-B
W9OBW	200- 4- 50-A-B
W9KCV	48- 2- 24-B
W9AKM	45- 3- 15-B
W9CQJ	38- 2- 19-B
<i>Indiana</i>	
W9UIA	24- 3- 4-A-C
W9MBL	10- 2- 5-A
<i>Wisconsin</i>	
W9NJT	56- 4- 14-A

### DAKOTA DIVISION

<i>Minnesota</i>	
W9KPK	18- 2- 9-A-B

### GREAT LAKES DIVISION

<i>Kentucky</i>	
W4FBJ	32- 4- 8-A-B
<i>Michigan</i>	
W8MVG	117- 9- 13-A
W8NNT	24- 3- 8-A
<i>Ohio</i>	
W8SFG	637-13- 49-A-B
W8WSE	190- 5- 38-A-B
W8NQD	126- 7- 19-A-B

### HUDSON DIVISION

<i>E. New York</i>	
W2PCQ	45- 3- 15-B

<i>N. Y. C. &amp; L. I.</i>	
W2OHE	1001- 7-143-B
W2SYW	790-10- 79-A-B
W2WPH	455- 5- 91-B
W2AOD	420- 6- 70-B
W2TWJ	325- 5- 65-B
W2BNX	305- 5- 61-B
W2AIQ	225- 5- 45-B
W2AUF	220- 5- 44-B
W2WLS	155- 5- 31-B
W2CET	112- 4- 28-B
W2YJB	78- 3- 26-B
W8YED/2	78- 3- 26-B
W2ATI	63- 3- 21-B
W2KU	54- 3- 18-B
W2FNI	42- 3- 14-B
W2WOZ	42- 2- 21-B
W2HNJ	40- 2- 20-B
W2ACY	39- 3- 13-B
W2AWH	39- 3- 13-B
W2DOG	39- 3- 10-B
W2WLI	26- 2- 13-B
<i>N. New Jersey</i>	
W2IQQ/2	963- 9-107-A-B
W2WAI	959- 7-137-B
W2COT	730-10- 73-A-B
W2DZA	715-11- 49-A-B-C
W2AMJ	585-15- 39-A
W2VFN	330- 5- 68-B
W2CBB	308- 7- 44-B
W2OOC	252- 7- 36-B
W1QLJ/2	250- 5- 50-B
W2YLS	228- 6- 38-B
W2UWN	160- 4- 40-B

### NEW ENGLAND DIVISION

<i>Connecticut</i>	
W1PEA	1632-16-102-A-B
W1PBB	884-13- 64-A-B-C
W1HDQ	578-12- 48-A-C
W1IYO	245- 7- 31-B-C
W1CGY	180- 9- 20-A
W1BDI	114- 6- 14-A-B
W1MRP	56- 4- 14-A
W1AW	21- 3- 7-A-B
<i>Maine</i>	
W1EIO	176- 8- 22-A-B
<i>E. Massachusetts</i>	
W1CTW	2044-14-126-A-B-C
W1PIV	920- 8-115-B
W1HIL	820-10- 82-A-B
W1DHX	789- 9- 87-A-B
W1JSM	558- 6- 93-B
W1AQE	380- 5- 76-B
W1DJ	342- 9- 38-A-B
W1IHL/1	325- 5- 65-B
W1JYC	325- 5- 65-B
W1BAQ	312- 4- 78-B
W1NWL	240- 8- 30-A-B

(Continued on page 118)



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

### ATLANTIC DIVISION

**EASTERN PENNSYLVANIA** — SCM, Jerry Mathis, W3BES — ED is organizing a mobile emergency net on 28,800 kc. So far the participants are: EM, JOO, DOE, MQU, AJF, IU, and ED. NHI is a new ORS and has been handling a fine lot of traffic. QEW has discarded his flea power and now has 150 watts. The Schuylkill ARC held its second annual picnic July 15th with members, XYs, and jr. operators present. The E. Pa. Net is on full time schedule, 5:30 P.M. EST, 3785 kc., Monday through Friday. CAU, section OO, reports a marked improvement in off-frequency operation. ISE, Emergency Coordinator for Philadelphia and Delaware Counties, has given the AEC a new boost and has signed many new members. With regret we announce that AVK, a well-known Williamsport ham, was killed in a truck accident August 25th. The Havertown Emergency Net, consisting of one mobile and seventeen fixed stations, meets every Monday at 8 P.M. EST on 146.8 Mc. The Net soon will have up to twelve mobile units working. In order to give all members experience the NCS is rotated each week. Present members are: DQE, EQ, LAZ, MYP, NAG, AJV, KDS, FTI, IPK, DSL, FBF, LNQ, EOZ, HUV, KAB, CQF, and AWT. The Philadelphia High Frequency Club was host to a group of Philadelphia Area representatives of affiliated radio clubs who are planning to operate a booth in the Commercial Museum during a hobby show scheduled for the middle of November. DZ will be in charge of traffic and is lining up possible outlets for same. The AERL AEC will be well represented. Anyone wishing to assist, please contact QV. IAXA has been assigned the call, 30RA. KT has one of the new Clapp VFOs which sounds like crystal. He thinks he has found the secret in keeping his u.h.f. resonator beams together. The expansion of the aluminum tubing breaks the bolts in half so he tapped the tubing for a screw entering from each side, thereby allowing the bolts to expand with the tubing. Then with tape and shellac the job is ready for the wintry blasts. Traffic: W3NHI 172, DZ 24, KFA 16, VMF 8, OML 6, ELI 4, CAU 2, DUU 1.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA** — SCM, Eppa W. Darne, W3BWT — The Baltimore Radio Communication Society members are to be congratulated on their first Annual Hamfest-Picnic held at Triton Beach, Md., August 15th. An ideal location, a complete 28-Mc. rig on the air, games, prizes, and refreshments were among the features, making it a swell time for all who attended from Baltimore and Washington. Those who did not attend surely missed a very swell affair. The Club plans to have many interesting speakers, technical and educational films, for the coming season. Also, a code class will be started on 28 Mc. In October, The Mobile Radio Club of Washington held its monthly drill on 28 Mc. on August 17th. The entire Washington area was covered by dispatching units through three mobile control stations. The Club's present membership is nearing 50. JZY vacationed with a trip through the Midwest. Andy also is rebuilding his rigs. MWD is on 7 Mc. for traffic work. CJS continues to get out well with his "Droopy S" indoor antenna, "wrapped around the room." EYX visited ex-MNA, now WIRJY, who sends regards to all. MCD made WAS with 45 watts on 7 Mc. OSM is the new call of Captain W. V. Davis, of Patuxent River, Md., a real old-timer who has returned to the air after being off for thirty years. Pending the completion of a big rig, he gets out well using small "surplus" rigs on 3.5 and 7 Mc. EWH has his old call back and now is CDL. EFZ carried along a 12-watt rig on a recent fishing trip. He made contacts with the rig and caught fish also. "Scotty" is using a doublet antenna again on 14-Mc. c.w. IJV is up to 130 countries worked with his 60-watt rig. Traffic: W3LVJ 11, ADO 6, AKB 5, BWT 3, JHW 1.

**SOUTHERN NEW JERSEY** — SCM, G. W. (Bill) Tunnell, W2OXX — The untimely death of SAK is a great loss to the section. SXK turned in a nice traffic total in spite of the hot weather. ZI advises that the 3900-kc. 'phone net

kept going throughout the summer. Good work, that means we had emergency coverage. VMX snagged his 46th state and has a new modulator under construction. UKS is mounting a lot of new equipment from mobile gear to monitors. YAO and VUM are about to fire up their new 28-Mc. beams. BLR is experimenting with long wire antennas. The South Jersey Radio Assn. and the Cumberland Radio Club had PB transmitter hunts and outings. Our Director, QV, reported the results of the recent ARRI Board Meeting of the Delaware Valley Radio Assn. and the South Jersey Radio Assn. PVA is in the Lakeland General Hospital and visitors are permitted. PZK has erected a real "eye-opener" tower. ASG snagged Ankara on 14-Mc. 'phone. PWM obtained his former call, DAJ. Last summer PAU went to Maine and worked the gang down here, but this year he stayed home and worked Maine, all on 144 Mc., of course. QGS worked 3GNA and 6VQB/3 across the river on 420 Mc. Traffic: W2SXX 74, ORS 43, HAZ 4, ZI 4.

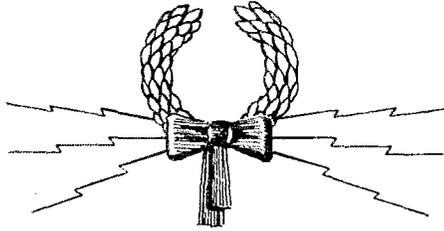
**WESTERN NEW YORK** — SCM, Harding A. Clark, W2PGT — SEC: SJV, RM: FCG. The 28-Mc. gang has been going strong on groundwave DX contacts — 50- to 75-mile contacts are common. DPS, WME, and FEB now hold the record with several contacts over a distance of 175 miles. ABV has replaced the pigeon trap with new four-element beam. UTF operates in Eastern Shuttle Traffic Net. QHH has 120 endorsement on DXCC Certificate. UYG now is on 28-Mc. mobile. WGL is running 16 watts grid-modulated on 3.85 Mc. TDR, TYR, VUF, WUW, WQI, and QFG recently acquired Class A tickets. The Utica 144-Mc. gang meets each Sunday at 9 p.m. QJN is with WRUN. With the help of WPJ, FBA, CNT, and TEX. TXB and his XYL, WOW, now have a dual 14- and 28-Mc. beam. WOW operates 28 Mc. and TXB operates 14-Mc. 'phone and c.w. (At the same time?) With the recent change in FCC ruling there seems to be a tremendous increase in portable and mobile operation. Well, gang, the summer season is over so let's have those missing reports and news items. Traffic: (July) QHH 10, (August) QHH 39, UYG 11, UTF 9.

**WESTERN PENNSYLVANIA** — Ernest J. Hlinsky, W3KWL — Highlighting the activities for August was the tremendous trend toward v.h.f. and the consistency of the gang taking advantage of the temperature inversion on 144 Mc. With RUE leading the way up came the Steel City Radio Club with its KWH call to make dents on "ye ole 2 meters." It's fellows like RUE, KWH, OMY, TVM, NKM, and PGV, who find friendly get-togethers, who are the making of a hot 144-Mc. band. OMY was so proud to have his first 144-Mc. QSO with your SCM, that he has promised your correspondent half of the mountain that sits in the northern portion of his house. Let's see the 144-Mc. DX go sky high. The Amateur Transmitters Association has changed its club QTH from the Lecture Hall at Buhl Planetarium to the basement of the same building. Present officers are NUG, pres.; SWX, vice-pres.; along with AER, UST, and PY; and UHN, secy. Another swell club going strong is the Fort Necessity Amateur Assn. This club is busy getting the club house under way. In this gang LAC is on 14-Mc. mobile. SGA is working on his 3.85-Mc. mobile rig. RUK is doctoring his 28-Mc. rig. UUZ, club secretary, says his club meets on the first and third Wednesdays of each month and the Pittsburgh gang is invited to attend. LSS sends in dope on LSP, who has new 805s modulators and new p.p. 810 final. LIW is getting ready for traffic nets. AER rebuilt receiver and now has Dual Conversion; he also is toying with t.v. Up in Erie NCJ is battling with 14-Mc. DX working IIADW, VP5AO, and VP4TZ. In Mercer County, NCD played host to some of the gang at a corn roast. LIF spends most of his time in golf competition and already is champion of Country Club. LBZ gave up QRMing the BCI and 3.85-Mc. 'phone to monkey around with t.v. OAJ has new QTH in Masury, and finds 144 Mc. to his liking. KQA still is hoping to get his 32-element beam on 144 Mc. perking. The Western Pennsylvania ORS Traffic Net will resume its activities on Sept. 27th so let's go, gang. Here's your chance for some honest-to-goodness traffic handling. Traffic: W3NCJ 83, AER 10, LSS 5.

### CENTRAL DIVISION

**ILLINOIS** — SCM, Wesley E. Marriner, W9AND — Net frequencies: c. w. — 3765 kc. 'Phone — 3940 kc. Chief RM: EVJ. Central RM: SXL. Southern RM: JTX. PAM: UQT. SECs: FIN and EWH. On Aug. 29th delegates from downtown radio amateur clubs met at Decatur and formed the Illinois Council of Amateur Radio Clubs, an organization to coordinate the efforts of all radio amateur clubs in Illinois. CRR, an old-timer at Genesee, has been having his

(Continued on page 78)



KENNETH BRYANT WARNER, W1EH

*with deepest respect  
to the memory of  
a tireless, devoted leader  
in the advancement of  
amateur radio.*

**NATIONAL COMPANY, Inc.**  
MALDEN, MASSACHUSETTS

troubles. Termites chewed up a portion of his house before they were discovered and now are hard at work on his antenna poles. Of course Herb is working on the termites, too. SYZ now has an FS-135-C 100-ke. frequency standard on his HQ-129X receiver. ACU rebuilt during the summer and now has a 100TH in 6-ft. parmetal cabinet with 250 watts input, all bands, and new folded dipole on 3.85-Mc. phone. BUK doubled the power to 400 watts. BRX is collecting steel for new tower and 14-Mc. beam. ZPC got his Class A license. He also spent a day with SYZ. EBX says "Traffic is picking up here — looking for daily schedules." CMC received both WAS and WAC Certificates this month. JO is at new QTH in Lombard. YTV has been painting his home. BOV, EKK, BDX, and IRA, of West Frankfort, and DVI, of Zeigler, got together and are working on an emergency set-up for Franklin County. IRA has been appointed EC for Franklin Co. BRD intends to get back into 3.5-Mc. traffic work soon and plans DX tests with ground plane on 7 Mc. The wind took the antenna at HNE. He would like to arrange a schedule with someone on 224 Mc. CWH and BSH, at Mt. Prospect, have converted two BC-788s and are experimenting with them on the 420-Mc. band. They are working on some multi-element beams. Listen for them on week days on 420 Mc. at 6 p.m. CDST. EYF is new in Dixon. And now for the ARRL National Convention at Milwaukee, Wis. Your SCM was there and also former Indiana SCM, SWH. Our old friend, John Huntoon, ex-KJY, from ARRL, was there. Had lunch with JTX from down East St. Louis way. DJG and the boys from Egyptian Radio Club were there. ERU and HGQ also were present. Some of those Illinois hams attending were: QUV and QYW, of Quad City Area; GNU, GBT, AHV, AAU, DEH, and EYF, of Rock River Radio Club; PRV and UIJ, of Rockford; NN, TO, HQH, AA, IBC, ZPC, BUK, CMC, GA, and EDW, of the Chicago Area; ZRB, MUD, LIP, QLZ, C'UH, TZQ, and others. KGBAL, recently of Guam, was there as was J2AAK, recently of Totsuka, Japan. Joe, as W9CMC, is now on the air from Maywood with push pull 100THs on 14-Mc. e. w. and 28-Mc. phone. He will be glad to QSL any one missed. Write to Joe Seaccia, jr., 902 So. 3rd Ave., Maywood, Ill. AHV purchased a new Globe King 275-watt rig at the Convention and had a rough time getting it to the car. BPU had a nice vacation operating portable in Colorado, Nebraska, Iowa, New Mexico, Texas, Oklahoma, and Missouri. He visited WVGs in Denver and ex-9MIN, now 0MIN, and W5OMK were visitors in Bloomington. MUD is working on new 28-Mc. four-element beam. He calls it a hybrid. The next Illinois report will be my last, fellows. I am taking a rest from the SCM duties for awhile. I want to thank all of you for your splendid cooperation, 73 and good operating. Traffic: W9EBX 88, SYZ 41, CTZ 34, BRD 13, ASN 11, DUA 11, ZPC 9, BUK 7, CMC 7, AQH 6, HNE 2.

INDIANA — SCM, Charles H. Conway, W9FSG — DKV leads the section in traffic this month, with 37 for a total. Pete operated from Winona Lake, Indiana, for 10 days during the month. HUV snagged a VP6 for his 101st country. UKT moved to Kokomo, near the loudest power leak in town. He has a new frequency standard going, so pay heed. TT switched from 3.5 Mc. to Calvert's, the QRN was that bad. BCJ is marker for QIN. Zero on him and join in. MPL rebuilt for 50.043 and 144.45 Mc. UJA has his APS-13 going on 430 Mc. (he hopes). Ralph plans on doing a bit of low-frequency work on 28 Mc. this winter. DOE has 18 watts on 144 Mc. HKJ visited Headquarters, and a number of his rag-chewing friends during his vacation. The Evansville Club is repeating its QSL Contest of last year. The gang is out to stop DGA, last year's winner. Traffic: W9DKV 37, BCJ 22, KTX 13, NH 2.

WISCONSIN — SCM, Reno W. Guetsch, W9RQM — The Wisconsin State Net (e. w.) meets at 6:30 p.m. Mon-Fri., 3775 ke. The Badger Emergency Net (phone) meets at 6:00 p.m. daily, 3950 ke. You are invited to participate. YCV is still looking for a place to live that will permit him to put a rig on the air. The FLARC had a picnic at Blue Mounds, Aug. 15. BAP now is mobile. UFX has a new Hudson and is installing mobile rig in it. KCY now is 50VE, in Texas, where he is attending college. The Madison Club is planning a WAS Contest for 7- and 14-Mc. e. w. HZS is planning on mobile operation. ERW is a new call at Eau Claire. In two months he has worked 37 states. ZL, CM, and six VE districts on 7 Mc, with 90 watts. SZB has renewed his ORS appointment and is active on both the e. w. and phone nets. FZC and the Wausau EC made plans for the National Emergency Test. LZU is a busy man these days with SEC duties, new job at b. c. station, MRAC booth at Wisconsin Centennial, ARRL Convention, and marriage plans! The Milwaukee AEC operated 144-Mc. year at Soap Box Derby and car races at the State Fair. AFT has 125 watts on 28.54 Mc. ESJ keeps busy with the BEN, JBF and RQM are now mobile and initiated the equipment at the National Convention. New calls at Wausau are FAM and FCF. BQM operates portable with a Mark II in the car. DJV, formerly 20AA, now resides in Madison and is interested in traffic operating. ESV has been busy this summer moving b. c. station to new location and adding I. m. service. A new four-element beam hovers over HEE's shack. Active stations are desired for appointment as ORS, OPS, OBS, OO, and OES. Write for further details on the appointment which fits your operating trends. Traffic:

W9ESJ 139, LFK 67, IQW 26, CBE 25, CWZ 20, SIZ 19, DND 12, RQM 11.

## DAKOTA DIVISION

NORTH DAKOTA — SCM, Paul M. Bossoletti, W0GZD — AJU, of St. Louis, visited the gang in Fork. HIV has been transferred from UND to the AC at Fargo. ELX is building 814 rig between classes at U. Both North Dakota nets meet every Mon., Wed., and Fri. at 8:30 p.m. CST; East No. Dak. Net on 3525 kc. and West No. Dak. Net on 3550 kc. OEL and ZCM are RMs, respectively. Alternates and assistant NCS are CGM and SSW. JXC is going on 3.85-Mc. phone. VAZ put up a delta-fed 3.5-Mc. antenna. ILT plans on another heavy 28-Mc. season. HKM kicked up the power. Ex-LYH was back visiting in the State recently. HSM has 304TL and two-element beam on 14 Mc. RRW is busy getting up new antennas. IZA operated portable while in Aneta. HDD is reactivating for the winter on 3.5 Mc. PST is building Chinese Interpreting modulator and receiver adapter. YRD's doughnut business is so good he has temporarily suspended hamming. Blanks are available for application for all official appointments.

SOUTH DAKOTA — SCM, J. S. Fosberg, W0NGM — The Huron Amateur Radio Club, with the Naval Reserve, has started code and theory classes with a group of 14. A new call, LMP, will be heard from Bridgewater. The Sioux Falls Club had a fine meeting with WIBDI. Several attended from surrounding towns. USI is going back in the Army. This is a bad loss on 50 Mc. for South Dakota. The following attended the National Convention at Milwaukee: RWE, PRZ, QVY, and NGM. All had a good time and benefited by it. GQH is building a home at Selby and the plans call for plenty of space for a ham shack. EOJ will soon be back on the air. GCP wants new stations on the net and more ORS applications. Be sure to send in your application for EC appointment or AEC membership and be on the air for the fall tests.

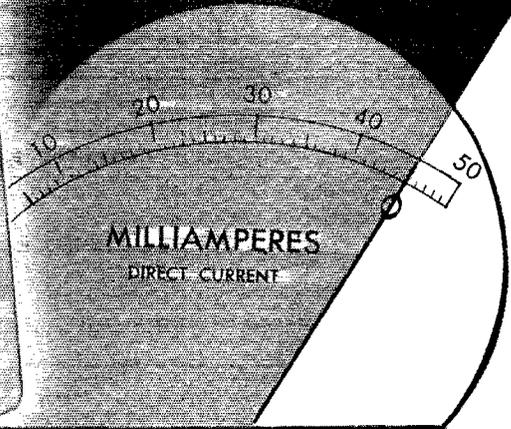
MINNESOTA — SCM, Walter G. Hasskamp, W0CWB — Biggest news of the month comes from KPQ, who gives us the following dope on new 144-Mc. "DX." Has anyone topped these records? On Aug. 19th HXY, of St. Cloud, worked 9TKL, Waukegan, Ill., and 9BBU, Elgin, Ill. Distance 380 miles! On Aug. 22nd KPQ, of Robbinsdale, worked 9TKL and JHS, of Champlain, worked 9JVC, at La Salle, Ill., and ZHB, at Zeigler, Ill. All these contacts were over distances of 320 to 340 miles. JIL, of Plainfield, operated portable on 144 Mc. from Backus and worked the St. Cloud gang, KPQ and JHS. HXY and KPQ have each worked three states on 144 Mc.; Minnesota, South Dakota, and Illinois for HXY, while KPQ has Minnesota, Wisconsin, and Illinois to his credit. The Arrowhead Amateurs had a picnic with EJP's TBS-50 on the air. NRV has shutterbug fever so got himself a 5-inch scope to look at when modulating. HVQ and JCL are new hams in Duluth. HZQ has BC-604 pushing a pair of 807s u.f.m. on 27 Mc. and says "no more BCL." KAMP has a new Stancor kit on the air, 125 watts to 5514. EG is doing a lot of comparison work on frequency standard and components. DSB is constructing an electron tube keyer in hopes it will rectify those clicks in his kilowatt. The Minneapolis and St. Paul clubs had an FB picnic and get-together. Besides the "return" softball game, a fast emergency set-up of club equipment was on the air as DBC in two hours and 30 minutes. That isn't bad considering that the mobile jobs at the picnic had to be dispatched to pick up the emergency equipment which was planted at different locations throughout the city. RQT keeps schedules on 7 Mc. with YPX, ex-9IBJ. IYB's new QTH is Austin. DEI has a new Collins 75A receiver. RHT has an FB airborne mobile on 3.85 Mc. Anyone else airborne in the Northwest? He also offers the airborne mobile facilities to MSN in event of emergency. ZAD is moving to Minneapolis. JIF and CWB visited BGY. Don't know who convinced me, but your SCM now is YFO using a BC-606A. Have you forgotten that MSN, phone and e. w., is back on regular schedule? Let's hear you report in! Traffic: W0RJF 47, DSE 8.

## DELTA DIVISION

LOUISIANA — SCM, W. J. Wilkinson, jr., W5VT — LCEW says he has sent in 110 QSLs for DXCC recognition. Had a nice letter from EMI, who was all fixed for the little blow in NOLA last week. KYK has erected a 2-section 8JK beam and likes it. FB on 28 Mc. JWI has a complete emergency set-up for home and portable. FMO recently was appointed OPS. There are lots of fellows scattered over the section who should have this appointment, especially those on our nets (Delta 75 and Pelican). NBK has been having "bug" trouble. LUT, one of the duo responsible for the operation of CT2XA in the Azores for a spell, writes that he will be back in Loggy Bayou soon. YU, Tulane University Radio Club, has big plans for the coming semester. LDH says prospects are great for the most successful club ever. KTEF, as SEC, and CEW, as PAM, are in there outfitting and doing a good job. We are in need of an RM for the section and several areas are without an EC. IUW has been piling up some swell scores in the CD QSO Parties. Every-

(Continued on page 80)

# GRID MILS tell the story!



On 10 and 20 fone...  
PR's put out more  
**DRIVING POWER!**

On the higher frequency fone bands DRIVE is the problem! Plenty of grid mils to the final means top efficiency... full modulation capability... longer life for the big bottles... more watts in the antenna. Drive begins with your crystal stage! That's why rugged PR Precision Crystals are designed to deliver high power output under gruelling amateur conditions... negligible drift

over wide temperature range... amazing activity... sealed against contamination and moisture... accurately calibrated. Yes, low cost PRs deliver MORE POWER! Available from your jobber for all bands, including ten and eleven! Every crystal unconditionally guaranteed! — Manufactured by PETERSEN RADIO CO., INC., 2800 WEST BROADWAY, COUNCIL BLUFFS, IOWA. (Telephone 2760.)

**PR** Precision CRYSTALS

SINCE 1934



10 METERS  
PR Type Z-5.

Harmonic oscillator. Ideal for "straight through" mobile operation. High activity. Heavy drive without damage in our special circuit ..... \$5.00

20 METERS  
PR Type Z-3.

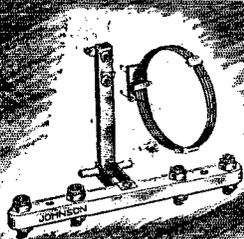
Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. High power output. Just as stable as fundamental oscillators ..... \$3.75

40 & 80 METERS  
PR Type Z-2.

Rugged, low drift fundamental oscillators. High activity and power output with maximum crystal currents. Accurate calibration... \$2.75

# Did You Know-

**THE NEW  
JOHNSON PLUG-IN  
LINK ASSEMBLY FITS ALL  
CONVENTIONAL INDUCTORS?**



**MATCH LINK TO LINE  
FOR GREATER EFFICIENCY**

Add new versatility and efficiency to your present RF amplifier with the new JOHNSON Plug-In Swinging Link Assembly. With it you can eliminate inefficient compromise — when attempting to match an inductor to any transmission line regardless of frequency or impedance with but a single pick-up link. The new JOHNSON Plug-In Link Assembly permits instant impedance matching — not only with JOHNSON inductors but with all conventional, present-day inductor assemblies. Simply plug in a link with the necessary turns to match your line — whether impedance is as low as 50 ohms or as high as 600.

No pruning or adding of turns is necessary. With the correct JOHNSON Plug-In Link, tuning networks are unnecessary in most applications.

**LOADED WITH FACTS**



The new JOHNSON "Air Wound Ham Inductor Catalog" contains information and tables which will enable you to select the correct link or links for your individual application. The booklet is a virtual storehouse of information on Q considerations, tube-inductor matching, link-line impedance matching, antenna coupling, etc. Get it at your dealer or write JOHNSON for a copy of this important reference manual today. It's yours for the asking!



**JOHNSON**

*a famous name in Radio*

**E. F. JOHNSON CO. WASECA, MINN.**

one holding an appointment should get in on the first. KTE is about to get straightened out after moving his QTH so look for him on the Rebel Net. BSR, the Delta Division Director, requests a letter from you telling him what you think of things in general. CNG has joined the AEC. VT is getting set for a big fall and winter spree on 3.5, 7, and 14 Mc. Let's have a card or letter giving us a look-in on what you are doing or expect to do. "Be sure. Be safe. Switch to Safety." Traffic: W5FMO 8, VT 7, N2K 3.

TENNESSEE — SCM, Ward Buchanan, W4QT — The c.w. net has been reactivated and meets Monday through Friday at 6:30 p.m. CST on 8737 kc. F. E. is RM and other members are AFI, BAQ, BBT, BQK, CVM, CZL, DLY, ETN, FX, GCS, GILL, HOJ, JIH, and LCB. HK and LQE are getting serious about 144 Mc. and want schedules for tests and QSOs with other 144-Mc. stations in the section. MEB has an 829 on 28 and 50 Mc. NGY is working 28 Mc. and building a rig for 50 Mc. LHB, AZD, and KYB are working 14-Mc. phone. KYB lacks only four confirmations for DXCC on 14-Mc. phone. EP is convalescing and expects to resume activity on 14-Mc. phone. DPI has established new QTH in Knoxville. MWL works 28 Mc. from new shack. The Kingsport gang threw a birthday party on the air for KYI, YL in North Carolina. HYG has 750-watt rig ready to go. BBL has 304TLs and beams on 14- and 28-Mc. phone. KST and KUW are building equipment for 28-Mc. mobile. PTF is working 4- and 14-Mc. phone and accumulating equipment for the Oak Ridge AEC program. KMH is active on 4-Mc. phone and planning new rig for c.w. The Oak Ridge Club meets the first and third Tuesdays. Average phone net attendance was 18 for the month of August. CVM built a successful automatic electronic key. CZL has completed final for kw. rig and other units are under construction. PT, handled storm traffic. Traffic: W4CZL 27, EBQ 11.

**GREAT LAKES DIVISION**

KENTUCKY — SCM, W. C. Aleock, W4CDA — Under the leadership of BEW and MSC, Ashland has an AEC group with fifteen members. They have formed an emergency net on 7160 and 29,600 kc. Additional stations are welcome. MRT has 7-Mc. WAS, MZE is new call in Ashland. F. E. Handy was guest of honor at ARTS meeting and gave the boys plenty to think about. Everyone enjoyed his talk immensely and it is hoped that he will be able to visit Kentucky again soon. ARTS conducted a very successful hidden treasure hunt and has another planned for October. The SCM left the State unexpectedly and W4BAZ is pinch-hitting.

MICHIGAN — SCM, Joseph R. Beljan, jr., W8SCW — SEC: GJH. RMs: NOH, PVB, and UKV. The QMN Net resumed operation Oct. 4th with a fine turnout and all indications point to our best season yet. Have you reported it? If not, put that rig on 3663 kc. and join in on the fun, and at the same time give our State net a boost and better coverage. Three directed nets are held nightly, Monday through Friday. The 5 p.m. Net is 15 w.p.m. or less, the 6 p.m. Net is 15 to 20 w.p.m., while the 7 p.m. Net is 20 w.p.m. and over. GJH is working hard on the State's emergency set-up and if you are not a member of the Emergency Corps now, request application blanks from our SEC, SCM, or your local EC. This year's Sweepstakes promises to be the liveliest yet and many of the gang have been pointing to this event for months. All participants are requested to send me their scores, along with the number of contacts and sections worked, for publication. TNO completed his 250-watt rig. SKQ moved to new QTH. BBJ finally put up that skyhook at his new QTH. QFF continues to do a nice job as OBS. GSJ has a half-kw. on QMN. UUS is taking charge of the 6 p.m. QMN Net until NOH gets settled at his new QTH. TRN makes BPL on deliveries. NKK is rebuilding beam, station control unit, and VFO. ATB and AXP are now Class A and both report into the BR Net. Congrats to the BR and MEN Nets for the fine turnout they enjoyed all summer. MGQ finally put the rig in his car and is working out nicely. OCT worked 28-Mc. mobile while vacationing out West and hooked a TG9. YEY has a new Collins exciter. WZE is having antenna trouble. UGR completed QST-size ten-watt exciter complete with power supply. FTW operated portable at Camp Grayling. FJL, LEC, and UAS are having a private DX Contest between themselves. FJL is leading with 174 countries, followed by UAS with 167, and LEC with 166. All three are DXCC. WSA put up a half-wave for 3.5 Mc. MCV moved to new QTH and will be active on 3.5 and 144 Mc. CMM is going mobile with a Meiburo Silver 701. CJF is looking over the bands with an SP-44 Panadaptor. GNN is DXing on 28 Mc. with 500 watts to a pair of 751s. TRP has a new beam and is looking for DX. CXP proudly twists dials on his new Collins 75-A-1 receiver. FXA has new Collins 32-V-1 transmitter. DBW has a Stancor 150-watt rig on c.w. Traffic: W8TRN 184, UUS 96, UAS 8, CYH 7, DED 6, CYX 5, SCW 5, BLR 3, LHH 3, PLA 1.

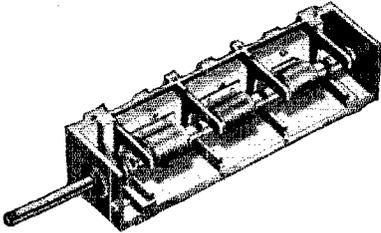
**HUDSON DIVISION**

NEW YORK CITY AND LONG ISLAND — SCM, Charles Ham, jr., W2KDC — Things are getting back to normal for the winter. However, the 144-Mc. gang has

(Continued on page 88)

# MALLORY HAM BULLETIN

## Inductuner\* Wins Acceptance— *Amateurs Find New Uses*



Thousands of television receivers now equipped with the Mallory Inductuner tuning device in their RF circuits, give ample proof of the whole-hearted acceptance this inductance tuning device has had by top-flight television engineers the country over.

In the March 1948 issue of this magazine, the Mallory Inductuner was introduced to the amateur with the announcement of details of a 50 to 240 megacycle converter. The response to this announcement was extremely gratifying and indicated quite conclusively the avid interest the average amateur has in new technical developments in the radio field.

However, we have discovered that the naturally inventive mind of the amateur has not been content with such a "limited" field for Inductuner application. Almost every mail contains requests from amateurs for circuit information and data for incorporating the Inductuner in television signal boosters, signal generators, single dial VFO exciters and many other applications where precise tuning is required.

As an aid to those amateurs who like to design their own equipment, we have available, for the asking, an informative engineering booklet describing in detail the electrical and physical characteristics of the Inductuner. Such items as equivalent electrical circuit, inductance, representative tuning curves, physical dimensions and other interesting bits of information are included. Simply address a letter or postal card to Box 1558, P. R. Mallory & Co., Inc., Indianapolis 6, Indiana, and ask for the Technical Information Booklet on the Inductuner.

\*Registered trademark of P. R. Mallory & Co., Inc. for inductance tuning devices covered by Mallory-Ware patents.

**P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA**

**P. R. MALLORY & CO. Inc.**  
**MALLORY**

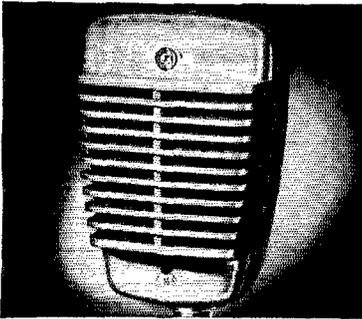
# SHURE

## Proudly Presents

# 2 OUTSTANDING MICROPHONES

## The Sonodyne

NEW MOVING COIL DYNAMIC MICROPHONE



MODEL "51"

1. High output! 52 db below 1 volt per dyne per square centimeter.
2. Multi-Impedance Switch for Low, Medium, or High Impedance.
3. Wide-range Frequency Response; 70 to 9000 c. p. s.
4. Semi-directional Pickup.
5. Functional design for improved Acoustical Performance—beautiful die-cast pearl gray case.
6. Ideal for hams, public address, recording, communications, and similar applications.

## The Versatex

THE NEW VERSATILE CRYSTAL MICROPHONE



MODEL 718A

1. Can be used by itself as a desk stand, on a floor stand, or in your hand.
2. High output: minus 53 db.
3. Specially engineered speech response.
4. Has special moisture-proofed crystal.
5. Heavy plastic case—eliminates shock hazard.
6. Contains R-F filter to prevent crystal burnout.

Crystal Microphones licensed under patents of The Brush Development Company

# SHURE BROTHERS, Inc.

Microphones and Acoustic Devices  
225 W. Huron St., Chicago 10, Illinois  
Cable Address: SHUREMICRO



been very busy. The complete reorganization of the AEC in Nassau is progressing with units being formed locally instead of countywide. New stations on 144 Mc. are UUN, DUS, and MDB. In Suffolk, TPZ, KDN, and GEE are very active on 3.85-Mc. 'phone. BRV is disaster chairman of the North Suffolk R. C. unit. YHP has gone back to school in Indiana. KH6JF/2 is settling down in Sayville. PAA and PTO are on 420 Mc. They are up to 1 1/2 miles two ways and 3 1/2 miles one way. New transmitters are planned and the boys want to contact others on 420 Mc. VHS was on vacation and has returned to build t.v. KV44F/2 finally has antenna. EYS is having difficulty working WAS. Herman has been at it only 15 years. TUK is planning no schedules. Wanna bet? VAF is working on 220 Mc. and dreaming of 420 Mc. RQJ vacationed during August but worked ZLA. NFR received DXCC Certificate. PPT now has Class A license. VSU is regularly on Eastern Shuttle Net. RTZ has been vacationing and visited Headquarters. VOS still is having antenna-loading problems. OUT is willing to help beginners by forming a regional slow speed net. VXI is running 7 watts but works out well on a 50-ft. wire. Traffic: W2OUT 99, VOS 80, RTZ 39, RQJ 8, KDC 6, TUK 6, VXI 6, VAF 6.

**NORTHERN NEW JERSEY** — SCM, Thomas J. Lydon, W2ANW — N. N. J. C.W. net, 3630 kc., daily except Saturday at 7 p.m. 7-Mc. Net, 7070 kc., Mondays, Wednesdays, and Fridays. N. N. J. Net stations held a meeting at the Elizabeth Red Cross Building on Sept. 15th and made plans for a more efficient net. MJC is new ORS and is New Jersey member of the Slow Speed Trunk Line. LBI and EWZ have moved to Northern New Jersey. GFG finally got rid of his chirps with new power supply. He also has new 14-Mc. ground plane antenna. NIY visited RQY, OHV, TF, and GWY on a recent trip to upstate New York. NDL/3 has decided to stay in the Navy and has been assigned new call, 3OPG. LFR handled 1620 messages last season. CWK, operating CBT/2 at Boy Scout Camp, did a nice traffic job. NCY is again rebuilding that half kw. The first meeting of the N.N.J. Mobile Club was held at the home of HIK in Orange with 25 in attendance. GCV is still very much mobile on 144 Mc., despite the completion of a kw. on 14 Mc. KAK, with a 7-Mc. emergency rig, worked the gang back home while on vacation. TWG is having trouble getting tubes for his 28-Mc. rig. EJA and TWG are building a television transmitter. TUA has moved to Florida. LQP now is living in Staten Island. The column this month is exceptionally short as the reports are not coming in. Please send in your report early each month for publication here. Traffic: W2CBT 153, CWK 117, CGG, 101, QW 14, CJX 12, CAH 7.

## MIDWEST DIVISION

**IOWA** — SCM, William G. Davis, W8PP — The Iowa gang regrets the passing of our secretary, K. B. Warner. Ham radio was represented with the 34th Division of the National Guard through ICH, using an SCR-399 and 15-ft. whip. While in encampment at Ft. Riley, Kans., good schedules were kept with the home folks. Operators were HQA and LKK. 9ARE, ex-SCM of Iowa, visited the ham club at Burlington. HKN is back in TLCN. HMM still is high in Iowa for traffic. BZE reports great doings for the 144-Mc. gang. PHA, ETJ, MLO, PGE, and FNT keep S. E. Iowa on the 144-Mc. map. NFM and IFB have nine states and six districts; WGZ has six states and four districts; BZE has six states and three districts; HQA has eight states; and GOK has six states, on 144 Mc. The Cedar Rapids gang has 12 mobile units, all on 29,090 kc. RQN furnished the crystals to make it possible and the boys find they have much better success. They hold regular drills with meeting point announced after they get on the air. The Des Moines Radio Club held a reactivation meeting Sept. 1st and was addressed by F. E. Handy, of Headquarters, and PP. BHO has completed a 15- by 7-ft. trailer and installed kw. rigs on 3.85, 14, and 28 Mc., powered by 3-kw. plant. F. E. Handy visited the Sioux City Ham Club. PP is a grandpa again. There is lots of activity on 3.85-Mc. mobile by the Iowa gang. Lightning took AEF's 3.85-Mc. antenna and part of the equipment. SQQ got that sky wire up. Traffic: W8HMM 688, ICH 37, PP 12, HKN 4, AUL 3.

**KANSAS** — SCM, Alvin B. Unruh, W8AWP — IFR continues to handle traffic on 3.85-Mc. 'phone. NXJ has Class A ticket and new 28-Mc. beam. BNU also has new beam. LYF uses 807 final since lightning got his power transformer. IZJ reports that TLT has Stancoor ST-203A and Gon-Set converter for 28-Mc. mobile rig. OAQ is Official Observer, Class IV. He also renewed ORS Certificate. BPL renewed Class II OO Certificate. PZP moved to Atchison. EPX complains of landlady troubles but hopes to be on soon. PNN has been rebuilding for net, also trying to enlist KXL and OOT for QKS Net operation. MAE handled lots of traffic via Kansas, Missouri, and Illinois 'phone nets. He reports new 3.85-Mc. 'phones ZAT, IOL, and VGB. PAH returned from vacation and is rarin' to go on section Emergency Corps matters. ICE has new 28-Mc. beam, and RQF has new dual 28-50 Mc. three-element job, also ground plane for 144 Mc. Mr. Handy, Communications Manager of ARRL, addressed the Wichita Amateur Radio Club August 26th and was well received. Your SCM recently worked 4IYT, who was formerly 9KCS in the Kansas Net. Andy

(Continued on page 84)

8740

8743

8734

8735

8738

8739

8747

8433

8799

8752

**INTERCOMMUNICATION  
AND SOUND SYSTEM  
CABLES**

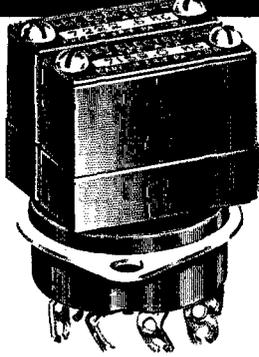
*Every Type for Every Service*

Sold Exclusively Through Recognized Wholesale Distributors

**Belden**  
*Radio* **WIRE**

# "GET THE RIGHT COMBINATION"

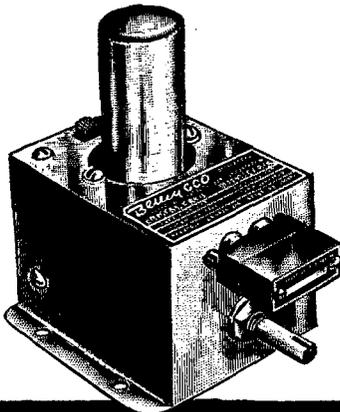
## CRYSTALS



TYPE AX2 high stability, advanced design crystals, plated to insure long term precision and reliability. The first plated crystal for amateur frequencies.

# Bliley

CCO-2A, a completely packaged crystal controlled oscillator for the 2-6-10-11 meter bands, employing Bliley crystals Types AX2 and AX3.



## OSCILLATORS

Ask your Bliley distributor for Bulletin 35

BLILEY ELECTRIC CO. UNION STATION BLDG. ERIE, PA.

sends 73 to all the gang and is looking for the fellows on 14-Mc. c.w. Traffic: W0MAE 23, IFR 4, AWP 1.

MISSOURI—SCM, Ben H. Wendt, W0ICD—Activity in the section has been very slow for the past month. The end of vacations and cooler weather should bring renewed vigor to amateurs and cause this column to grow. 23-Mc. ground-wave chain nets are springing up in several points of the district. Traffic can be handled over great distances by a system of relay stations. This proves to be good AEC practice. KYF and JVE are working W3s, W8s, and W9s on 144 Mc. ZIS has a 32-element rotary beam 70 ft. high on 144 Mc. and reports hauls of up to 500 miles. He hopes to be a record-smasher soon. ARH has contacts with KZs, LUs, G5s, GC4s, KP4, CR7, CX1, ZS6, VP8, ZL1, VK2, G8, G3, HH3, VK3, YV5, HC1, VP6, and KZ5 on 28 Mc. using a pair of 1625s at 125 watts. An AEC was organized at St. Joseph with 9 charter members. IAC was appointed EC. IAC has 1 kw. on 14 Mc., 300 watts on 3.85 Mc., and an emergency rig also. KVS is a new 7-Mc. c.w. ham at Poplar Bluff. OMG is the proud owner of a new Collins 75-A receiver. OUD is installing a glass door in front of the rack to keep from hiding the equipment. BMQ, ex-5BMI, is pounding the brass from Lees Summit. INK is conversing with Western Union regarding emergency work. GEP and CKS are attending M. U. GNX is going strong with a new 140-wattter on 28 Mc. WAP is handling 7-Mc. traffic on "NFN" and would like a Colorado outlet. WAP is building VFO for 3.5 and 7 Mc. PTG, BKA, and ULM and his XYL were Poplar Bluff visitors. Traffic: W0WAP 38, GEP 31, DEA 7, QMF 5, OMG 4.

NEBRASKA—SCM, William T. Gemmer, W0RQK—The Emergency Corps is looking for more members. "Be Prepared" and join the EC. KPO is building a bandswitch rig winding up with 812s at a cool 300 to 400 watts. UZF will be at M.L.T. this winter with a 28-Mc. rig. BVR is attending Nebraska U. BRO followed the wheat harvest with a portable rig. LZO made WAC and WAS on 14 and 28 Mc. and is crowding 60 countries. LJO has Command sets in his car for 3.5, 3.85, and 7 Mc. The Hastings Radio Club was in operation on Field Day with rigs on 3.5, 3.85, and 14 Mc. ILS and WWV were there with a Navy TCS and 110-volt a.c. generator. Regular meetings of the HRC are held the 1st and 3rd Wednesdays of each month. EDD is on 3.85 Mc. with a T55 running at 150 watts. FAM has forsaken brasspounding for carbon-pushing with a pair of 852s, grid modulated. EWO has a new three-element beam on 28 Mc. AZQ is operating MM on the S. S. *Kenneth McKay* and will be looking for Nebraska contacts on 28 Mc. APV has a BC-459A driving 812s modulated by T24Os. SHH changed 28-Mc. beam to wide spacing. GPE has a new h. f. 14- and 28-Mc. antenna and mill for copying. LRD and KOK are new hams in Omaha. FQB put up 1/2-wave vertical on 7 Mc. The Ak-Sar-Ben Radio Club will have a 25-ft. booth at Midwest Electrical Exposition in Omaha. FHA is using a 3.5-Mc. doublet on 3.5 and 7 Mc. GPX, EXP, OBU, and B1W have been working their emergency rigs regularly on Sundays. CBH and OBU have Class A tickets. Traffic: W0JLO 3.

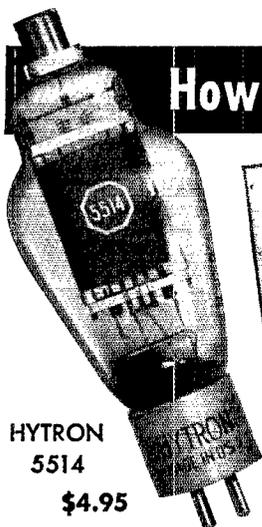
### NEW ENGLAND DIVISION

CONNECTICUT—SCM, Walter L. Glover, W1VB—C BDI, BUD, IIN, HYF, and YB attended the National Convention in Milwaukee. QVJ is leaving this section for Florida, where he expects to be for several years. TD tries to maintain his OBS schedules. APA schedules 6BAM and KG8DG. DWP enjoyed two-weeks vacation in Maine. HYF has portable 7-Mc. rig in his car. QNV applies for ORS appointment while UGX/1 applies for OPS appointment. BIH still schedules VE8MA. INF also schedules W6BAM. ORP has been appointed RM, and Ed hopes to get the Nutmeg Net and other traffic schedules lined up for the best season ever. AW keeps schedules with 6AOA Tues., Thurs., and Friday, and with IIN nightly, week days. 3LRK is new AW operator, replacing PHW, who has returned to college. QVF wants traffic schedules outside of nets. He can QSP direct schedule with California. Hot weather, vacations, etc., have caused this report to be brief this month. Hope we can do better next month. Traffic: W1AW 130, BIH 58, QVF 20, INF 16, QMI 6, APA 5, HYF 3.

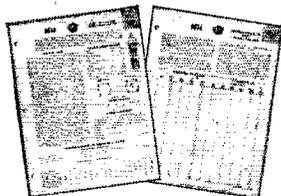
MAINE—SCM, F. Norman Davis, W1GKJ—SEC: LNI. PAM: FBJ. RM: NXX. AQL and LKP renewed OBS appointments. NXX has renewed his RM appointment and hopes to hear all the regulars back on the Pine Tree Net this fall; he also desires more outlets throughout the State. If you are interested in handling traffic, call in on 3550 kc. at 7 p.m. EFR reports he is ready and waiting for the PTN to start. AQL has an 813 in the final now. 8AQ/1 spent his vacation at Wells Beach as usual and had a VFO-807 rig using n.f.m. QZC has been running 70 watts to a BC-459A in Presque Isle at the AACs station. RIC also is in the AACs at Presque Isle but didn't have a chance to get a rig on before he heard that he is going to be transferred to another station. QZC also is being shifted. EYI, JRS, and RKZ have 522s going on 144 Mc. PTL was all over the State during the summer visiting other hams. The 522 has made 144 Mc. the most active ever during the past summer. RJL and LKP are two of the latest additions to

(Continued on page 88)

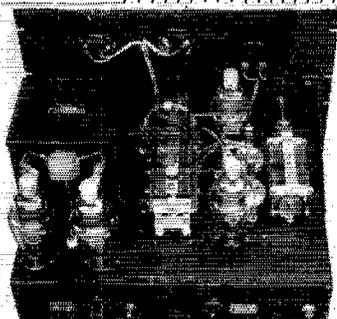
# How Hams are using the HYTRON 5514



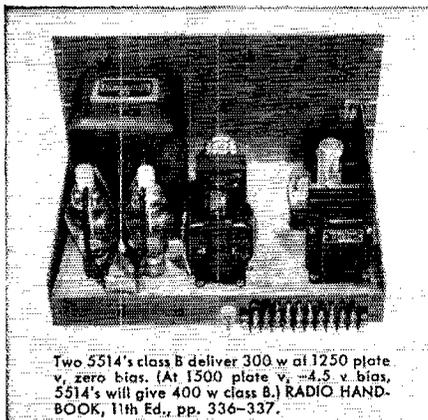
**HYTRON  
5514**  
\$4.95



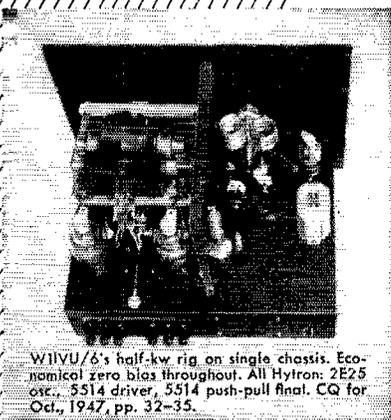
Most complete characteristics sheet for a transmitting triode; typical operation data for 8 plate potentials. Also class B Interchangeability Chart demonstrating comparatively the 5514's superiority over other triodes. Write for both.



WIPEK's complete, 350-w, 3.5-to-28-mc, phone/c-w transmitter uses 4 Hytron 5514's — class B and C — and only 7 cubic feet of space. QST for Sept., 1947, pp. 37-46.



Two 5514's class B deliver 300 w at 1250 plate v, zero bias. (At 1500 plate v, -4.5 v bias, 5514's will give 400 w class B.) RADIO HANDBOOK, 11th Ed., pp. 336-337.



W1IVU's half-kw rig on single chassis. Economical zero bias throughout. All Hytron: 2E25 oser., 5514 driver, 5514 push-pull final. CQ for Oct., 1947, pp. 32-35.



Simple, economical, 3-stage, 3.5-to-28-mc outfit. Single 5514 gives 43 to 200 w output at 400-1500 plate v. THE RADIO AMATEUR'S HANDBOOK, 25th Ed., pp. 184-187.

Tube data sheets are helpful. Those for the Hytron 5514, unusually so. But seeing how the other fellow has put the 5514 to work is even better. The articles describing the illustrated transmitters bristle with "hot" ideas. It will pay you to review them. Write also for both of the 5514 data sheets. Discover for yourself why the Hytron 5514 is so popular: Low internal tube drop and consequent high efficiency at plate potentials from 400 to 1500 volts. Generous output, low drive. Ready interchangeability with other triodes. In short, an economical, all-purpose ham tube designed for hams. Plan to put the 5514 to work in your rig, too. See it — buy it at your Hytron jobber's.

## GOT TVI TROUBLES?

Two 5514's in properly balanced Class B R-F—1500 v at 350 ma plate, -4.5 v bias, 6.5 w grid driving power—deliver 400 w c-w output essentially harmonic-free. See National ad p. 85, July QST.

SPECIALISTS IN RADIO RECEIVING TUBES SINCE 1921

# HYTRON

RADIO AND ELECTRONICS CORP.



MAIN OFFICE: SALEM, MASSACHUSETTS



## 300 ohm TUBULAR TRANSMITTING TWIN LEAD

Amphenol's new Twin-Lead transmission line eliminates the effects of moisture because of its novel construction of two conductors carried in opposite walls of a polyethylene tube. Losses are extremely low as the dielectric between the conductors is largely air. The tubular construction holds surface moisture well outside the strong field between conductors with the result that bad weather conditions have little effect on characteristic impedance.

The conductor size is more than adequate to handle 1 kilowatt of radio frequency power. Since the conductors are appreciably heavier than those used in standard receiving Twin-Lead, the RF resistance losses will be much lower. Their weight also assists in providing adequate support for a suspended transmission line. The round shape presents little wind resistance and the tendency to flutter is eliminated.

Amphenol's new Twin-Lead—14-076—is also ideal for FM and Television installations. Where the best reception day after day is desired, be sure to use this new weatherproof tubular line.

**Radio Amateurs** — Is your name on our list to receive the Amphenol Engineering News regularly? If not, we shall be glad to put it on at your request.

### AMERICAN PHENOLIC CORPORATION

1830 South 54th Avenue, Chicago 50, Illinois

COAXIAL CABLES AND CONNECTORS • INDUSTRIAL CONNECTORS, FITTINGS AND CONDUIT • ANTENNAS • RADIO COMPONENTS • PLASTICS FOR ELECTRONICS

the band. ROM is a new call at Old Orchard Beach. He is starting out with the usual 522 on 144 Mc. and a BC-696A on 3.5-Mc. c.w. Traffic: W1NXX 2, 8AQ/1 2, 1E1Y 1.

**EASTERN MASSACHUSETTS** — SCM, Frank L. Baker, Jr., W1ALP — QQL is EC for Lynn. The following ECs renewed their appointments: HP for Merrimac, MQ for Dover, IPZ for Shirley, IXI for Walpole, EK for Newton. OBS appointments renewed: ALP, EHT, and GDY. ORS renewed: HWE and EMG. Notice to all OBS, please send me your old certificates for a new Official Bulletin Station Certificate. The new RM for the 3.5-Mc. c.w. band is AQE. OMI is new ORS. JE wants new members for the Swing Shift Net, which operates in the daytime. Drop him a line. QOI has an 829 following his 522 and a six-element beam. For the fellows who are home at noontime there is a net on 144 Mc. CTR, DPV, and others are on at 12 noon. MMY bought a house in Sharon. IN is president and HSV secretary of the 56 Mc. Minute Men. BVL now is working for Hytron. DWY is working for Tracerlab. IO and PRZ are on 220 Mc. NBS got married. EYI is on 3900-kc. 'phone. EK reports that the Newton Net holds drills regularly. 2BAT and 5HXI visited EKG. HWE still is in the hospital. ILS and AQE worked the first known interstate intercall area contact on 2400 Mc. with 2RMA in Schenectady, N. Y., from Mt. Greylock at North Adams. The El Ray Club, OMI, is putting final touches on a 1 kw. for 3.9 Mc. and has a 1 kw. on 7-, 14-, and 3.5-Mc. c.w. with 100 watts and a beam for 28 Mc. being built. PAW is secretary. WU found grasshoppers in the head of his dipole when he took it down. MDU vacationed in Madison, Wis. QMJ has new 150-watt job on 7 Mc.; he also is a member of the Swing Shift Net. GDY is working lots of DX on 14-Mc. c.w. MEG has a new 200-watt job and built a t.v. receiver. He finished t.v. course at N.E. University. AYG handled traffic with 2MDW and his father-in-law, 2JL. QJB sat in as a kibitzer during a chess game between 2VSU and 2UUV. He has finished portable rig. The T-9 Radio Club held a meeting at IPK's and also held its annual boat ride. The South Shore Amateur Radio Club held a meeting in August and plans are in progress to award a certificate to all those that work 10 members. BGW worked a few new countries despite the heat. PAW is spending time on mobile emergency equipment and all band VFO. MCR, EC for Dorchester, says he has 9 members in the net on 147.6 Mc. Crystals were donated by N.W.B. ONZ has a 32V-1 Collins and a 75A receiver on 3.9-Mc. 'phone and still is in the USAF at Bedford as a staff sgt. NXJ spent the summer in the White Mountains. HIL is on 3.9-Mc. 'phone while putting up a beam for 4 bands, all rotated by one motor. PAD, PEG, and MOJ visited AW. WS is working for Raytheon. QQW has a six-element beam for 144 Mc. The Framingham Radio Club held its first meeting. IBY has 900-watt job on 14 Mc., also a new car. IXJ has 4D32 and is increasing power. JUL will be on 50-Mc. mobile. PEG has worked 115 countries to date. BWJ is on 28 Mc. working DX. Traffic: (July) W1TY 22, (August) W1QMJ 43, QJB 31, TY 28, GDY 11, LM 10, AYG 6, RBK 6, WU 6, MEG 3, MDU 2.

**WESTERN MASSACHUSETTS** — SCM, Prentiss M. Bailey, W1AZW — SEC: UD. RM: BVR. PAM: NY. The heat during August sure caused a dip in activities. However, with the cooler WX coming up we really are going to town. All Western Massachusetts nets are again in operation and we have acquired several new appointments. BVR had a visit from 4IKI, who kept his regular schedules with the Gator Net from BVR. JYH and GZ are new ORS and JE is new OBS. We extend our sympathy to the relatives of BKF. He recently passed on to the land of "Silent Keys." PIL has been discharged from the hospital and is getting along nicely. JE, KDW, AMI, and RDB will represent Worcester on WMN this season. HFO complained of the heat but managed to stay in the shack long enough to snag some DX on 14 Mc. BDV is back in the harness again. He is going to build a Monitone. RDB broke his wrist playing football. Dick is a tackle on the Classical High team. The new VFO will have to wait until he can use two hands to build it. CCH, our only OES, has a new 24-element 144-Mc. horizontal beam ready to try out. GZ is gunning for more and more traffic. He sends in a sizeable total each month. JE is taking it a little easier on the SS Net. He is letting the boys take over. JYH is building new VFO for SS and CD Contests. Rog has boosted his countries worked up to 171, with 137 confirmed. COI got a new one by connecting with ZC6XY on 14-Mc. 'phone. A 2400-Mc. receiver is in the process at Holly's shack. We extend our sympathy to the relatives of NFF, who was killed in an automobile accident. Fred was an ardent member of the Pittsfield Radio Club and will be greatly missed. The PRC has resumed meetings at the Stanley Club barn. AZW has been working DX. Traffic: (July) W1GZ 52, (August) W1GZ 58, JE 54, BVR 13, RDB 3, RHU 3.

**NEW HAMPSHIRE** — SCM, Gilman K. Crowell, W1AQO — LSN reports that the 50-Mc. net has been plugging along all summer. CAY is building a new 50-Mc. converter and will be on the net very soon. Where are those 50-Mc. signals from Concord that have been promised? EIO reports a meeting of the Great Bay Radio Club in Dover. RNE is a new ham in Littleton. PVF is going to school in Massachusetts. Good luck, Sandy. MCS is building another

(Continued on page 88)



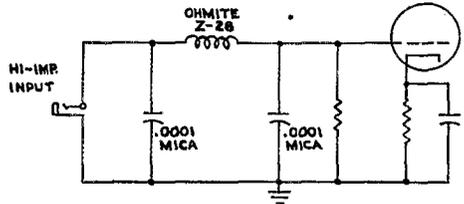
## DOES YOUR RIG SQUEAL ON 10-OR 20-METER PHONE?

If your rig squeals, howls, or grunts, the cause probably is r-f pickup in the microphone cable. The r. f. is detected in the first tube of the speech amplifier, and the modulation transformer starts screaming in protest. This trouble can be stopped cold, right at the source, by use of an Ohmite frequency-rated

# QSO's

from **OHMITE**

FIRST SPEECH AMP. TUBE

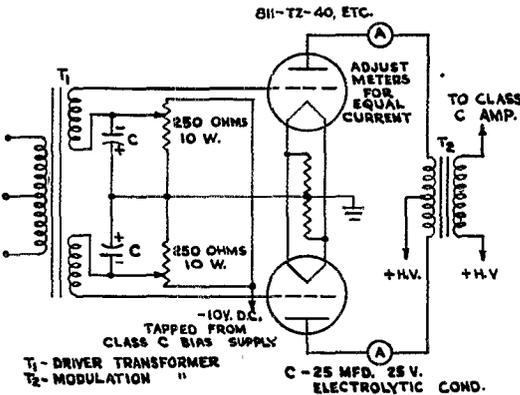


choke inserted in the microphone input of the speech amplifier, as shown.

## ELIMINATE CARRIER HUM DUE TO UNBALANCED CLASS-B MODULATOR

Most zero-bias Class-B modulators are powered by a high-voltage supply filtered only by a swinging choke and one filter capacitor across the h-v output. The a-c ripple left in the output is supposed to be canceled out by the equal current flow in op-

posite directions through the center-tapped primary winding of the modulation transformer. But, if the idling current of the two Class-B tubes is not the same, the magnetic field produced by half the primary of the modulation transformer will not exactly cancel the magnetic field produced by the other half of the winding. Result is that the ripple shows up in the secondary side of the transformer and modulates the rig. The idling current of the Class-B tubes can be equalized by use of Ohmite 10-watt "Dividohm" resistors. A small amount of bias voltage is taken from the Class-C bias supply and is used to equalize the idling current.



## HOW TO FIGURE BLEEDER RESISTORS

Building a power supply? Then you'll want to see Ohmite's chart showing suitable bleeder resistors. It covers most power supplies, but if yours is not shown, design your bleeder resistor to draw 10% of the full-load current at the filter output voltage. Should a tapped bleeder be required, use an Ohmite "Dividohm" adjustable resistor.

Write for Bulletin 137  
"Ohmite Ham Hints"

OHMITE MANUFACTURING CO.  
4865 Flournoy St. Chicago 44, Illinois



Be Right with

# OHMITE

RHEOSTATS • RESISTORS • TAP SWITCHES

# Crystals for the Critical

## STABILIZED CRYSTALS TO MEET EVERY NEED

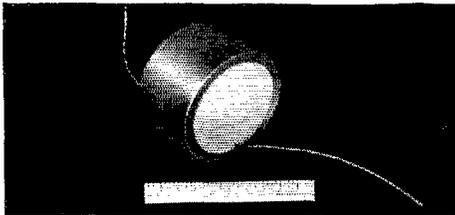
Whatever your crystal needs, James Knights Co. is equipped to satisfy them quickly and economically.

To effect greater savings for you on short runs, a special production system has been established.

We are also equipped to quickly build "Stabilized" crystals to your exact specifications. In addition, James Knights Co. fabricates a complete line of "Stabilized" crystals to meet every ordinary need—precision built by the most modern methods and equipment.

For quality—speed—economy, contact the James Knights Co. You'll be glad you did!

### New James Knights Catalog on Request



A university physicist wanted a 2" supersonic X-cut crystal. The James Knights Company made it promptly, and has since delivered many other special crystals for the same university.

# The JAMES KNIGHTS Co.



SANDWICH

ILLINOIS

emergency rig. ATJ is installing a mobile rig in his airplane. OGU is a new addition to the New Hampshire gang, working at WTSV in Claremont. AXL has been visiting around the State. BFT and AOQ may be heard mornings on 14 Mc. working their share of DX. LVG has a new harmonic. Congratulations, Sonny. AVJ is returning home from summer QTH soon so we can expect more activity there. AVL will be back on the air as soon as golfing permits. Traffic: WIAOQ 12, QJY 8.

VERMONT — SCM, Burtis W. Dean, WINLO — QQN is on 28-Mc. 'phone with three-element Workshop and TBS-50. PDR has three-element beam up. 2VNT now is 1VNT. VE2LM, IT, and PYO are experimenting on 144 Mc. with ground plane antennas. IT has been heard by QQ in Richford on 144 Mc. RNA has HT-18 on the air. PYO has 1 kw. on c. w. and 800 watts on 'phone. CUN will make winter headquarters at BWC. PTB has Meissner 150-B and is on 3.85-Mc. 'phone. OKH has been heard in Texas with 35 watts on 3.85-Mc. 'phone. Tommy has worked 48 states on 28-Mc. 'phone with 50 watts. PSD spent part of the summer in Veterans Hospital at White River Junction. Death has taken another old-timer from our ranks, EH, for over 25 years secretary and general manager of ARRL. Although the amateurs have lost a great friend and worker, now is the time for all hams to pull together and make a bigger and better ARRL. Traffic: W1AVP 10, EWF 4.

### NORTHWESTERN DIVISION

IDAHO — SCM, Alan K. Ross, W7IWU — Nampa: New L calls are MPL, MOH, HDB, MRZ, and TOT, ex-PTOT. JL did an FB job of suctioning for the Gem State Radio Club's Hamfest at Boise. A lot of good gear changed hands. ALY won the QLF Contest. It's more fun than a picnic. Try it at your next outing. For the uninitiated, QLF means "send with your left foot now." GHT is schooling at Moscow and plans to get on occasionally. New ORS is BEO, Sandpoint, who will meet with the Gem Net on 3745 kc. Twin Falls: JMX is installing four-element beam for 29 Mc. KEK has moved to a new home. (Some fun, eh. I just moved, too.) KRK has moved to Oregon. Let's have a report from every appointee each month. LNC has rebuilt, forsaking n. e. m. for a. m. Every ham is welcome to join the E. Net Work, which meets every Tues. and Thurs. 7:00 p.m. MST to 9:00 p.m. MST, on 7250 kc. MFC is Net Control Manager and MLC is Assistant Net Control.

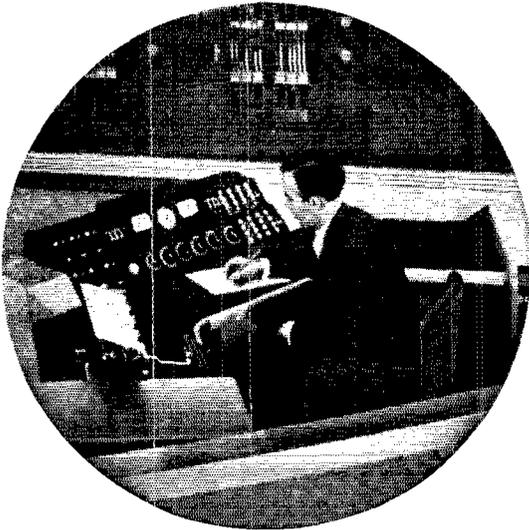
MONTANA — SCM, Fred B. Fitzinger, W7EGN — BOZ and CDG live across an alley from each other and both have high-power 28-Mc. rigs feeding rotary beams but they appear to be friends. JHM and HBM have new Class A licenses. HBM has ART-13 on 3.85, 7, and 14 Mc. QB left for Lewistown and skips around Montana as relief maintenance CAA. BYX is converting ART-13 to AC. CAL hooked a gas engine to a dynamotor for his portable gear. LVJ acquired a new ham shack. LEK is busy converting SCR-274N. FTO is adding baseook sections to his four-element 28-Mc. beam. KL7SF, ex-LCF from Lewistown, is located at Nome and is looking for Montana contacts. Kalispell hams are building 144-Mc. pack sets to help out the Flathead Lifesaving Association. UPI and MPS are new hams in the Kalispell area. Out-of-State visitors to Kalispell ham shacks were VE6EA and W7LEM. Our Alternate Director, CPY, has been on a visiting spree, too. ELY has organized a new ham club in Missoula and the next meeting will take up the business of a constitution, by-laws, club name, etc. CVQ, in Shelby, is helping a Canadian Mounty get a ham ticket. KAQ has moved from Anagar to Missoula to attend the University. BONU on 3.5 and 3.85 Mc. Traffic: W7EGN 6.

OREGON — SCM, Raleigh A. Munkres, W7HAZ — The recent picnic at Newport brought memories of prewar days when picnics and hamfests were the rule rather than the exception! Some sixty Oregon hams and their families gathered, which in itself was enough to make the thing a success. On top of that the weather was perfect, the refreshments superb, and the prizes very gratifying. 3.85-Mc. mobile was very much in evidence and no doubt was the main subject of conversation. We thank GEJ, BVV, and DAA for a most enjoyable time! News this month is as scarce as it was last. However, Klamath Falls, Pendleton, and Grants Pass continue to report regularly. It is sincerely hoped that with the coming of the fall season all of you will settle down to some serious reporting in order to bring this column back up to par. RM APF reports that the Oregon Net is getting back into shape after the summer slump and that he is moving from Cutler City to Philomath. Traffic: W7APF 92, HVD 62.

WASHINGTON — SCM, Clifford Cavanaugh, W7ACF — Harold Johnston, DXF, Northwestern Division Director, visited the Valley Radio Club at Puyallup and the gang reports an FB evening. KCU, an XYL in Colfax, is first member of YLRL in this State to ask for an ORS appointment. EHJ is busy building a garage so the mobile gear in his car won't get wet this winter. JHP, Kefavik, Iceland, sends in application for AEC. AIA, the Vancouver Radio Club's station, was on the air at Clark County Fair handling 265 messages. All traffic was handled on 'phone, going mostly via CKT. Those operating were: JWD, IOU, RPL.

(Continued on page 80)

Capitol Radio Engineering Institute—Pioneer in Radio Engineering Instruction Since 1927



**WANTED!**

**CHIEF ENGINEERS  
Studio Engineers  
Transmitter Engineers**  
for more than

**1100 FM\* & 2350 AM  
BROADCAST STATIONS**  
the FCC indicates will be in  
operation in the U.S. next year

**Yes, Plenty of Good-Paying Jobs . . .  
BUT only for those Qualified**

FM is actually coming into its own in 1948-49 . . . more than 1100 FM stations with permits and grants now on the air, or soon to be. Over 1700 standard broadcast stations now in operation — 1200 more with construction permits and applications. Television receivers are on mass production lines. Hundreds of new TV stations will be going on the air — over a hundred construction permits now issued — over 400 TV applications now at the FCC.

Radio-electronics is not only expanding in job opportunities but it is also growing in technical complexity. Rapid developments in every branch of the field are leaving many radio technicians and engineers far behind the parade of progress. These are the men who fail to realize that their technical knowledge must grow with the expansion of the industry.

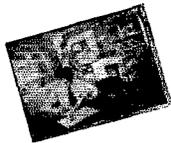
*\*As of Sept. 1948: 618 FM stations on the air. 818 FM stations with construction permits and conditional grants*

What does this mean to you? It means you must study not only to hold the job you now occupy . . . but study to qualify for the better job you want. CREI modern technical training can (within a comparatively short time) qualify you for the better jobs and help enable you to step ahead of those who have failed to improve their ability through technical training.

Beginning right now CREI can provide the on-the-job training that equips you with the technical ability to go after — and GET — the important, high salaried jobs. Get all the facts today about the unprecedented opportunities that await you. Learn how CREI spare time training can help you as it has helped thousands of other professional radiomen advance to better jobs during the past twenty years.

**Mail Coupon for FREE BOOKLET**

*If you have had professional or amateur radio experience and want to make more money, let us prove to you we have the training you need to qualify for a radio job. To help us intelligently assure your inquiry — in writing, PLEASE STATE BRIEFLY YOUR BACKGROUND OF EXPERIENCE, EDUCATION AND PRESENT POSITION.*



**VETERANS! CREI TRAINING AVAILABLE UNDER THE "G.I." BILL!**

**Capitol Radio Engineering Institute**

*An Accredited Technical Institute*

DEPT. Q-11 16TH AND PARK ROAD, N. W., WASHINGTON 10, D. C.  
Branch Offices: New York (7): 170 Broadway • San Francisco (2): 760 Market St.

**CAPITOL RADIO ENGINEERING INSTITUTE**  
16th and Park Rd., N.W., Dept. Q-11,  
Washington 10, D. C.

Gentlemen: Please send me your free booklet "CREI Training for Your Better Job in RADIO-ELECTRONICS," together with full details of your home study training. I am attaching a brief resume of my experience, education and present position.

Check  Practical Radio-Electronics  
Course  Practical Television

Name .....

Street .....

City..... Zone..... State.....

I am entitled to training under the G.I. Bill



**SINGLE SIDEBAND  
SELECTOR  
TYPE YRS-1**

## Single Sideband SELECTIVITY with NO LOSS of AUDIO RESPONSE

**S**INGLE Sideband Selectivity with full range audio response! Remove those heterodynes and QRM and still enjoy excellent audio quality with the G-E Single Sideband Selector YRS-1. Connects to the standard communications receivers.

- Single sideband reception of modulated, unmodulated (CW) or single sideband transmissions.
- Provides the effect of extreme selectivity without restriction of audio fidelity.
- Push-button selection of either sideband — other sideband attenuated.
- Audio distortion associated with selective fading is greatly reduced.
- Intelligibility of fading signals is improved.
- Can be connected to practically any communications receiver having an intermediate frequency of approximately 455 KC.
- Normal operation is in no way disturbed when single sideband selector is not in use.

**ONLY \$275<sup>00</sup>**

(Price subject to change without notice)

For complete information on the single sideband selector write: *General Electric Company, Electronics Park, Syracuse, N.Y.*

165-G5

**GENERAL ELECTRIC**

EEA, LMY, LTY, and MQC. ZU, CZY, FRU, and CKT make BPL. It's been a long time since anything like that has been done in this section. GHI reports all DX worked this month has been on intercom from shack to house. JKO is busy on 28-Mc. f.m. mobile. CWN finally got his shack built. ETO is too busy knocking apples to get on regularly. FWD says a Weston light meter makes a grand gadget to tune up a transmitter. LEC is a new ORS. FRU, T.L. "A" manager, reports T.L. "A" is pretty well lined up with outlets all the way across Northern U.S.A. CZY, NCS for WSNET, works Greenland on 3.5 Mc. APS is overhauling for winter traffic. KNV works portable from vacation in mountains. MCW is busy as KL7 outlet for WSNET. KWC and EYS were the only OBS to ask for renewal as per new regulations. CKT is new PAM. KWC reports the Skagit Radio Club handled 1071 messages at the North-western Division Fair at Lynden. Credit goes to KVA, BLP, MBY, and KWC for this total. RAO says that he and CZY are going to get out a bulletin for WSNET. ETK is the only OO reporting this month. He says there is a great deal of out-of-band operation on 14 Mc. DRA is on with new rig, 700 watts. DGN checks in from Manchester for the summer. MH got his ORS renewed. JDC is working portable from Cape Flattery during vacation. LJM is installing new antenna and masts for his high-power rig. Wonder when the gang on WSNET will all work break-in. Red Gunston, SEC for Washington, reports much interest in the AEC and urges all hands to have their self-powered gear ready for anything. Traffic: W7CKT 3008, CZY 1112, FRU 569, KKR 255, ZU 187, RAO 178, LEC 127, DRA 115, FWD 91, AC 70, MCW 40, ETO 25, APS 20, CWN 5, DGN 5, KNV 4.

### PACIFIC DIVISION

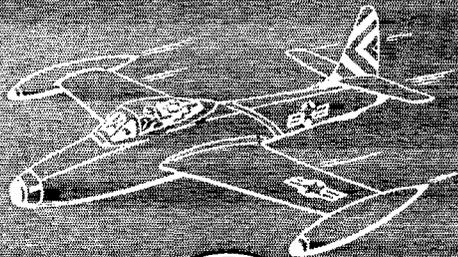
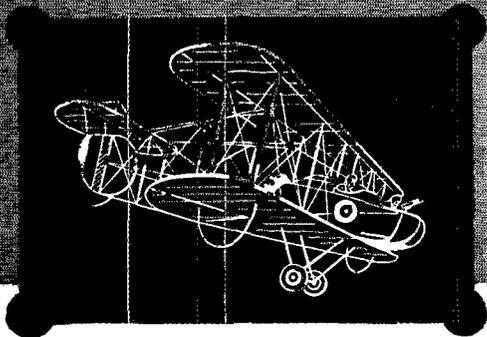
**H**AWAII — SCM, John Souza, KH6EL — GH, the retiring secretary of the Honolulu Amateur Radio Club, was given an Aloha Dinner at Lau Yee Chai on August 25th attended by thirty local hams and their wives. Cass has been the "spark plug" of the club and his activities in club affairs will be greatly missed by the gang. Aloha, and good luck on your next assignment. BW is deep in construction of emergency and mobile gear. A surplus telegraph mill also has been added to ease traffic on the Pine Net. BA, our hard-working QSL Manager, has been burning much midnight oil on 14-Mc. c.w. with three-element beam with an eye toward WAZ. LF finds enough time to raise DX on 14 Mc. after doing yeoman service moving traffic on 7 Mc. PM can't believe that high power is necessary after raising CN8 on a CQ using single 907 into a doublet on 14-Mc. c.w.

**SANATA CLARA VALLEY** — SCM, Roy E. Pinkham, W6BPT — The Palo Alto Radio Association held its annual picnic on Aug. 29th. The affair was well attended. Contests, games, and swimming were enjoyed. Many prizes were given to the lucky ones, among whom were YPM, BO, AEW, 3NTS, ZUJ, CAZ, NYS, SYW, JSB, VHE, CGG, and DJG. DJG bid in the ARR-5 receiver which was auctioned. The Monterey Bay Radio Club spent Labor Day at Mt. Madona. JWM reports club attendance holding up very well during summer. SCCARA held a dinner on Sept. 22nd opening its fall activity. VIQ is heard back on 28-Mc. phone. CFK has returned from his vacation and has resumed his column in the Sunday paper. DAE has finished his new receiver and reports it has good selectivity and very high signal to noise ratio. LCF has accepted position as principal of a school in Menlo Park. QUD is working good DX with his beam on 28 Mc. from Campbell. MMG has returned from his vacation spent in New Hampshire. SYW reports his new QTH as 344 So. El Monte Ave., Los Altos. NX will hold schedules with anyone on 144 Mc. during the week days if they will contact him. It has been reported that NKP is trying 3.85-Mc. mobile phone. VHE is back from his two-weeks cruise with the Naval Reserve. AVJ is organizing a net on 28 Mc. for the San Jose area. ZZ attended the ARRL National Convention while on vacation trip back to his old home QTH. Traffic: W6WJM 189, MMG 2, SYW 1.

**EAST BAY** — SCM, Horace R. Greer, W6TI — Asst. SCM, C. P. Henry, 6EJA. SEC: OBJ. ECs: AKB, EHS, NNS, IT, IDY, QDE, WGN. Asst. EC u.h.f.: OJU, RMa: ZM, FDR. The East Bay section was shocked to hear of the passing of K. B. Warner, 1EH, on the morning of Sept. 2nd. In the past few years many "greats" have passed on but this occasion is just a little different. It hits home. The American Radio Relay League is today not only the spokesman for Amateur Radio in this country but is the largest Amateur organization in the world. It stands for the maintenance of fraternalism and a high standard of conduct. Ken in no small way has helped to bring this all about. His efforts for over thirty years have paid dividends. Our problems were his problems. Our interests were his interests. A real and true ham at heart. Yet, the show must go on. Ken's place will be taken by others, but to thousands of amateurs that knew him, there will be only one "K.B." The San Leandro Radio Club held a gala picnic on Sunday, Sept. 5th, and a great time was had by all. Those interested in learning emergency work from the ground up, please contact OBJ, Omar Day. PB has his new exciter working PB. BUY has a telephone pole up at last for his three-element 28- and 14-Mc. antennas. LDD has new motor for his beam. BF

(Continued on page 98)

# MODERN DESIGN IS COMPACT!



**Compactness of Ken-Rad miniatures frees needed chassis space, with no sacrifice of tube efficiency or life. And you get higher-frequency operation!**

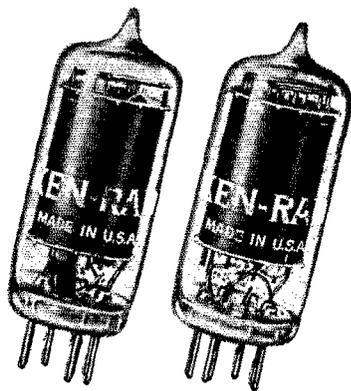
IT'S NICE to have room for new features you plan to add to your rig. Nice, also, to know that the space you've saved is net gain, with no loss in tube performance.

Furthermore, Ken-Rad miniatures are better for r-f work than the standard-size tubes they replace. They operate at higher frequencies . . . because their internal leads are so short.

Look closely at the 6BA6 and 6BE6. These tubes typify the advantages—small size, compact structure, real v-h-f operation—of the Ken-Rad miniature line. "Naturals" for ham experimental work, they fit neatly into h-f converter circuits, among other useful applications.

There the 6BA6 serves as an r-f amplifier, or even as an i-f amplifier, while Type 6BE6 will act as both mixer and oscillator. Don't let the unfamiliar type numbers bother you—the 6BA6 is substantially the 6SG7 r-f-amplifier pentode in miniature form (but improved, with a higher gain); and the 6BE6 is an ultra-compact version of our old friend the 6SA7-GT pentagrid converter.

Visit your Ken-Rad distributor or dealer to see, handle, "size up" the extensive group of Ken-Rad precision-made miniatures. Then check their low prices! These modern tubes . . . for best results . . . are *your best buy!*



**6BA6**

**6BE6**

## Ratings of 6BA6 and 6BE6

Filament voltage	6.3 v
current	300 ma
Max plate voltage	300 v
Max screen supply voltage	300 v

170-QA12-8889

# KEN-RAD

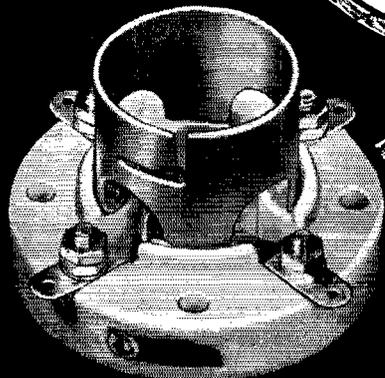
Radio  
Tubes

PRODUCT OF GENERAL ELECTRIC COMPANY

Schenectady 5, New York

Make the nearest Ken-Rad distributor or dealer your preferred source for amateur tubes

# JOHNSON TUBE SOCKETS



*World Famous*

THOUGHTFUL design, superb workmanship and top quality materials are combined in the manufacture of JOHNSON sockets to earn for them the reputation as the world's finest.

Illustrated above is the JOHNSON 123-209, a 4-pin bayonet type socket for medium power tubes having a medium 4-pin bayonet base, such as the 866.

Also available is the 123-210, a similar JOHNSON socket that fits the same tubes as the 123-209 but which is slightly smaller in size.

The 123-211 is a larger 4-pin socket for tubes such as the 872.

The 123-216 is for tubes having a GIANT 5-pin bayonet base such as the 803 and RK28.

These high quality JOHNSON tube sockets, which represent only a part of the extensive JOHNSON tube socket line, are available in porcelain or steatite.

See them at your dealers or write  
for latest catalog



# JOHNSON

*a famous name in Radio*

**E. F. JOHNSON CO. WASECA, MINN.**



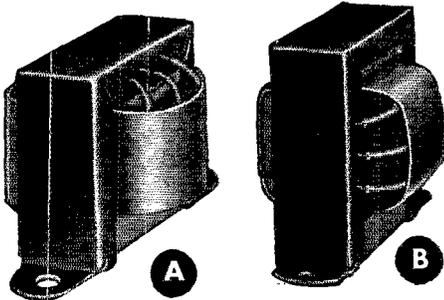
has been QRL work. YDI is on the Mission Trail Net daily. QXN invites traffic via the Pioneer Net. OT is doing a bang-up job putting out ARRL Official Bulletins. FDR is turning in PB traffic each month. VDR reports that the Mission Trail Net is looking for beginners for c.w. net on 3804 kc. at 7:30 p.m. PDST. OJW has been getting his television receiver to perk. On Sept. 10th the East Bay Radio Club and the Vallejo Radio Club held a get-together meeting. ZM sends in a letter giving the dope on the new Napa Valley Amateur Radio Assn. Officers are: CAN, pres.; LXE, vice-pres.; Bill How, secy.-treas. There are 34 members in the club, more than half being licensed amateurs. Meetings are held in the P. G. & E Lecture Room on Burnett St., Napa, the first Wednesday of each month. Welcome to the East Bay section, gang. ELW has new country home. Please send in news for this column by the 5th of each month. Some appointees have not been reporting. It might be necessary to cancel a few in the near future. Traffic: W6FDR 570, QXN 88, VDR 39, YDI 29, TI 7.

SAN FRANCISCO — SCM, Samuel C. Van Liew, W6NL — Phone JU 7-6457, SEC: DOT, CEC: BYS, BYS is back from his vacation and in the groove again working nightly schedules on the WORTS Net, 9:30 p.m., 7275 kc. ERS ran up quite a lot of traffic while on his vacation on which he took along his portable gear. CHP and VW took a trip to Grouse Ridge early in September and tried out medium-power 3.85- and 144-Mc gear. PHF has kw. final ready to go on all bands. LVW is trying out new 144-Mc. beam stacked Reinartz loops. He also has fine sixteen-element 144-Mc. beam. Fred says it works swell but is too bulky. SZ has beautiful new kw. final ready to go on the air. WB also has new kw. final completed and is putting final touches to his new shack. DOT has forsaken ham radio for the paint brush. He is just painting his own house so will be back with us soon. ZVB is organizing Coast Guard Net here. DXW still is struggling with key clicks. The San Francisco Naval Shipyard Club held a picnic Sept. 11th at Flood Park. The Club is making plans for the coming Navy Day Radio Program in October. At the August meeting of the San Francisco Radio Club an interesting talk on "Radio Diablo" and problems encountered in its installation was given by WN, one of the construction engineers. Also the election of officers took place and the following were elected: PHF, pres.; Bob Knight, vice-pres.; Mort Kuhn, secy.-treas.; Caveny, sgt. at arms; S. C. Van Liew, Rev. L. W. Boss, Joe Fincutter, Paul Dane, W. H. Simonson, Dick Czeikowitz, and Doc. Binkley, board of directors. The Southern Alameda County Amateur Radio Club officially opened its club station DWO/DKR Sunday, Aug. 29th. HJP is spending his vacation debugging his new kw. transmitter. He is looking for further contacts with the Bay area. The San Francisco Red Cross emergency station will be taking shape soon under the call of CXO. Thanks for the reports. Traffic: W6BYS 134, NL 126, ERS 72.

SACRAMENTO VALLEY — Acting SCM, Ronald G. Martin, W6ZF — SECs: KME and BVK. RM: REB. PIV, our OES, reports the Mountaineers near Riverton, El Dorado County, now know how to get out of holes in the High Sierras — high gain beams at the top of 100-ft. pine trees and more power — 144-3.5 Mc. BLP reports that he and AVO packed in seven miles in the High Sierras to the 8600-ft. level at Lake Tahoe and with handie-talkie, 1 watt, 144 Mc., with R9 both ways made contacts with Sacramento, San Francisco, San Mateo, and a Navy plane over Coalinga — approximately 200 miles air line! GDJ's DX count is consistently climbing. YZ bought a Collins 75-A receiver and 32-V-1 transmitter. QDT has 304-TLs in the final! ARR and CFU applied for AEC membership. The Armed Forces Communications Assn., Sacramento Chapter, has been increasingly active. JDN, on 14 Mc., is converting a number of the ARC-5 receivers for all-band operation. KME is stirring enthusiasm on this emergency network on 146 Mc. between flying and reserve officer work. AK is Sacramento Club's representative on the Pacific Division sub-directorate. WTL finally worked Nevada on 28 Mc. YTN is on 7-Mc. c.w. RMT has gone to phone with borrowed modulator for his 300-watt rig. GUV, at the Chico Fair, was a big success, assisted by ZNU, GHG, YQC, WTN, WYX, ZPJ, and TKE. AF is on 14,070 kc. REB and his Pioneer Net have been busy with County and State Fairs. Please send reports to your Acting SCM, 3820 Second Ave., Sacramento 17. Traffic: W6REB 1254, ZF 72, PIV 20, AVO 14, JDN 10, WTL 4.

SAN JOAQUIN VALLEY — SCM, Ted R. Souza, W6FKL — Aast. SCM, James F. Wakefield, 6PSQ, SEC: JPS. ECs: KUT and PHL. WRO put in the summer as radio officer aboard the S.S. *Marine Phoenix*. PSQ is new OES. BNP, BLS, BSW, JPS, JCB, and PSQ are on 144 Mc. regularly. During the County Fair at Turlock the TARC had a display booth with operating equipment. Traffic was cleared via 144 Mc. to ADB, DVS, FYM, and WPV, who, in turn cleared on 3.85- and 14-Mc. phone and 3.5-Mc. c.w. Others participating were LLO, DIV, UGV, UBQ, and QER. KUT now has 154 countries. GQZ reports the following: BCL has just completed a new 28-Mc. beam; AJE is working a lot of DX on 28 Mc. YIN is a new man on 144 Mc.; CUE has gone high power on 3.85 Mc.; QER is on again after a severe illness; UWY is building a tower for his

(Continued on page 98)

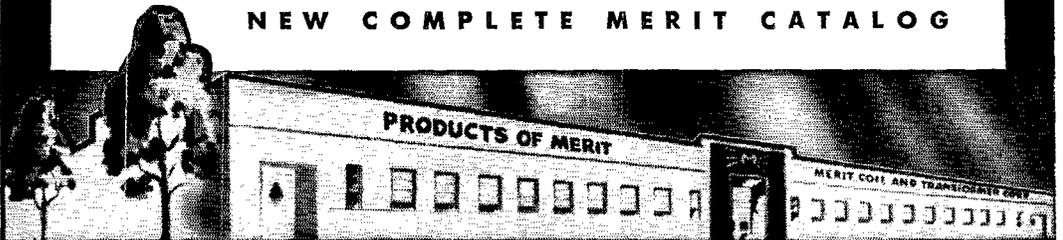


## A SWEET LINE OF FILAMENTS

Here are a few of the new and complete line of MERIT QUALITY Filament Transformers, outstanding for economy and performance. Your local jobber has them in stock for you.

Type No.	Net Price	Sec. Volts	Sec. Amp.	Mfg.
P-2940.....	\$2.85	2.5 c.t.	10	B
P-2944.....	\$1.35	6.3 c.t.	1	A
P-2961.....	\$3.45	6.3 c.t.	3	B
P-3040.....	\$2.10	5 c.t.	3	A
P-3041.....	\$3.45	{ 5 c.t. 6.3 c.t.	{ 3 3.6 }	A

ASK YOUR JOBBER FOR A COPY OF THE NEW COMPLETE MERIT CATALOG



# MERIT COIL & TRANSFORMER CORP.

TELEPHONE  
4427 North Clark St. Long Beach 6311 CHICAGO 40 ILL.



# TRANSMITTING and SPECIAL PURPOSE TUBES

**BIG SAVINGS NOW on Top Grade Tubes from our Tremendous Stock! All Brand New—All JAN Inspected—All made by Leading Manufacturers to Signal Corps specifications. Stock up NOW!**

**3C24/24G. Transmitting Triode..... Each 39¢ 6 for \$1.80**  
**316A, Doorknob VHF Transmitting Tube..... Each \$1.80**

E1148* .095	5BP4 \$3.95	807 \$1.15	954 \$0.49
EF50* .79	5CP1* 3.75	809 1.65	955 .49
HY815* .95		810 6.95	957 .49
VR105* .89	6AK5 .89	811 1.79	958A .49
VR150* .89	10Y .59	813 7.95	959 .49
2AP1 2.49	211 .69	814 2.95	1616* 2.95
2C40 .89	285A* .75	815 1.69	1619 .49
2C43* 4.95	286A* .69	826 .79	1624* .90
2C44 1.35	304TH* 3.95	829B 4.95	1625 .49
2D21 .98	304TL 1.39	830B 3.95	1626 .49
2E22 1.50	331A/805* 4.95	832A 2.65	1665/2050* 1.18
2X3A* .99	705A 2.95	836* 1.25	2051* .69
2X2/879 .49	717A 1.65	838 3.95	7193 .49
3AP1 2.39	723AB* 5.95	843 .45	8005* 4.95
3B24 1.95	801A 1.49	845W 3.45	9001 .49
3CP1 .39	803 8.95	866A* .98	9002 .69
3CP1S1 .39	804 8.95	872A 1.75	9003* .49
3E27 3.49	805 4.95	931A 2.39	9004 .49
3GCT/1852 .99	8C4 .29	12A6 .29	9006 .49
3AG5 .59	8J6 .89		

\* Available From New York Only

## Terrific Value! JACKSON MULTIMETER



Model 643  
**\$29.50**

While They Last! Regularly \$45

**1000 ohms per volt. A Real Buy! Automatic range selection—push button controlled. 23 ranges—7 functions: ½ ohm to 5 megs, AC Volts 0-5000, DC Volts 0-500, Decibels —10 to +64, DC Volts 0-5000, Microamps 0-1000, Amps. 0-10. Welded steel case 8½ x 8½ x 6". Self-contained battery and test leads included. While They Last! Wgt. 8 lbs. Cat. No. S-821.... Reduced to \$29.50**

## TRANSFORMER SPECIALS

**POWER TRANSFORMER—Pri: 120V, tapped at 110V, 60 cycles. Sec: 768V, CT at 805 Ma. Electrostatically shielded. Flush Type Mtg. 4¼ x 3¼ x 5¼" overall Hgt. 12 lbs. No. S-851..... \$3.95**

**FILAMENT TRANSFORMER—Electrostatically shielded. Flush mtg. Pri: 117V, 60 cycles. Sec: 5V at 6 amps, and 6.3V at 6 amps. 3¼ x 3¼ x 3¼" H overall. 5 lbs. No. S-852..... \$1.95**

**CHOKE—4.2 Hy at 300 Ma. DCR 78 ohms. Fully enclosed in metal case. Four stud mtg. 2500V breakdown. 4 x 4 x 4¼" H. 8 lbs. No. S-853..... \$2.95**

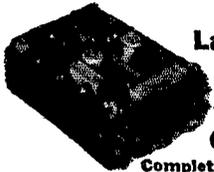
**50 MA POWER TRANSFORMER—Fully enclosed, flush mtg. Socket for 5Y3 Rectifier built into top and internally wired. Pri: 117V, 60 cy. Sec. #1: 530 V, CT at 50 ma. Sec. #2 supplies 5V at 2 amps, to socket. Sec. #3: 6.3V at 1.9 amps. Electrostatically shielded. 2¼ x 3 x 3¼" above chassis. 8 lbs. No. S-837..... \$2.19**

**UNIVERSAL 55 MA POWER XFORMER—Has Tap Switch to adjust primary input from 110 to 245 volts, 60 cycles, in 6 stages. Fully enclosed, flush mtg. Sec: 530V, CT at 55 Ma, 5B at 2 amps.; 6.3V at 3.15. Electrostatically shielded. Mtg. Cntrs. 2¼ x 2¼" x 5 lbs. No. S-835..... \$2.49**

**160 MA POWER XFORMER—Pri: 110V, 60 cycles. Sec: 720V, CT at 160 Ma.; 6.3V at 4 amps.; 5.0V at 3 amps. Fully enclosed, flush mtg. Overall: 4¼ x 3¼ x 3¼" x 8 lbs. No. S-793..... \$3.49**

**POWER TRANSFORMER—1845V each side of CT at 500 ma. Primary tapped 105/115/125V. Fully encased, inverted flange mtg. Screw Terminals. \$14.95 No. S-877.....**

**MULTIPLE FILAMENT TRANSFORMER—Primary 105/115/125V at 60 cycles. 6 separate secondaries all CT as follows: 3 windings at 6.4V at 8 amps.; 2 windings at 2.6V at 2.5 amps.; 1 winding at 2.6V at 10 amps. Inverted flange mtg. 4¼ x 5 x 5¼" H. 14 lbs. No. S-880..... \$5.95**



## Last Call for BC-645

RCVR-XMTR

**Only \$9.95**

Complete with 15 tubes

Join the gang on 420 Mc with these Brand New BC-645 Rigal Easy to convert for voice or CW. Complete instructions furnished. Xmitter uses 316A self-excited oscillator using tuned lines. Receiver is extremely stable 11 tube superhet using tuned lines in RF and HF osc. circuits. 3 IF stages at 40 mc with 7H7's, 15 tubes: 4-7F7, 4-7H7, 2-7E6, 2-6F6, 2-955, 1-WE316A. Less power supply. Shpg. Wgt. 25 lbs. Cat. No. S-588, While They Last \$9.95

## H-23U DeLuxe HANDSET



A fine Telephone Handset that's perfect for your portable or marine rig. Brand New Signal Corps unit. High impedance phone, low resistance carbon mike. Butterfly switch. PL-55 and PL-68 plugs attached with sturdy 6 ft. rubber covered cord. Excellent sensitivity. Light weight is ideal for mobile use. Shpg. Wgt. 3 lbs. Cat. No. S-674..... Special \$3.95

## Universal Type "W" HandMike

A good single button carbon microphone that will take plenty of abuse. Just the thing for a mobile transmitter or for use in P.A. work where a carbon microphone is required. Furnished with detachable handle. Cat. No. S-893 Special, Only \$9.8¢



## "Mac" KEYS

Model 200

Genuine "Mac" Transmitter Key for code practice or communication work. Heavy silver contacts. Cat. No. S-722..... Special 69¢



## AERIAL FEEDERS

A Terrific Value! Short lengths of coax cable are always useful. Lo-loss polystyrene insulation. ¼" dia. Get a supply while they last!

Cat. No. S-214 47" long 10¢  
 Cat. No. S-215 79" long 19¢



## Signal Corps Crystals

Mounted in FT-243 holders. All brand new! This holder alone is worth more than our complete price. Get a supply today and grind to your own frequency.

Cat. No. S-606 3995 kc) EACH 19¢  
 Cat. No. S-607 4450 kc)

## Silicon Crystal Diodes

Designed for converter use at 10,000 mc. Swell for building a field strength meter, diode limiter or for use where a diode handling small currents is required. Plug-in type. Type 1N28. Cat. No. S-269... Special 39¢



## PYREX 7" INSULATORS

Here's a very hot buy! A standard Pyrex 7" glass insulator. Some new—some shop-worn. However, all in perfectly good, useable condition. Normally sold for 90¢. Stock up now at our low price! Wgt. 1 lb. Cat. No. S-892 Very Special, Each... 39¢

# NEWARK

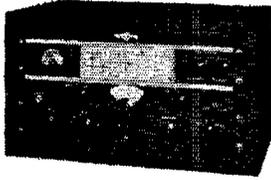
RADIO & TELEVISION

**3 GREAT STORES! Uptown at 115 West 45th Street and Downtown at 212 Fulton Street in NEW YORK 323 West Madison Street in the heart of CHICAGO**

**MAIL ORDER DIVISIONS: 242 West 55th St., N.Y. 19 and 323 West Madison Street, Chicago 6, Illinois**

## COLLINS 75A RECEIVER

Here is a receiver that meets the requirements of the most discriminating amateur. Double conversion provides approximately 50 db image rejection even on 10 meters. Band width variable in 5 steps from 4 Kc to 200 cycles at 2X down. Covers 80, 40, 20, 15, 11 and 10 meter bands. Complete with 14 tubes, speaker and instruction book. Shpg. Wt. 190 lbs.  
**No. A19080 \$375.00**  
**Amateur Net.**



Only \$75 Down—12 Months at \$26.50

### OTHER COLLINS EQUIPMENT

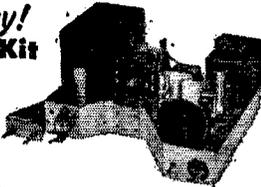
- 70E-8, Variable frequency oscillator. **Amateur Net \$40.00**  
**No. A19083, Shpg. wt. 7 lbs.**
- 310E-1, 15 watt Band Switching Exciter unit complete. **\$190.00**  
**No. A19086, Shpg. wt. 50 lbs.**
- Only \$38 Down—12 Months at \$13.43
- 310C-2, Exciter. Uses 70E-8 Oscillator and Multipliers. Complete with power supply. **\$100.00**  
**No. A19085, Shpg. wt. 27 lbs.**
- Only \$20 Down—12 Months at \$7.07

## Terrific Television Buy!

### Tech-Master 630TK 10" Kit

Complete with All Parts, Instructions, and 30 RCA Tubes (including 10-BP4.) Duplicates in every respect the famous RCA 630TS, generally accepted as best engineered TV set available!

**\$198.50**



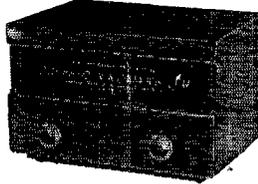
This Soundview 630TK kit is an exact copy of famous RCA 630TS Television set. Contains efficient RCA front end 18-channel tuner—completely factory wired and aligned with 8 RCA matched tubes, plus built-in wave trap. Complete with 30 RCA tubes (12" or 15" tube can be substituted for 10BP4 if desired). Dual controls for picture and FM sound, and for horizontal and vertical control. Kit is supplied with RCA schematic and service manual, but less wire, solder, and mtg. screws. **Cat. No. A-19752.** Shpg. wt. 85 lbs. **Only \$39.70 Down—12 Months at \$14.03**

Mahogany Cabinet, Hand rubbed. **No. A19753 \$42.50**

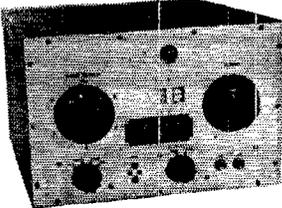
## Sensational General Electric FM TUNER

Covers entire FM band with Amazing Fidelity. Uses "Guillotine Tuning". Beautiful Walnut cabinet. 20 lbs. — No. A-302

Model XFM-1  
**\$49.50**  
 Complete with 3 Tubes



## MEISSNER SIGNAL SHIFTER



Enjoy the thrill of assembling the famous Meissner Signal Shifter and save 50% on the cost. The finished unit will be identical to the factory wired job even to panel marking. Furnished complete with all parts including the shielded turret assembly which is completely built-up ready to install. Complete easy to follow, step by step instructions, including schematic diagram and photos. Shpg. Wgt. 40 lbs.  
**No. 35335 \$49.75**  
**Amateur Net.**

Model FMX, Phase Modulator designed for use with the signal shifter. Adopts the signal shifter to a low power NBFM transmitter. **\$12.00**  
**No. 35300, Shpg. Wgt. 3 lbs.**

## FREE! Mail this Coupon for NEW 1949 CATALOG



Newark Electric Co., Dept. IA  
 242 West 55th St., N.Y. 19, N. Y.

Please send me FREE the Newark 1949. Catalog.

My Name.....

Address.....City.....State.....

## BY-LINES... by

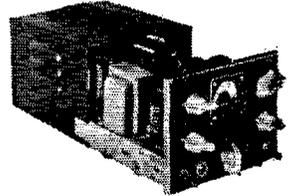
*Bob Gunderson*  
**W2JIO**



Winter operations are beginning and our first consideration is the antenna. I work anything that comes along, and folded di-poles will be used this year. While these antennas are not the best, W2JIO well remembers the ice storms of last January which took down most local antennas. These will be used once they represent complete loops, per se they represent complete loops permitting the feeders to be connected across an old 2.5 V filament transformer, the short circuit current being sufficient to keep the antenna from collecting ice. Try it and see, and stay on the air!

73, Bob - W2JIO

## SUBRACO MT-15X 10 Meter "Dashboard" Xmtr.

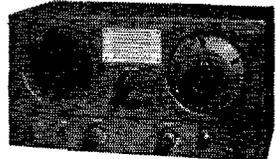


Only 5 1/2" x 4 1/2" x 6 1/2" deep, this compact mobile transmitter is a miniature power house. Designed to operate at 30 watts input. Circuit uses a 6V6 Tritet Xtl. Oscillator quadrupling from 7 to 28 Mc driving a 2E26 Class "C" modulated amplifier. High level class B Modulator can deliver 17 watts of audio. Built-in antenna relay. All controls on front panel including miniature illuminated meter with 3 scales to meter all stages. Will operate from 300-400 volts at 160 ma. Less tubes and accessories. Shpg. Wt. 8 lbs.

**No. A17075, \$79.95**  
**Amateur Net.**

**\$15.99 Down—\$5.65 Monthly**  
 Complete with tubes and two male antenna connectors—less crystal  
**No. A17076, \$87.50**

## NATIONAL HFS RECEIVER



Acclaimed by engineers as the finest, most versatile high frequency receiver covering the 27 to 250 mc. May be used for FM, AM and CW. Also operates as converter when used with any superhet tuning to 10.7 Mc. When used with a 10.7 mc. IF strip delivers the ultimate in High Fidelity FM reception. Less power supply. 25 lbs.

**No. A19114, \$125.00**  
**Net.**

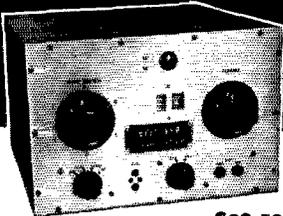
**\$25 Down—\$3.84 Monthly**  
 No. 5886 Power Supply for 110 V, 60 cycle operation.  
**No. A19105, Net \$22.40**

# SAVE 50%

## NEW MEISSNER SIGNAL SHIFTER Now Available In Kit Form

### \$49.75

AMATEUR NET  
IN KIT FORM



\$99.50

Complete Assembled Unit

You can now own a high quality ECO at half price by building it yourself. Complete, easy to follow, step by step instructions including schematic diagram, photos and pictographs make assembling a joy. All you need is a pair of pliers, a screwdriver and a soldering iron. Everything else—including cabinet and tubes, wire and solder—is furnished. The only two difficult jobs are already done! The complicated shielded turret assembly and band spread gear mechanism are already completely built up; ready to install.

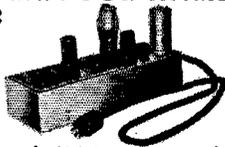
### Compare these features

- Band Switching — Six position shielded turret. 10, 11, 15, 20, 40 and 80 meter bands. Blank position for additional band.
- Single Tuning Control
- Self-Contained Power Supply
- Osc. or Amp-doubler Keying
- Magic Eye Tuning Indicator
- Output, Six Watts with 807 Loading
- Crystal Control on any Band
- Stability — Achieved by high quality components, efficient design.
- Voltage Regulation
- Zero Temperature Coefficient Capacitors
- Turret Mounted Inductors
- Exclusive MEISSNER Stand-By Circuit.

Amateurs! Here's your opportunity to own a high quality Signal Shifter at a real saving!

## HERE'S MORE GOOD NEWS FOR HAMSI! NBFM with New MEISSNER Phase Modulator FMX . . .

The new MEISSNER FMX PHASE MODULATOR is designed for quick conversion of the Signal Shifter to NBFM phone. The deviation control allows a swing of 5 to 10 KC at 28 mc. Input for high impedance crystal or dynamic mike is provided. Any Class C amplifier that the Signal Shifter is capable of driving becomes a phase modulated amplifier.



The FMX MODULATOR is installed in the position normally occupied by the power supply, the latter becoming a remotely located unit. Plate and filament voltages for the FMX are secured from the SIGNAL SHIFTER power supply. Tubes required: 6SJ7, 6SG7 and VR-150.

Model FMX PHASE MODULATOR,  
complete, less tubes, Amateur Net. . . . . \$12.00

**ORDER AT YOUR DEALER TODAY!**

SIGNAL SHIFTER KIT, Part No. 10-1207. . . . . \$49.75

# MEISSNER

mfg. division

MAGUIRE INDUSTRIES, INC. MT. CARMEL, ILL.

Export Sales Scheel International, Inc., 4237 North Lincoln Avenue, Chicago 18, Illinois Cable Harscheel

(Continued from page 98)

multiband antennas; ZNL is rebuilding; DWH is doing FB on 7 Mc.; PJF and INP and family spent fine vacation in Sequoia Park with portable on all bands; HDE has had receiver trouble; AQQ is active on 144 Mc. and MDQ can be found on 28 and 144 Mc.; EXH went airborne on 144 Mc. and has applied for OBS appointment. YGZ is interested in ORS and RM appointments. BHI is busy going to school and working in b.c. station. The Fresno father-and-son team, PTF and ZVP, are on 14 Mc. shooting for DX. QEU has new construction permit for b. c. station in Fresno. QOS and FKL have joined Civil Air Patrol. MEY moved to new QTH. PHL and OHB are keeping Merced on the air. If interested in an appointment, fellows, drop me a line. Traffic: W6BXN 254, BHI 15, FKL 6.

### ROANOKE DIVISION

**NORTH CAROLINA** — SCM, W. J. Wortman, W4CYB — DGV is knocking around on 14- and 28-Mc. 'phone. NI is kicking a mean hole in 14- and 3.9-Mc. 'phone with a "gallon." IDO has plans for 28 and 50 Mc. MYO is working some 144-Mc. stuff. DLX, AAU, and CYB work 144 Mc. almost nightly. DPV, who was KA1SS for some time, visited the Key and Mike Club in Winston-Salem. MR has been laying around on 14 Mc. but has managed a few new countries. GG and CS have obtained the necessary pasteboards for DXCC Certificate. GXB put up a steel tower for a 14- and 28-Mc. rotary. HEH is gunning for DX on 14-Mc. c.w. GGU is running a 304TL and is DX hunting. EIW has given up 'phone for 14-Mc. c.w. AIT has over 150 confirmations. UA is another 14-Mc. DX hound running a pair of 812s. MR says he is all but surrounded by hams — GG, GXB, GXF, EIW, HEH, BHA, MDD, UA, MHE, GXA and a couple of others, all within one mile. NAP lacks five states for WAS Certificate. MWF, ex-9MWF, is a new ham in Hickory. We want to thank NYE for a nice letter. Bob, a shut-in from over Rocky Mount way, is new in the game but is well known to the "1330" Club. Listen for him on 3520, 3550, or 3580 kc. and give him a buzz. KJS is working hard on the Emergency Corps. Please send in applications for EC in your community if one has not been appointed. JPY is new EC for Elizabeth City, and IMH is EC for the Mountain Counties around Plumtree. The North Carolina Net is functioning again on 3605 kc. and the 'phone net on 3865 kc., both operating five nights per week.

**SOUTH CAROLINA** — SCM, Ted Ferguson, W4BQE/ANG — Thanks to NTO for the dope from Spartanburg. BEH has 400 watts on 14-Mc. c.w. NTO has p.p. 807s with 150 watts on 14 Mc. and an 829 on 144 Mc. LAT operates portable/mobile on 28 Mc. CEL keeps up the good work on 3.85-Mc. 'phone. MJT operates 7-Mc. c.w. and hopes to be on 28-Mc. 'phone soon. KIM is building a new VFO. MAO operates 7-, 14-, and 28-Mc. c.w. JGM is constructing 35-ft. steel tower. HEV operates 3.85-Mc. 'phone. New hams in Columbia are NZK, OAD, and OAP. My thanks go to ANK for the nice report of activities from Charleston and Summerville. MRK and OAK are 7-Mc. c.w. boys. DFC will be on 7- and 14-Mc. c.w. and 28-Mc. 'phone from Isle of Palms. MRJ keeps up his activity in the S. C. and Cracker Net. DNR has new p. p. 812 final with 450 watts on 7 Mc. BIZ is on 7 Mc. and carries his usual group of schedules. IZD operates 3.5 Mc. and is building emergency transmitter and receiver. CE can be heard on 3.85-Mc. 'phone and 3.5-Mc. c.w. Our SEC, ANK, is doing a wonderful job and needs your support for his c.w. and emergency net. We will gladly furnish ORS and OPS application blanks on request. Traffic: W4BIZ 45, ANK 11, DNR 4.

**VIRGINIA** — SCM, Victor C. Clark, W4KFC — Virginia was represented at the National Convention in Milwaukee by AKN, IQE, IA, IPS, KAO, KFC, KVM, LKB, LKB, and NRO. LKB reports that CT now signs VOZCO on all bands from Argentina, Newfoundland. KHM is station of HQ First AACB Wing at Langley Field; most operation is on 28 Mc. New CD appointees: JHI (OBS), KWY (EG for Norfolk area). KWY is ex-3EMM of DX contest fame! KDY, our SEC, was married Aug. 21st. NQV carted off numerous prizes in recent model airplane contest at Detroit. KAO, our 2-AM, OLD, KDY, and others are investigating the feasibility of placing Virginia 3-Mc. 'phone net on daily schedule basis for purposes of handling traffic and emergency preparedness. Liaison stations are to be selected to relay traffic between the section 'phone and o.w. nets. ECs are required in nearly all sections of the State. Volunteers are requested to contact the SEC or the SCM. FV has been bargain-hunting on New York's "radio row." KKN is building separate kw. finals for use in the DX Contest. He and NNN plan to erect beams for 14-Mc. DX work. KFC had BRB, from Florida, KDY, and KYD as visitors. FF was host to PVRC members at his Chesapeake Bay summer home. The Arlington Radio Club held a get-together at the home of IWO. IPC is oiling up his rig for use on VN (Virginia Net). LIQ is close to the 100-country mark, using inside antennas. HRD, from Philadelphia, was a recent visitor at PVRC. A meeting of the PVRC at the home of CC literally disintegrated when one of the members snagged ZC1CL on CC's rig. Our report is that everyone reached home in time to add the rare one to his collection. From all appearances there will be strong Virginia participation in

(Continued on page 98)

# HAMMARLUND

## CAPACITOR CATALOG

HAMMARLUND MFG. CO. INC. 460 WEST 34<sup>TH</sup> STREET, NEW YORK

Publication date  
November 15, 1948

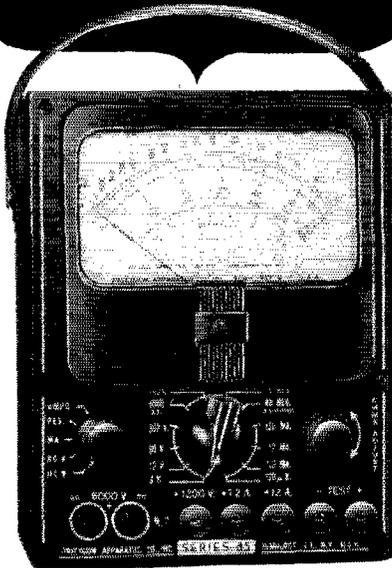
A brand new catalog for manufacturers, engineers, and amateurs. Illustrated with large photos and detailed drawings. Write today for your free copy!



# HAMMARLUND

THE HAMMARLUND MFG. CO., INC., 460 W. 34<sup>TH</sup> ST., NEW YORK 1, N. Y.  
MANUFACTURERS OF PRECISION COMMUNICATIONS EQUIPMENT

# APPLICATION ENGINEERED "PRECISION" Circuit Tester 20,000 Ohms per Volt



## THE NEW SERIES "85"

Compact, laboratory styled, *high sensitivity* test set "Application Engineered" for test and service-maintenance phases of modern *radio-electronics-communications*.

20,000 Ohms per Volt D.C. • 1000 Ohms per Volt A.C.

**VOLTAGE RANGES:** 0-3-12-60-300-1200-6000 A.C. & D.C.

**CURRENT RANGES:** 0-120 microamps; 0-1.2-12-120-MA.; 0-1.2-12 Amps D.C.

**RESISTANCE RANGES:** 0-6000-600K-6 Meg-60 Megohms.

**DECIBEL RANGES:** From -26 to +70DB.

Complete with batteries and test leads..... **\$3875**  
PLUS superior physical features:

- ★ 4 1/2" wide angle meter.
- ★ Heavy duty bakelite case size 5 1/2 x 7 1/4 x 3"
- ★ Heavy gauge, anodized aluminum panel.
- ★ Rotary Range and Function Selection.
- ★ Recessed 6000 volt safety jacks.
- ★ Only two pin jacks for all standard ranges.

See this new "Precision" Test Set at all leading radio parts and ham equipment distributors. Write for the Precision 1948 catalog describing quality Electronic Test Instruments for all phases of modern radio-electronics A.M., F.M. and TV.

### PRECISION APPARATUS CO., INC.

92-27 Horace Harding Blvd., Elmhurst 13, N. Y.

Export Division: 458 Broadway, N. Y. City, U.S.A.  
Cables: MORHANEX

the forthcoming SS. Let me know how many Virginia stations you contact in this contest. Traffic: (July) W4FV 17. (August) W4KVM 15, KFC 12, FV 5.

**WEST VIRGINIA** — SCM, Donald B. Morris, W8JM — The MARA revived interest by holding an auction, with YGL the M.C. BWI transferred to Spencer and operates on 3.5-Mc. c.w. EC FMU has a fine Community Plan which other ECs should follow. DCO, a new amateur in Clarksburg, operates on 28 Mc. LQR is a new amateur in Elkins. OXO uses spare time converting surplus gear. PQQ and VMK attended the National Convention and CCN visited VE2s while on vacation. QG and GBF have new automatic keyers. RCN has new 152A and rig on 50 Mc. OJI and YB operated low power 'phone while on vacation. JM has new homemade 28- and 54-Mc. converter. RGP, NTV, and KXV have 28-Mc. beams, and with MIS have 28-Mc. Net. EP, with good location and low power, works into Ohio on 144 Mc. CSF, DFC, NTV, BTV, GBF, QG, and JM have increased power for 3770 Net operation. Amateurs interested in a State 'phone net are invited to drop me a line stating your preference of time and frequency. 3GEG and 3NCD visited the MARA while on vacation. Formation of a radio club at Parkersburg has increased activity in this vital Ohio River city. Traffic: W8GBF 5, JM 3, QG 2.

## ROCKY MOUNTAIN DIVISION

**COLORADO** — SCM, Glen Bond, W8QYT — IC is re-building, using a broad-band frequency multiplier from 3.5 to 28 Mc. with a pair of 811s in the final. MOM, in Lamar, tells us he is copying MTF on single side-band. Mac says it is FB when you learn how to tune it in. ZCX is living in Arkansas at present. AML now has his Class A ticket and is on 3.85-Mc. 'phone. LZV cancelled his schedules to rebuild the rig and overhaul the antenna. Elmer now is ready for heavy traffic. SGG is taking a little rest at Sunnysrest in Colorado Springs but has his rig set up in his room and started the Interstate Utility Net Sept. 13th at 8:30 P.M. on 3540 kc. and will operate Mondays through Fridays at this time and frequency. Any stations interested, please call in on this frequency. DYS has moved to Canon City and should be on the air soon. The Denver Radio Club held an election of officers in September and is starting a membership drive. The Electron Club has started meetings after a two-months summer vacation. The mobile boys have had a fine summer of operating and Colorado has had a number of out-of-State mobiles visit us. Traffic: W8FZI 13, LZV 11, MOM 5, SGG 4.

**UTAH-WYOMING** — SCM, Alvin M. Phillips, W7NPU — UTM was awarded a Public Service Certificate for his participation in the Columbia River flood emergency. TST is building a housetop tower for his 30-Mc. beam. The gang welcomes BED back to Utah. After a year's absence John has returned and is setting up at St. George. DAD likewise has returned and is locating at Modena, Utah. PA has moved to California. LLIH is sneaking a little 4-Mc. 'phone and FYR is on 14 Mc. when not using his spare time building a new 3.5-Mc. final. DTB is busy working on his new 1-kw. bandswitching rig which will cover all bands from 50 Mc. to 3.5 Mc. Traffic: (July) W7UTM 52. (August) W7UTM 60, TST 4.

## SOUTHEASTERN DIVISION

**ALABAMA** — SCM, Dr. Arthur W. Woods, W4GJW — Mack, Lois, and Little Mack, who are respectively HYI, FGR, and ???, are on 14 and 28 Mc. AUP simulated emergency status while taking portable rig on vacation. MXU will be out of the Air Forces instead of going to D4 Land. The Brookley Air Force Base Amateur Club uses BC-610s on all bands. The Brookley Club moves considerable traffic. CIU soon will be on the air from Jasper, the farthest known northwestern Alabama station. GOF, LRU, and CIU all work 144 Mc. but need schedules with other stations within range. AEC work is continuously forging ahead and this section has nets functioning nightly on 3715, 3955, and 7220 kc. NCs are IMK, GBR, and DD, respectively. MAB has replaced KCQ as SEC and everybody's most sincere thanks go to KCQ for his perfect job of organizing the AEC in this section. During the recent mild hurricane disturbance all three nets were alerted and in stand-by status. Liaison was maintained between all nets. An organizer and NC for a 144-Mc. net is being sought. All suggestions will be gladly accepted by your SCM. Every ham is requested to become a member of one of the nets and to assist in liaison work with nets of adjacent sections. GJW has new YL Jr. operator.

**EASTERN FLORIDA** — SCM, John W. Hollister, W4FWZ — Amateur Radio lost a lifelong friend and worker in the untimely death of 1BEH. Caryn on, 1BUD, The Palmetto Net, on 3875 kc., is in full swing again. The first hurricane threat found all nets ready to go. Official WX from JJP was rebroadcast by b. c. stations all over the State. IQV, DU, and FWZ were alerted to stand by, by the National Emergency Net. Ft. Lauderdale: ZC reports excellent tie-in with Disaster Relief Committee with extensive set-up on 7 and 144 Mc. MGW now is AEC member. Gainesville: EID and GYO, our OES, turned in excellent reports on v.h.f.

(Continued on page 108)

# PLASTICON CAPACITORS

## HI VOLT POWER SUPPLIES



Designed to transform 118 VAC to high voltage—low current DC for use in radiation counters, oscilloscopes, dust precipitators, projection television sets, spectrographic analysers, photomash equipment, etc. Hi Volt Power Supplies are self-contained in hermetically sealed steel containers.

### HIVOLT

Cat. No.	VDC	Dimensions	Your Cost
5-1	2400	3" x 3 3/4" x 5 1/2"	\$11.14
5-2	2400	3" x 3 3/4" x 5 1/2"	15.14
5-5	5000	4" x 3 3/4" x 6 1/2"	38.22
5-10	10000	4" x 3 3/4" x 8"	58.80
5-30	30000	7x7x7"	147.00

## PHOTOFLASH CAPACITORS

For the best in photoflash capacitors, specify PLASTICONS for faster recharge and more light. Type AOCOE are the lightest photoflash capacitors made, more flexible to use, safer and more economical than single high capacitance large block.



### PHOTO FLASH

Cat. No.	Watt Sec.	Pk. Chg. V.	Dimensions	Your Cost
COE22C3	7.6	2250	4x2x1 1/4"	\$2.92
COE3M2	9	3000	4x2x1 1/4"	3.00
COE4M1.5	12	4000	4x2x1 1/4"	3.20
COE5C1	15.1	5500	4x2x1 1/4"	3.56
CEAM12	100	4000	4 1/2 x 4 1/2 x 3 3/4"	27.17
CE4M24	200	4000	8x4 1/2 x 3 3/4"	38.81

## PLASTICONS

By the use of synthetic plastic film dielectrics, PLASTICONS can be made smaller, lighter, more efficient and more economical than older types of capacitors made with paper and mica insulation. Plasticon films are chemically purer and more uniform. Plasticon capacitors have a longer life and can operate under more severe conditions.

### SPECIAL PLASTICONS

Taking advantage of the wide variety of plastic film dielectric characteristics, Plasticons are engineered to meet many special applications. We can furnish capacitors for 200°C; for pulse network duty; close tolerances; ultra high resistance.

Manufactured by

**CONDENSER PRODUCTS CO.**

1375 North Branch St., Chicago 22, Ill.

## GLASSMIKES ASG



Type ASG are Plasticon A dielectric-silicone fluid impregnated capacitor elements in hermetically sealed glass tubes. Temperature range—60° C to +125° C. The smallest and lightest high voltage capacitors made. Type ASG are ideal for DC and low frequency AC applications.

Cat. No.	Cap. Mfd.	Volts D.C.	Dimensions	Your Cost
ASG 1	.01	600	1 1/2 x 1 1/4"	\$ .88
ASG 2	.02	600	1 1/2 x 1 1/4"	.94
ASG 3	.05	600	1 1/2 x 1 1/4"	1.03
ASG 4	.1	600	1 1/2 x 1 1/4"	1.15
ASG 5	.25	600	1 1/2 x 2 1/4"	1.32
ASG 6	.5	600	1 1/2 x 2 1/4"	1.53
ASG 7	.005	1,000	1 1/2 x 1 1/4"	.88
ASG 8	.01	1,000	1 1/2 x 1 1/4"	.94
ASG 9	.02	1,000	1 1/2 x 1 1/4"	1.00
ASG 10	.05	1,000	1 1/2 x 2 1/4"	1.09
ASG 11	.1	1,000	1 1/2 x 2 1/4"	1.26
ASG 12	.25	1,000	1 1/2 x 2 1/4"	1.47
ASG 13	.5	2,000	1 1/2 x 1 1/4"	1.12
ASG 14	.005	2,000	1 1/2 x 1 1/4"	1.21
ASG 15	.01	2,000	1 1/2 x 1 1/4"	1.32
ASG 16	.02	2,000	1 1/2 x 1 1/4"	1.47
ASG 17	.05	2,000	1 1/2 x 1 1/4"	1.66
ASG 18	.1	2,000	1 1/2 x 2 1/4"	1.88
ASG 19	.25	2,000	1 1/2 x 2 1/4"	2.18
ASG 20	.001	3,000	1 1/2 x 1 1/4"	3.03
ASG 21	.002	3,000	1 1/2 x 1 1/4"	3.09
ASG 22	.005	3,000	1 1/2 x 1 1/4"	3.18
ASG 23	.01	3,000	1 1/2 x 1 1/4"	3.28
ASG 24	.02	3,000	1 1/2 x 1 1/4"	3.44
ASG 25	.05	3,000	1 1/2 x 2 1/4"	3.62
ASG 26	.1	3,000	1 1/2 x 2 1/4"	3.82
ASG 27	.001	5,000	1 1/2 x 1 1/4"	3.82
ASG 28	.002	5,000	1 1/2 x 1 1/4"	3.94
ASG 29	.005	5,000	1 1/2 x 1 1/4"	4.09
ASG 30	.01	5,000	1 1/2 x 1 1/4"	4.26
ASG 31	.02	5,000	1 1/2 x 2 1/4"	4.50
ASG 32	.05	5,000	1 1/2 x 2 1/4"	4.79
ASG 33	.1	5,000	1 1/2 x 2 1/4"	5.35
ASG 34	.001	7,500	1 1/2 x 1 1/4"	4.12
ASG 35	.002	7,500	1 1/2 x 1 1/4"	4.26
ASG 36	.005	7,500	1 1/2 x 1 1/4"	4.44
ASG 37	.01	7,500	1 1/2 x 2 1/4"	4.79
ASG 38	.02	7,500	1 1/2 x 2 1/4"	5.44
ASG 39	.05	7,500	1 1/2 x 2 1/4"	6.76
ASG 40	.0005	10,000	1 1/2 x 1 1/4"	4.29
ASG 41	.001	10,000	1 1/2 x 1 1/4"	4.41
ASG 42	.002	10,000	1 1/2 x 1 1/4"	4.59
ASG 43	.005	10,000	1 1/2 x 1 1/4"	5.29
ASG 44	.01	10,000	1 1/2 x 2 1/4"	6.17
ASG 45	.02	10,000	1 1/2 x 2 1/4"	7.35
ASG 46	.03	10,000	1 1/2 x 3 1/4"	8.82
ASG 47	.06	10,000	1 1/2 x 3 1/4"	10.29
ASG 48	.0005	15,000	1 1/2 x 2 1/4"	8.53
ASG 49	.001	15,000	1 1/2 x 2 1/4"	8.70
ASG 50	.0005	20,000	1 1/2 x 3 1/4"	11.47
ASG 51	.001	20,000	1 1/2 x 3 1/4"	12.05
ASG 52	.0005	30,000	1 1/2 x 3 1/4"	13.24

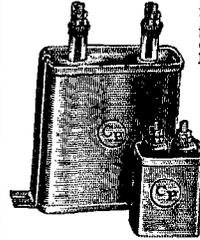
## RF GLASSMIKES



Plasticon L film-silicone fluid impregnated in glassmike style case. Type LSG has Q of 2500 to 5000. Rated at 2500 WV—7500 V Test. Lower losses, more easily mounted, smaller and more economical than mica capacitors.

Cat. No.	Cap. Mfd.	Dimensions OP Length	Your Cost
LSG500	.00005	1 1/2 x 1 1/4"	3.88
LSG101	.0001	1 1/2 x 1 1/4"	.88
LSG751	.00025	1 1/2 x 1 1/4"	.88
LSG501	.0005	1 1/2 x 1 1/4"	.88
LSG102	.001	1 1/2 x 1 1/4"	1.00
LSG202	.002	1 1/2 x 1 1/4"	1.44
LSG502	.005	1 1/2 x 1 1/4"	2.06
LSG602	.006	1 1/2 x 1 1/4"	2.20
LSG103	.01	1 1/2 x 1 1/4"	2.50

## INDUSTRIAL and TRANSMITTING



Plasticon A element; mineral oil impregnated in sturdy lead coated steel containers. Smaller, lighter and more economical than paper capacitors. Temperature range—40° C to +105° C. Type AOC-Rectangular; Type AOC-Oval. Type ASC and A8CO (not listed) have Plasticon A element, silicone impregnated. Same dimensions as corresponding AO types. Temperature range—60° C to +125° C. greater capacitance stability. Prices on application.

range—60° C to +125° C. greater capacitance stability. Prices on application.

## DC RECTANGULARS

Cat. No.	Cap. Mfd.	Volts DC	Dimensions	Your Cost
AOC6C1	1.0	600	2 1/4 x 1 1/4 x 1"	\$2.19
AOC6C2	2.0	600	2 1/4 x 1 1/4 x 1"	2.65
AOC6C4	4.0	600	2 1/4 x 1 1/4 x 1"	3.30
AOC6C8	8.0	600	2 1/4 x 1 1/4 x 1"	4.98
AOC6C10	10.0	600	2 1/4 x 1 1/4 x 1"	5.60
AOC1M1	1.0	1,000	2 1/4 x 1 1/4 x 1"	2.37
AOC1M2	2.0	1,000	2 1/4 x 1 1/4 x 1"	3.17
AOC1M4	4.0	1,000	2 1/4 x 1 1/4 x 1"	3.85
AOC1M8	8.0	1,000	2 1/4 x 1 1/4 x 1"	5.43
AOC1M10	10.0	1,000	2 1/4 x 1 1/4 x 1"	6.27
AOC2M05	0.5	2,000	2 1/4 x 1 1/4 x 1"	2.84
AOC2M1	1.0	2,000	2 1/4 x 1 1/4 x 1"	3.47
AOC2M2	2.0	2,000	2 1/4 x 1 1/4 x 1"	4.02
AOC2M4	4.0	2,000	2 1/4 x 1 1/4 x 1"	5.43
AOC3M1	1.0	3,000	2 1/4 x 1 1/4 x 1"	7.12
AOC3M2	2.0	3,000	2 1/4 x 1 1/4 x 1"	9.05
AOC3M4	4.0	3,000	2 1/4 x 1 1/4 x 1"	12.52
AOC4M1	1.0	4,000	2 1/4 x 1 1/4 x 1"	16.17
AOC4M2	2.0	4,000	2 1/4 x 1 1/4 x 1"	19.40
AOC4M4	4.0	4,000	2 1/4 x 1 1/4 x 1"	26.64
AOC5M1	1.0	5,000	2 1/4 x 1 1/4 x 1"	19.40
AOC5M2	2.0	5,000	2 1/4 x 1 1/4 x 1"	24.25
AOC75C1	1.0	7,500	2 1/4 x 1 1/4 x 1"	29.57
AOC10M1	1.0	10,000	2 1/4 x 1 1/4 x 1"	51.74

## DC OVALS

Cat. No.	Cap. Mfd.	Volts D.C.	Dimensions	Your Cost
AOC06C2	2.0	600	2 1/4 x 1 1/4"	\$2.59
AOC06C4	4.0	600	2 1/4 x 1 1/4"	3.11
AOC01M1	1.0	1,000	2 1/4 x 1 1/4"	2.26
AOC01M2	2.0	1,000	2 1/4 x 1 1/4"	3.04
AOC03M01	0.1	3,000	2 1/4 x 1 1/4"	4.46
AOC05M01	0.1	5,000	2 1/4 x 1 1/4"	8.28
AOC05M025	0.25	5,000	2 1/4 x 1 1/4"	9.05
AOC05M05	0.5	5,000	2 1/4 x 1 1/4"	10.68
AOC08M005	0.05	8,000	2 1/4 x 1 1/4"	8.93
AOC08M01	0.1	8,000	2 1/4 x 1 1/4"	9.83
AOC010M005	0.05	10,000	2 1/4 x 1 1/4"	11.32

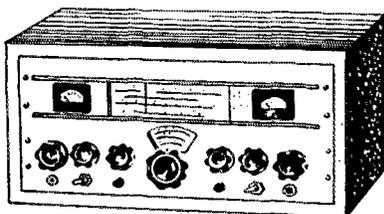
## LABORATORY CAPACITORS

Type LAG (Glassmike style) and Type LAC (Rectangular can) have the lowest dielectric absorption of any capacitor made. Residual charge is .01— .02% Dissipation factor at 1 MC is .0002 to .0003. Capacitance and Q is constant from DC to 100 KC. Resistance averages one million megohms per microfarad. Standard capacitance tolerance is ± 5%. Type LA units are used for timing and integrating circuits.

Cat. No.	Cap. Mfd.	Dimensions	Your Cost
LAG101	.0001	1 1/2 x 1 1/4"	\$1.76
LAG201	.0002	1 1/2 x 1 1/4"	1.76
LAG501	.0005	1 1/2 x 1 1/4"	1.76
LAG102	.001	1 1/2 x 1 1/4"	2.06
LAG202	.002	1 1/2 x 1 1/4"	2.06
LAG502	.005	1 1/2 x 1 1/4"	2.88
LAG103	.01	1 1/2 x 1 1/4"	3.94
LAG203	.02	1 1/2 x 1 1/4"	5.12
LAG503	.05	1 1/2 x 1 1/4"	6.17
LAC104	.1	2 1/4 x 1 1/4 x 1"	9.23
LAC204	.2	2 1/4 x 1 1/4 x 1"	9.82
LAC504	.5	4x2 1/4 x 1 1/4"	12.35
LAC105	1.	4x3 1/4 x 1 1/4"	18.87
LAC205	2.	4x3 1/4 x 1 1/4"	30.16
LAC505	5.	6x3 1/4 x 1 1/4"	57.98

**For SUBSTANTIAL SAVINGS  
with SURE SATISFACTION . . . buy at**

**The RADIO  
SHACK Corp.**



**COLLINS 32 V-1 XMTR**

A complete 150-watt transmitter that you can put right on your desk beside your receiver. Built by engineers who understand the desires of hams, the 32 V-1 has more desirable features per cubic inch than any other ham transmitter. Amateur net price .....\$475 \$95.00 puts it in your shack.

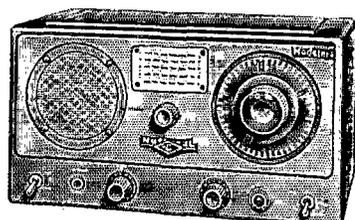
**CO-AX CABLE SETS**

Fifty-foot RG-8-U co-ax cable with PL-259 connectors \$1.95 attached each end

**ANTENNA WIRE**

Solid enameled  
100 feet #14 ..... .79  
100 feet #12 ..... 1.25  
100 feet #10 ..... 1.69

**NATIONAL HFS RCVR**



Get the best in VHF reception with this "hot" receiver for 1 1/4, 2, 6, and 10 meters. It's stable, sensitive, easy handling. Complete with tubes and built-in speaker. Amateur net price .....\$125.00 Power supplies for HFS  
110 volts a-c 60 cycles ..... 22.43  
6 volts d-c (vibrator) ..... 34.16

**YOU CAN STILL GET EASY TERMS ON NEW GEAR**

*Deposit only 20% . . . and take a year to pay the rest.*

**CHECK CHOICE HERE LIST PRICE SEND US ONLY**

CHECK CHOICE HERE	LIST PRICE	SEND US ONLY
<b>COLLINS</b>		
75A rcvr	\$ 375.00	\$75.00
30K xmtr	1450.00	290.00
32V-1 xmtr	475.00	95.00
310B-1 exctr	190.00	38.00
310B-3 exctr	215.00	43.00
310C-1 exctr.	85.00	17.00
310C-2 exctr	100.00	20.00
70E-8 exctr	40.00	8.00

**HALICRAFTERS**

S38 rcvr	47.50	9.50
S40A rcvr	89.50	19.90
S47 rcvr	200.00	45.90
S51 rcvr	129.50	29.90
S53 rcvr	79.50	15.90
S55 rcvr	119.50	25.90
S56 rcvr	99.50	22.00
SX42 rcvr	275.00	59.00
SX43 rcvr	169.50	35.90
SP44 panadapter	49.50	9.90
T-54 TV rcvr	169.50	33.90
HT9 xmtr	350.00	70.00
HT18 xmtr	110.00	22.00

**NATIONAL**

NC-33 rcvr	57.95	11.59
NC-57 rcvr	89.50	13.90
NC-173 rcvr	179.50	35.90
NC-183 rcvr	269.00	53.80
NC240D rcvr	241.44	48.28
HRO-7 rcvr	279.00	55.80
HFS	125.00	25.00

**HAMMARLUND**

HQ129X rcvr	189.15	37.83
SP400X rcvr	450.00	90.00

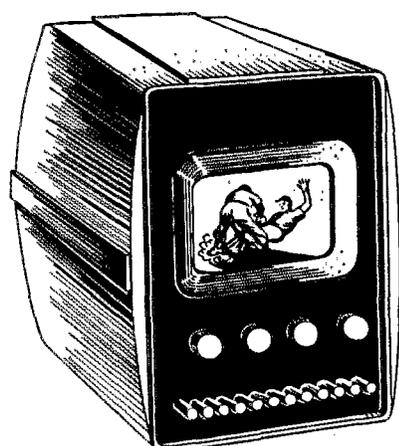
**R. M. E.**

HF-10-20 rcvr	77.00	15.40
VHF-152A rcvr	86.60	17.32
DB22A	77.00	15.40
RME-84	98.70	19.74
RME-45	198.70	39.74

**MILLEN**

90800	42.50	8.50
90881	89.50	17.90
90281	84.50	16.90

- IMMEDIATE SHIPMENT of the gear you want is assured by our complete stocks of receivers, transmitters, instruments and other amateur apparatus.
- EASY, MONEY-SAVING TERMS require only a small service charge on time payments.
- WHATEVER YOU NEED for full enjoyment of amateur radio is ready for you at the Radio Shack. C. O. D. orders filled promptly with 20% deposit.

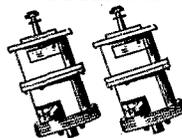


**HALICRAFTERS  
10-INCH DIRECT  
VIEW TV RCVR**

Here's exceptional value in a handsomely styled TV set that delivers satisfying performance. Push-button tuning on 12 channels with bright, clear, steady pictures at all times. Includes latest circuit features. Furnished complete with 22 tubes, rectifiers, installed picture tube, mahogany cabinet; ready to operate. Net price — Model T-67 .....\$295.00 Same set in streamlined plastic housing ..... 279.50

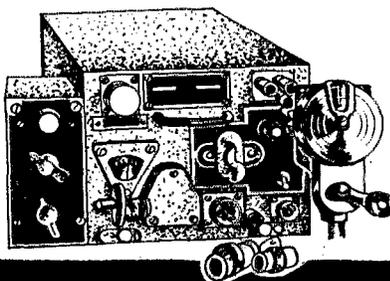
**Speed delivery and save C. O. D. charges — send full amount with order. 50% deposit required on all C. O. D. orders.**

**BRAND NEW GE SELSYNS \$3.95 PER PAIR**



Ideal for beam position indicators and many other uses. You can run these splendid selsyn control transformers at 35 volts 60 cycles and they'll give you permanent, efficient performance.

**BRAND NEW! NAVY AIR-BORNE RCVR MODEL ARB 6-Tube 4-Band Superhet \$195.00**

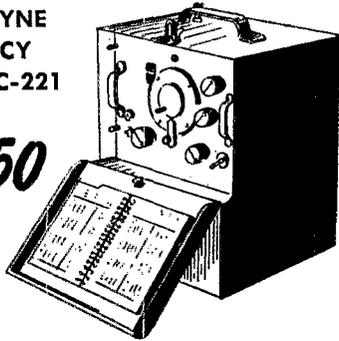


Four bands . . . 195-500kc — 1.6 — 4.5 — 9.05 mc. Handles MCW and CW, with MVC and AVC and sharp or broad selectivity. Pilot control box and calibrated tuning head (requires flexible shaft for connection). Designed for 28-volt d-c use, with manual or electric band switching; readily converted to 110-volt operation with manual switching. Complete with tubes and necessary plugs.

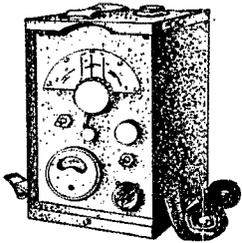
# CHECK THESE LOW PRICES on POPULAR RADIO SURPLUS

## HETERODYNE FREQUENCY METER BC-221

**\$59.50**



Range 125KC — 20 mc. Absolutely like new, indispensable for the discriminating amateur. Complete with calibration book, 1000 kc. precision crystal and spare tubes. Simple to set up as a proven VFO or as a means of calibrating receivers and transmitters. Can be operated from batteries or from a simple power supply (not furnished).



## FAMOUS BC-222 WALKIE TALKIE

Complete with new battery pack, calibrating crystal, and handset; range 28 - 52 mc. Compact — measures only 5 1/4 x 7 3/4 x 8 3/4. Splendid for field day use. **\$39.50**

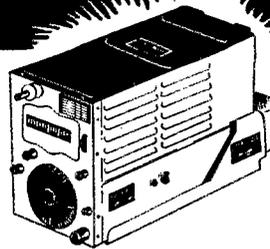
## FALL IS REBUILDING TIME

The Radio Shack has a host of good component values. For example:

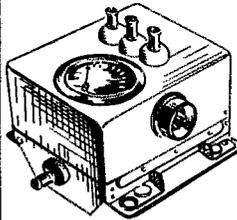
- A. 100 silver mica capacitors in ranges from 22-1000 pfd. A \$25.00 value only **\$2.49**.
- B. A kit of 4 RCA matched crystals in the small 1/2" center to center type of holder; 2 with frequency of 15.353 and 2,14.020; only **\$1.39**.
- C. Johnson 350E30 variable condenser; .030 spacing; 350 pfd. Use in antenna couplers for power up to 200 watts. Only **\$1.99** per pair.
- D. Hammerlund MTCD 100B; suitable for general amateur use in class C final up to 200 watts input; ceramic insulation, rugged, polished plates **\$1.49**.
- E. Vacuum padding condensers.
  - 12 pfd 20000 volts, **\$1.49**
  - 80 pfd 7500 volts, **.90**
  - 80 pfd 32000 volts **4.50**

## MOBILE EQUIPMENT

Now that mobile operation is legal for 80 meters, the BC-454B will enjoy still wider usage. It covers 3-6 mc. and can be altered easily for mobile use. Still only **\$5.95**.



The BC-457 transmitter — suitable for mobile, or conversion to a swell 6 meter VFO; one of the most stable oscillators commercially available .....**\$6.95**



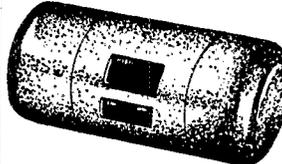
## BRAND NEW: BC-442 ANTENNA RELAY UNIT **\$1.95**

The BC-442 relay box couples this transmitter to a top-loaded whip; includes relay, padding condenser and thermo ammeter. A steal at **\$1.95**.

## FLEXIBLE TUNING SHAFT for 274-N

217 inches 177 inches  
207 inches 80 inches  
72 inches  
your choice **49c ea.**

## PE-103 DYNAMOTOR BRAND NEW—only **\$5.95** (less base)



Here's your opportunity to get one of these popular units at a rock-bottom price. Operates from 6 or 12 volts d-c; delivers 160 mils at 500 volts d-c.

## NATIONALLY KNOWN OIL CONDENSERS AT BARGAIN PRICES

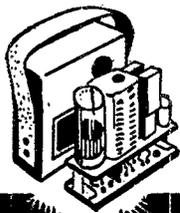
- 2 mfd. 2000 volt ..**\$1.79**
- 2 mfd. 3000 volt .. **2.95**
- 1 volt TLA type
- 4 mfd. 600 volt .. **.69**
- 1 volt TLA type
- 2 mfd. 600 volt .. **.49**

## TUBE SPECIALS!

304TH	\$3.95	2X2/879	.49
Six for	23.10	8E29	3.49
807	1.15	8BP1	2.39
811	1.79	3C24/24G	.67
814	2.95	5BP1	1.49
815	1.69	5BP4	3.95
830B	3.95	211	.69
868A	.98	816A	.49
VR150	.79	705A	2.95
6AC7	.99	717A	1.65
6AG5	.99	801A	1.49
6C4	.29	803	8.95
6AG7	1.06	805	4.95
6J6	.89	807	1.15
6H6	.68	809	1.65
		813	7.95
		826	.49
		829B	4.95
1A3	.79	882A	2.65
1A5	.65	886	2.25
1L4	.79	887	2.25
5Z3	.67	888	3.95
6AJ5	.98	845	3.45
VR90	.75	872A	1.75
VR105	.75	931A	2.39
VR150	.49	1616	1.39
1P23	2.95	1619	.49
3B24	1.95	1625	.49
3FP7	2.98	1626	.49
2D21	.98	8065	4.95
2K33	\$45.00	9001	.49
		9002	.69
		9003	.69
		9004	.69
2AP1	\$2.49	9006	.49



**VERY SPECIAL**  
1616 ..... ea. \$ .49  
6 for ..... **2.49**  
limited supply



## BC-746 TUNING UNIT

Can be easily converted to miniature transmitter for miniature tubes. Crystals alone worth the price. Net price with two crystals **69c ea.**

**The RADIO SHACK Corp.**  
CABLE ADDRESS · RADIOSHACK  
167 WASHINGTON ST., BOSTON, MASS., U.S.A.



## LOOK OVER THE BIG DRAKE LINE!

You'll get a dozen fresh ideas for beautifying your instrument panel, when you look over this handsome new DRAKE display—you can see it at leading jobbers' everywhere! It shows actual examples of many of the most popular and useful DRAKE Assemblies, which your jobber stocks in the convenient new DRAKE Unit Packages.

Pilot lights show how your unit is performing—and what's more, will give your panel that authentic professional look. For these are the same expertly engineered units used for years by leading radio and appliance manufacturers, who know from experience that DRAKE Assemblies mean tops in performance, at sensible prices. So be sure to see the DRAKE display at your jobber's right away!

For complete data on the  
big DRAKE line, write  
today for Catalog Q.



### Socket and Jewel LIGHT ASSEMBLIES

**DRAKE**  
MANUFACTURING CO.  
DEPT. Q, 1705 W. HUBBARD ST., CHICAGO 22

(Continued from page 98)

activity, particularly as to wave propagation studies. Jacksonville: IPL vacationed with 28-Mc. mobile. JKI is mobile on 3.85 Mc. 2LFN is at NBB with BC-459/807 on 14-Mc. c. w. It's back to U. of F. for FRG, EID, and HRB. Miami: IYT now is WAC and has 119 up for DXCC. BYF reports that better gear is being installed in Red Cross radio trucks. Orlando: The Club bulletin reports a set-up for emergencies on 3.85 and 28 Mc., handled by QN and AKF, including a radio truck and generator trailer. St. Pete: 4CQD is ex-2CQD. The Club holds meetings each Friday on 28 Mc. GAC is on 3.85 and 144 Mc. Umatilla: AYW has 807s, all bandswitching, slug-tuned broad-banded exciter, and n.f.m. on 28 Mc. AFH is using a BC-696. Tommy Carr took Class C exam and "signed up" for Palmetto Net. West Palm Beach: FNR is headed for the altar. AAP is on with Hammarlund 4-20. MVJ schedules 2RUF on 7280 kc. at 9:30 Fridays. New members of the Knights of the Kilocycle are LEP, MKP, and IJE. The fall season is starting, fellows. Let's get back in the groove with those reports so we can jam this column full with what you are doing. Join one of the nets on 3675, 3910, or 7290 kc. Buzz AYW, WS, or IKL. Traffic: W4MNT 46, ZC 18, IQV 17, BYF 10, BT 7, IYT 7, MVJ 1.

WESTERN FLORIDA—SCM, Luther M. Holt, W4DAO—Pensacola boasts the following new calls: OCK, OCX, and ODO. NYZ is NOX's husband. QK is new secretary of PARC. NAA got married. He was introduced to the XYL over the air from MSX, and their first date was made by amateur radio. EZT now is practicing law. KIK and EGN lost beams in high winds. BKQ passed Class A exam. CKN visited his home in South Carolina. FDL moved to Evergreen. JJZ has 701 on 28 Mc. MOB and MUX lost filament transformers. MTN built 144-Mc. rig. NOG plans n. f. m. FIH had receiver trouble. BGI has Gon-Set converter. JV spent two weeks active duty with Marine Reserves in Atlanta. MS has 26 states on 50 Mc., 23 verified. The PARC adopted new constitution and by-laws. LRX has 175 watts on all bands. JBH, who is a doctor, works 14-Mc. c. w. between operations. GTJ works 7 Mc. COS bought new beam. DLO wants Pensacola contacts.

GEORGIA—SCM, Clay Griffin, W4DXI—SEC: BIW, PAM: BOL, Augusta: AAY was heard in Baxley on 144 Mc. BZH and LYG are now on 3.85-Mc. phone. Columbus: VX and GKI attended the National Convention in Milwaukee. MBS is building a 28-Mc. beam which will have four folded dipoles in phase, with reflectors. He has taken a disc jockey job. CVJ and DDQ are working 28-Mc. DX. NYS, an ex-Maritime operator, has BC-458A on 7 Mc. NWG is running an HK-24 on 7 Mc. and is actually using a "folded gutter" for antenna. Macon: DZL and HBL are on 144 Mc. and would like Atlanta contacts. LXE has SCR-522. He is building a new home. NOU, a new ham, works 7-Mc. c. w. and 28-Mc. phone. NZX is a new YL ham, just 13 years old, on 3.5-Mc. c. w. and 28-Mc. phone. She is ILG's daughter. LQW has an ART-13 on 3.85-Mc. phone. 9DSN /4 is attending Mercer. The Mercer Club uses his call. CMA, Cedartown, works for b. c. station. He made WAC in three days with a piece of wire 10 feet off the ground. FKE has his mobile rig going. IRL has been operating on 7 Mc. GGD now has 100TH final with 350 watts. DXI has been chasing DX on 14-Mc. c. w. We need more written reports to have a good column every time. Most of our news is solicited from a few stations on 3.85 Mc. Traffic: W4IRL 13, GGD 8, DXI 4.

CANAL ZONE—The following was reported by KZ5AW: KZ5s competed with CP, HC, HK, HP, OA, and YV stations Oct. 12th in the first "Bolivarian Contest." Sponsored by the Radio Club of Peru, it's a capsule version of the ARRL DX Contest between the six Simon Bolivar countries, with KZ Land courteously included. AY is handling KZ5 QSLs, BG the certificates. PA is working traffic on 14 Mc. while compiling DX data in the early morning hours. AX participated in Frequency Measuring Tests with nice results. CGs new beam perks FB. Recent visitors to the Zone and CZARA were OA4CR, OA4BI, and W6MWK. SW and BD recently were presented with jr. operators. HP1A is new president of La Liga Panameña de Radio Aficionados (Radio Club of Panama). New calls are IP, RM, son of BL, and NM, well-known second operator of HP1A. The HP gang is growing and FS's Sunday morning code runs on 7 Mc. have lots of copiers in Panama, too.

### SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Vincent J. Haggerty, W6IOX—L Asst. SCMs, W. J. Schuch, 6CMN, and Irvin O. Hege, 6FYW. SEC: UKN. While our SCM is on vacation CMN is pinch-hitting. Anyone who is disappointed in not seeing his report must have failed to read the August QST section report. MU has been reorganizing, has new four-element beam up, and is ready for the band opening. RAD still is trying to get members for the Southern California Net, 3765 kc., 7:30 and 8:45 p.m. daily. FYW is back from three-weeks vacation and ready to go again. The Paso Robles Radio Club is concentrating on emergency drills and has complete portable layout for 3.5 and 7 Mc. to maintain outside contacts, and also is set for 27-Mc. local contacts. 7DLR/6 hopes to be on with Command rigs on 3.5, 7, 14, and 28 Mc. soon. AEE is

(Continued on page 104)



**THE "WORLD'S LARGEST"**



**HAS IT IN STOCK...**



**BOB HENRY**

Henry Radio stores in Butler, Missouri and 11240 West Olympic Blvd., Los Angeles, California have complete stocks of amateur, FM, Television, Short Wave, Communications, Recording, and other radio equipment. I promise you lowest prices, complete stocks, quick delivery, easy terms, generous trade-ins. I promise that you will be satisfied on every detail. Write, wire, phone or visit either store today.

*Bob Henry*  
W4ARA

**A FEW OF THE ITEMS I STOCK ARE:**

Collins 75A	\$ 375.00
Collins 32V	475.00
Collins 310B-1	190.00
Collins 310B-3	215.00
Collins 30K-1	1450.00
National NC-57	89.50
National NC-173	189.50
National NC-183	268.00
National HRO-7T	292.50
National HRO-7C	358.95
National HFS	142.00
National NC240D	236.25
Hallicrafters S38	49.95
Hallicrafters S53	89.50
Hallicrafters S40A	110.00
Hallicrafters SX43	189.50
Hallicrafters SX42	295.00
Hallicrafters SX62	289.50
Hallicrafters S47	229.50
Hallicrafters S51	149.50
Hallicrafters S58	59.60
Hallicrafters S55	129.50
Hallicrafters S56	110.00
Hallicrafters T54	189.50
Hallicrafters HT18	110.00
Hallicrafters HT19	380.00
RME HF-10-20	77.00
RME WHF-152A	86.60
RME DB22A	71.00
Hammarlund HQ129X	177.30
Gen-Set 10-11 converter	39.95
Stancor ST-203-A	44.70
Hunter Cyclomaster	169.50

Millen, Sonar, Bud, Gen-Set, Silver, Premax, Work Shop, Amphenol-Mims, Jensen, Meissner, Browning; I have everything.

Some prices slightly higher on the west coast.

**LOW PRICES**

I guarantee to sell to you as cheap as you can buy anywhere.

**COMPLETE STOCKS**

Hallicrafters, National, Hammarlund, Collins, Millen, RME, Meissner, Meck, Gordon, Amphenol-Mims, RCA, Vibroplex, Sonar, all other amateur receivers, transmitters, beams, parts, etc. If it is amateur or communications equipment—I can supply it.

**QUICK DELIVERY**

Mail, phone, or wire your order. *Shipment at once.*

**EASY TERMS**

I have the world's best time sale plan because I finance the terms myself. I save you time and money. I cooperate with you. Write for details.

**LIBERAL TRADE-IN ALLOWANCE**

Other jobbers say I allow too much. Tell me what you have to trade and what you want.

**TEN DAY FREE TRIAL**

Try any receiver ten days, return it for full refund if not satisfied.

**FREE NINETY DAY SERVICE**

I service everything I sell free for 90 days. At a reasonable price after 90 days.

**FREE TECHNICAL ADVICE**

and personal attention and help on your inquiries and problems.

Butler, Missouri

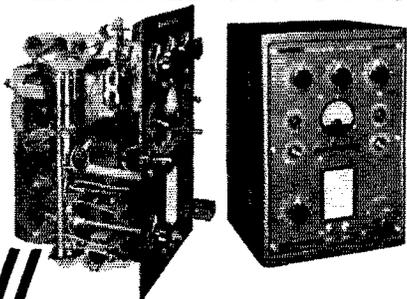
**HENRY RADIO STORES**

Los Angeles 25, Calif.

"WORLD'S LARGEST DISTRIBUTORS OF SHORT WAVE RECEIVERS"

# For BOTH

## MOBILE & FIXED STATION USE



# Harvey - WELLS

**TBS - 50**  
**TBS - 50A**

Now that mobile phone can be used on all amateur bands (except 40 meters) the TBS-50 & TBS-50A become more adaptable than ever before because it is ideal for use in automobiles, trucks, boats, camps, etc.

**50 WATTS**                      **8 BANDS**  
**PHONE OR CW**  
**(Class B. Modulation)**  
**NO PLUG-IN COILS**

**80, 40, 20, 15, 11, 10, 6 and 2 METERS**

*(Completely wired and tested — not a kit)*

Crystal controlled on all bands, yet requires no oscillator or multiplier tuning. Operates from AC pack or Dynamotor Supply for mobile work. New, beautiful black crackle finish.

TBS-50. Complete with tubes, only **\$99.50**

### THE NEW TBS-50A

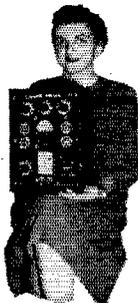
Incorporates a small three tube preamplifier with sufficient gain so that any high impedance microphone having an output level of approximately -50 db can be used.

TBS-50A, complete with tubes only

**\$121.25**

Send for catalogue describing Harvey-Wells Transmitters, Power Supplies, Preamplifiers and Rack Panels

**Harvey - WELLS**  
**ELECTRONICS, INC.**  
**SOUTHBRIDGE,**  
**MASSACHUSETTS**



*(Continued from page 108)*

building s.s.s.c. exciter; he also visited 50M, in Oklahoma, while on vacation. The Pasadena Short Wave Club elected new officers as follows: MQP, pres.; OQB, vice-pres.; NUF, secy.; and Tom Bennet, treas. BUK is on the air again. NAZ schedules Guam and 2LLG daily. UHA represented the local YLs on interview on KMPC. YSK is 28-Mc. mobile from Mt. Wilson while installing t.v. station for KLAC. DDE gave CMN a new bug. (He couldn't read the old 1919 model.) KEI is planning plenty of activity for fall. ZQV is a member of the Southern Border Net, 3550 kc., 9 p.m. daily. ZOL now is on 3.5 Mc. and has new antenna. BFI is moving to Chico. YSE got his Class A ticket. HOE is mobile 3.85-Mc. 'phone. RPO will visit Denver and New York City while on a two-weeks trip. ØALZ now is 6GJP, at Taft, and is on the air with low power temporarily. CAO is planning 28-Mc. mobile. ZMZ is back at traffic work. Welcome back, OM. AAE is on 7 Mc. KP was portable at Manhattan Beach during the summer. MYH is installing 28-Mc. mobile rig in his car. Traffic: W6RAD 186, DDE 159, CMN 129, NAZ 115, FYW 24, AEE 20, ZQV 10, KEI 5, ZOL 5, FMG 4, YSK 1.

ARIZONA — SCM, Gladden C. Elliott, W7MLL — JPY, our SEC, wants all Arizona hams to sign up for AEC and wants an EC in every community. NRI is back on 3.85 Mc. with 500 watts on n. f. m. GYK, OAS, and RU keep a daily schedule at 8 A.M. on 3.85 Mc. LLJ and JZD are on 7 and 28 Mc. PEY has a pair of T55s on 14 and 28 Mc. MMY, MPJ, MQE, MJO, MRF, MPG, and MPE are new Arizona calls. PBD reports he missed on 12 daily contacts in the past year with ZLs on 28 Mc. KRH, Douglas H. S., has a 522 on 144 Mc. JXL has 90 watts on 3.5- and 7-Mc. c. w. KTP has two rigs on 420 Mc. and a rotary rhombic. MOF reports fine results on 3.5-3.85-Mc. aeronautical mobile. TCQ reports Gs, ONs, and SMs on 14-Mc. c. w. MID has a new four-element wide-spaced beam. MHP has a new Harvey-Wells on 28 Mc. KOY reports fine results with her HT-9. MOA and JOK, in Phoenix, report hearing LLO, LPK, LAD, and LVR, in Tucson, quite frequently. LXM is 28-Mc. mobile in Benson. MAW won the August Hidden Transmitter Hunt in 29 minutes. LQG is on 3.5- and 7-Mc. c. w. and has a 522 on 144 Mc. KFS, JIY, JFT, JMT, and MNB are operating in Tucson. Join a net — 3515-kc. high speed c. w.; 3552-kc., low-speed c. w.; 3865-kc. 'phone. Traffic: W7LPA 72.

SAN DIEGO — SCM, Irvin L. Emig, W6GC — Asst. SCMs, Gordon Brown, APG, and Shelley E. Trotter, BAM. SEC: DUP. RM: BGF. BKZ has been appointed ORS and OPS. PG spends most of his time on 28-Mc. 'phone. BGF reports that the Southern Border Net (3550 kc. daily at 9 p.m.) now has traffic outlets in Texas and Oklahoma and is looking for a contact in New Mexico. LRU boasts 126 countries. The Marine Corps station, K6NMC, at Camp Pendleton, is quite active. At their September meeting, the San Diego YLRL members saw Field Day movies taken by APG. The YLs are conducting a membership drive and radio code and theory class for YLs. EPM keeps schedules with his brother on 7 Mc. The following are San Diego Emergency Coordinators: DLN, CGF, LKC, YZV, BOS, JOY, SEV, KSS, FMJ, and HRI. The following are Emergency Corps members: AHV, ATB, ATZ, AMQ, AWW, BGC, BLF, BLK, BLV, BSD, BTP, BW, BWI, CAI, CCK, CNQ, BDW, DWE, EOP, FGU, FSH, 5GAA/6, GRD, IV, JRM, JUM, KD, LOL, MI, MMO, OBD, OZD, PFQ, RMN, RWL, SEV, THL, TIX, UXX, UWE, VCD, VDQ, VJQ, VOP, VTV, VUK, WHN, WGS, WNN, WXW, WXX/6, WZZ, YCP, YLH, LNZ, YPR, YPV, YQK, YQW, YRK, YSH, YSP, YTH, YXI, YXM, YXU, YZF, YZV, and ZYD. DUP has been appointed San Diego Coast Guard Auxiliary radio station. OBD received DXCC Certificate. VCD and YTH are spending some time at White Sands, N. Mex. SI is considering ways of installing 28-Mc. 'phone on his new boat. BLZ received a WAC Certificate. OR won Labor Day Star Classic Regatta in San Diego Bay. FRX moved to Albuquerque. 5EUF, now DWX, is living in San Diego. JYV is busy building television receivers. VDA is enjoying time ashore between trips on the tuna boat, *Star of the Sea*. IZ heard portable-marine on 3.85-Mc. 'phone. ZSA has 28-Mc. portable installed in his car, as have MI, QNM, and PFQ for 3.85-Mc. operation. Traffic: W6BGF 154, BKZ 75, K6NMC 34, W6DUP 16, DBZ 8.

### WEST GULF DIVISION

NORTHERN TEXAS — SCM, N. C. Settle, W5DAS/ MNL — Asst. SCM, Joseph Bonnett, 5III. SEC: JDZ. RM: CDU. PAM: ECE. Now that we have mobile on all bands the boys in North Texas are really going to town. CFQ and Vivian work about everything they can hear on 3.5-Mc. 'phone. They have 90 ft. of wire wrapped around a fishing pole 10 ft. high. DXR and DAS also are on 3.5-Mc. 'phone mobile. A homemade 6K8 converter with 1500 i.f. works fine. GDÜ is this month's traffic king, with CDU second. LGY, a YL, works 3.5-Mc. 'phone. KWH, at Gilmer, has 40 watts on 3.85-Mc. 'phone. MMX, in El Paso, is OPS and OBS on 7-Mc. c. w. Is BYX still at Waco? RG, on mobile, has WAC. HSE is active in Brownwood. CEA is back on at Decatur. EYX has his old call, WB, at Amarillo. C. C. Prior, secy. of the Ft. Worth Club, says the boys there are

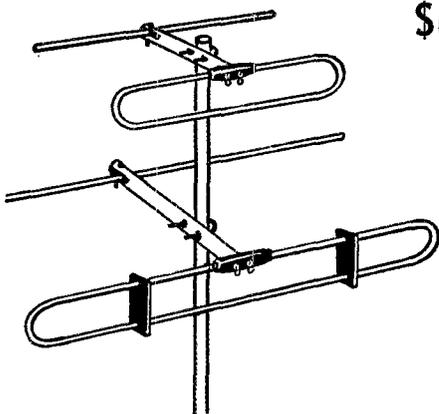
*(Continued on page 108)*

ARROW ELECTRONICS

NEW

# HI-LOW TV ANTENNA

**ARROW** presents



**\$9<sup>45</sup>**

Stacked, folded dipoles with reflectors, for complete coverage of all 12 — 2 to 13 — channels and also the 88 to 108 mc. FM band. Highest quality construction using dural tubing with cast aluminum fittings. Matches 300 ohm lead-in. Upper and lower sections may be oriented separately for highest gain and best ghost elimination. This strong, rigid, low priced antenna is available only at ARROW Electronics. Get yours NOW. 300 ohm line, if purchased with the HI-Low antenna — 2c per ft., without antenna, 2½c per ft.

**THORDARSON**

T 21 F 02	2.5 VCT	10 AMPS	<b>\$391</b>
T 21 F 20	5 VCT	15 AMPS	<b>\$576</b>
T 21 F 05	5 WCT	8 AMPS	<b>\$352</b>
T 21 F 16	2.5 VCT	8 AMPS	<b>\$355</b>

**TUBES**

ZB 120	<b>\$195</b>
HF 100	<b>\$195</b>
24 G	49¢ — 3 for <b>\$125</b>

DIAGRAMS OF ANY STANDARD TELEVISION IN STOCK **35¢**

NEW **EN** MODEL 1000  
*Speech Clipper*

**\$14<sup>70</sup>** HAM NET



ADDS GREATLY TO ARTICULATION  
HOLDS MODULATION TO 100%

Peak limiting pre-amplifier that clips tops and bottoms from speech frequencies which rise above a preset amplitude. Operates from any high impedance mike into any conventional speech amplifier. Filament and plate power derived from main amplifier.

**ECONOMY LINE POWER COMPONENTS**

PLATE XFMR	1750-0-1750 V AT 300MA	<b>\$14<sup>70</sup></b>
	115 V AC AT 60 CY. PRI.	
SWINGING CKE	5-10 HENRIES	<b>9<sup>49</sup></b>
	300 MA. 5000 V INS.	
FILAMENT XFMR	2-5 V 10 AMP	<b>2<sup>75</sup></b>
	5000 V INSUL.	

**ECONOMY LINE:**

**450 WATT** POWER SUPPLY KIT — SEE APRIL ISSUE QST pg.117 FOR COMPLETE DETAILS **\$39<sup>95</sup>** LESS TUBES  
WRITE FOR CATALOG SHEET

# ARROW ELECTRONICS

I N C O R P O R A T E D

82 CORTLANDT STREET, NEW YORK 7, N.Y.

# LEEDS

The Home of RADIO

**QUALITY  
PRICE  
DEPEND-  
ABILITY**

- SMALL ITEMS YOU MAY BE LOOKING FOR**
- Shielded Phone Plug..... 30c
  - 10 for \$2.50
  - Arc 5 Banana Plugs Per Doz..... 1.00
  - Per Gross \$1.00
  - 1/4 Amp 3 AG Fuses Per Doz..... 25c
  - 1 Amp 3 AG Fuses Per Doz..... 25c
  - 1/100 Amp 8 AG Instrument Fuses Per Doz..... 50c
  - 110 V. Pilot Assembly..... 39c
  - 6 V. Pilot Assembly..... 19c
  - 1/4 Watt Neons Double contact Bayonet Base..... 20c
  - Per 100 \$15.00

**RELAYS                      CS DIFFERENTIAL**

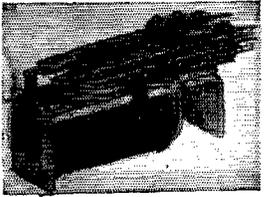


Dual coil with armature pivoted between coils. All contacts normally open. Operates 220-250 Volts. 8000 Ohms each coil, contacts S.P.D.T. Controls rated 2 amps. at 110 VAC. Ideally suited for balanced or bridge type circuits where limited current or power is available. Will withstand 12 G Vibration up to 60 cycles at 35,000 feet

altitude. Special low price..... **88c**

**Multiple Contact**

Telephone Type  
No. 882—2 windings each 125 ohms.  
No. 881—Single winding 12,500 ohms.



**49c**

**CHOKES**

SMOOTHING		SWINGING		PRICE EACH TYPE	
TYPE	Hy	TYPE	Hy	MA	Price
C-80	10	C-87	4-16	150	\$2.70
C-81	10	C-88	4-16	200	\$3.45
C-82	10	C-89	4-16	250	\$5.35
C-83	8	C-90	3-14	300	\$5.85

All above 3000 Volts Insulation

**STANDARD STEEL CHASSIS**

- 13 x 17 x 3 Black Crackle..... **\$2.22**
  - 13 x 17 x 4 Black Crackle..... **2.58**
  - 11 x 17 x 3 Black Crackle..... **1.86**
- Made of 1/8 inch steel

**VARIABLE CONDENSER**

6 Gang; 1 section of .00025 Mfd, 4 sections .000035 Mfd 1 section of .00005 Mfd; with 5 air trimmers of 15 to 25 Mmfd capacity. This condenser is all silver plated. Each **95c**



**DM — 43A DYNAMOTOR**

Manufactured by G.E. New. Input 24 V. @ 23 amps. 7500 RPM; output 515/1030/2/8 V., @ 215/260 millamps; filtered. Special..... **\$2.95**

If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00. We ship to any part of the globe.

# LEEDS RADIO CO.

75 Vesey Street  
CORtlandt 7-2612

Dept. QS 11  
New York City 7

(Continued from page 104)

ready for 28 Mc. to open. OWV worked an XE1 with his Grid Dip Meter on 7 Mc. GDH, at Sunrise Acres in El Paso, is on 144 and 28 Mc. GJU is looking for new QTH. GBN is editor of Radiator, East Texas Club paper. NMR now is Class A. IYJ had an Abe Lincoln beard at the last club meeting. EBW works for WBAP. BEH wants a 144-Mc. net. Don't forget to get in touch with JDZ, your new SEC at Coleman. Traffic: W5GDU 215, CDU 27, KWH 2.

**OKLAHOMA** — SCM, Bert Weidner, W5HXT — Asst. SCM, George Bird, 5HGC. SEC: AHT. The OZL Net has suffered a great loss in the moving of its RM, IGO, to another state. We hope that IGO soon will be able to report into OZL from the new home. The OCARC was entertained at the Engineering School of CAA at Will Rogers Field. More and more stations are portable-mobile on the lower frequencies. This will help AHT with emergency set-up. AGM has been selected EC for Oklahoma County. The new call for the Aeronautical Center Amateur Radio Club is FAA. With vacations over more stations are reporting into OLZ and to Oklahoma Phone Nets. F. E. Handy and AST both met with OCARC the same evening, and the session continued until the small hours of the morning. OWV was a new ham at Ardmore. GCM holds regular schedules with KG6DI. Traffic: W5NMM 87, MBV 40, AST 34, EEC 1.

**SOUTHERN TEXAS** — SCM, Ted Chastain, W5HIF — RM: DAA. PAM: EYV. SEC: IBT. NPA is new OBS in Corpus Christi. PM has new QTH, beam, and transmitter. HEL has moved from the section to Oklahoma. We wish him luck. BCF, FCD, HRU, and EQK have converted BC-659s for portable-mobile service on 28 Mc. BCF made a Naval Reserve cruise to Panama. NJB and NLE have gone back to college. MN is still high man in the section in traffic handling. ACL blames hot weather for the loss of one 813 and one 866. NIY is back on after a session of summer school. LWV's country total now stands at 101. MGB is new in Kingsville. DAA is doing some rebuilding, getting ready for the traffic season. JPC won a Bud VFO and plate transformer at the Division Convention in Houston. GLS, Emergency Coördinator for Houston, was awarded the trophy for outstanding amateur in the West Gulf Division. It is with much regret that I announce the resignation of BUV as Section Emergency Coördinator. ECs will be informed by mail as to his successor. This column has been rather lean because very few station activity reports have been reaching this office. Please let me have these reports so we can keep the column going. In the next issue of QST you will find a notice announcing the coming election of SCM for Southern Texas. As I do not intend to stand for office again, I suggest that each and every one of you give serious consideration as to a candidate. Traffic: W5MN 315, DAA 19, ACL 10.

**NEW MEXICO** — SCM, Lawrence R. Walsh, W5SMA — SEC: 5ZM. RM: HJF. PAM: FAG. The Los Alamos Radio Club held a Field Emergency Test the week end of August 28-29. Stations in the field were NXE, MYQ, OMR, OII, and SMA. In addition, FAG was operating in the field about 15 miles south of Albuquerque. OXC, Los Alamos, operated his home station. MPZ, Sandia Radio Club, reports that NRP has an s. s. c. transmitter and receiver on the air. Reports to date are excellent and the receiver is reported to be "out of this world." MSG has an s. s. b. rig under construction also. The Sandia Radio Club's training program is coming along fine and four fellows are anxiously awaiting their tickets. SMA attended the National Convention at Milwaukee and the hamfest in Cincinnati. ELL is moving to new QTH. FAG has his new rotaries on 14 and 28 Mc. about ready to operate. JYW was visited by J9ABK, who was in Hobbs on furlough.

**CANADA**

**MARITIME DIVISION**

**MARITIME** — SCM, A. M. Crowell, VE1DQ — GL, our new RM, has the new Eastern Traffic Net lined up with the following stations taking part: GL, HJ, MK, WC, UL, and OL. More ORS are required. Anyone interested in traffic, please get in touch with GL; he's on 3690 kc. 80E and 8NB, of Arctic fame, are back home, and Mick has been trying out the local mikes. QG has worked W3 on 50 Mc. and reports the 50-Mc. net is active every Mon., Wed., and Fri. at 7. DB says it has been too hot for much activity. The Halifax gang will lose one of its most active and energetic hams in the person of MZ. Ron is taking up residence in the U.S.A. and, while we are all sorry to see him leave us, we wish him every success in his new QTH. QZ seems very well satisfied with the new beam. DQ also is putting the finishing touches to a new 28-Mc. beam (the second edition, 1949 model). VH is in VE2 Land. EO has moved to a new QTH. The "little hamfest" held recently at Deep Brook was a big success. LZ has returned from a visit to Toronto. FQ knocked off XC6AJ and promptly sent in his cards for WAC Certificate. DB, PD, and RP seem pretty blue lately, together with all the other DXers — sunspottitis! Please send more reports, gang. Traffic: VE1GL 8.

(Continued on page 108)

Our 26th Year

# LEEDS

The Home of RADIO

QUALITY—PRICE  
DEPENDABILITY

## POWERSTAT VARIABLE TRANSFORMERS

- Type 20:** 115 V. input, 0-135 V. output @ 3.0 amps. 0.4 KVA **\$12.50**  
**Type 116:** mounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA. . . . . **\$23.00**  
**Type 116U:** unmounted; 115 V. input, 0-135 V. output @ 7.5 amps. 1.0 KVA. . . . . **\$19.00**  
**Type 1126:** 115 V. input, 0-135 V. output @ 15.0 amps. 2.0 KVA. . . . . **\$46.00**  
**Type 1226:** 230 V. input, taped at 115 V. 0-270 V. output @ 9.0 amps. 2.4 KVA. . . . . **\$46.00**  
**Type 1156:** 115 V. input, 0-135 V. output @ 45.0 amps. 6.1 KVA. . . . . **\$118.00**

**CORNELL-DUBILIER TYPE EB 9160**  
16 Mfd. 450 W. V. Electrolytic in can with mtg. nut Special. . . **79c**

## PLATE TRANSFORMER

Primary 115/230 Volt, 25-60 cycle.  
Secondary 820 Volts Center Tapped at 775 Ma. Hardly any voltage drop at 950 Ma. Completely shielded. Dimensions 6 1/2 x 6 1/2 x 7 1/2. Net Weight 36 lbs. Special . . . . . **\$7.95**



## FILAMENT TRANSFORMERS

Primary 115-230 volt 60 cycle. Secondary 5 volts at 15 Amps, 5000 volt insulation. Swell for 35T, 75T, 100TH, 250TH, HK-54, etc. Completely shielded dimensions 4 1/4 x 5 x 5 1/2. Weight 10 lbs. Special. . . . . **\$3.95**

- 2 1/2 Volts C.T. @ 10 Amps.  
7500 Volts RMS Type 40. **\$2.40**  
 6.3 Volts C.T. @ 3 Amps.  
2500 Volts RMS Type 46. **\$1.65**  
 10 Volt C.T. @ 10 Amps.  
3000 Volts RMS Type 316. **\$4.50**

**SHURE X-TAL MIKE & STAND**  
Made to list for \$16.00. Our Special Price **\$5.50**

## TUBES

3C24 Triode 100 Watts output: 6.3 Volts 3 amp.  
Filaments 2000 Volts plate @ 75 ma. Each **39c**. **\$3.50**  
 10 for . . . . .  
 2 x 2/879 Rectifier 2.5 Volts 1.5 amp. . . . **49c**

## SOCKETS

Low Loss Steatite Wafer Sockets for 829, 832, and 813 Tubes. Each. . . . . **73c**

## HEAVY DUTY CHOKE

6 Henries at 550 Ma, 28 Ohms DC Resistance. High voltage insulation. Completely shielded. Dimensions 5 1/2 x 4 1/2 x 5 1/2. Net Weight 15 lbs. Special. . . . . **\$4.95**

## HEINEMAN CIRCUIT BREAKER

Magnetic Type 5 Amp. Size. . . . . **95c**

## SELSYN MOTORS

115 Volt AC 60 cycles. Transmitters only. Can be used to turn small beam antenna or as indicators only. 3 1/2" diameter x 5 1/2" High. Shipping Weight 10 lbs. Per Pair. Special. Per Pair . . . **\$5.95**



## Wire Wound Potentiometer

100,000 ohm, precision made. G.R. type, 25 watt, 6" diameter. Brand New. **\$1.95**



## AMERTRAN TRANSTAT

Input 230/115 V AC, Output; 103 to 126 volts at 8.5 amps. Rated at .88KVA. Will make a perfect 230 to 115 volt step down transformer at about 880 watts. A real buy at . . . . . **\$9.95**

## BIAS TRANSFORMER TYPE KS 8779

Completely shielded, Insulator Terminals  
 Primary 115 Volts 60 cycle  
 180 V. @ 20 Ma.  
 300 V. @ 20 Ma.  
 Secondaries 6.3 V. @ 1.2 amps.  
 5.1 V. @ 7 amps.

Special **\$1.95**

## METERS

100 amp.—6 volt D.C., 3 inch scale, 4 1/2" square, Grey finish, supplied with 100 amp. shunt. Brand New. Each as illustrated. . . . . **\$2.95**



0-100 Ma. 2" Round McClintock **\$1.95**

## PLATE TRANSFORMERS

For Small Transmitters. DC Voltage Ratings are Approx. Values Obtained at Output of a 2 section Choke Input Filter. Using Mercury Vapor Rectifier Tubes. Pri. is for 115 V. 60 cy.

Type No.	Sec. Rms. Volts	Sec. DC Volts	DC Sec. MA.	Dimensions			Price Each
				H.	W.	D.	
P 57	660-660†	500	250	4 1/2"	3 1/2"	4 1/2"	<b>\$ 5.55</b>
	550-550	400					
P 58	1080-1080	1000*	125	4 1/2"	3 1/2"	5"	<b>7.20</b>
	500-500	400					
P 59	900-900	750	225	4 1/2"	3 1/2"	5 1/2"	<b>6.00</b>
	800-800	600					
P 67	1450-1450	1200	300	5 1/2"	6 1/2"	4"	<b>17.85</b>
	1175-1175	1000					
P 68	2100-2100	1750	300	5 1/2"	6 1/2"	4 1/2"	<b>21.30</b>
	1800-1800	1500					

\* For dual operation with simultaneous use of both sec. ratings.  
 † Has 40-volt bias tap.

## OIL FILLED CONDENSERS

- 4 Mfd 600 Volt D.C. Sprague. . . . . **49c**  
 8 Mfd 1000 Volt D.C. Tobe. . . . . **\$1.69**  
 0.5 Mfd 600 Volt D.C. Bathtub. . . . . Each **19c**  
 10 for **\$1.50**  
 7.5 Mfd 330 Volt A.C. G.E. . . . . **98c**  
 2 Mfd 10,000 Volt D.C. C.D. . . . . **\$13.95**  
 1 Mfd. 750 V. Sprague. . . . . **25c**  
 Dual .1 Mfd. 600 V. CD Type DYR each. . . . . **19c**  
 per 100 **\$10.00**

**Surprise Offer:**—Add \$1 to any order you send and get 10 boxes of R.C.A. Parts.

If not rated 25% with order, balance C.O.D. All prices F.O.B. our warehouse New York. No order under \$2.00. We ship to any part of the globe.

# LEEDS RADIO CO.

75 Vesey Street  
Cortlandt 7-2612

Dept. QS 11  
New York City 7

Earn the big pay of  
an expert radioman



This self-study  
**BASIC  
RADIO  
COURSE**  
trains you at home

**FREE TRIAL!  
EASY TERMS!**  
See coupon below

- EXPLAINS** the principles of operation of vacuum tubes, their basic circuits and other essentials of radio
- PROVIDES** the electrical background you need for this work
- FILLS IN** the radio and electrical mathematics you must have, taking you in easy steps from simple fractions to logarithms

● Let this self-study course prepare you right at home for a successful future in the RADIO field. It contains all the information you need . . . radio — electrical — mathematical — to handle all types of radio sets, test equipment and electronic devices. In clear, easy-to-understand language, this set explains everything from time delay circuits to mechanical and wire recording sound systems — frequency modulation — multiunit and multicathode tubes, etc. It spotlights test equipment and test and measurement procedures . . . reviews the operating characteristics and circuit applications of resistors, inductors and capacitors.

**Some of the special features that make this set so satisfactory for home study**

- Mathematical topics are clearly explained. What you don't know is filled in as you need it.
- The electron theory is used to explain the principles of electricity. Over 1000 drawings make each subject easy to follow.
- All important radio and electrical terms are defined.
- 29 appendices provide all the reference material you need. You don't have to go outside the set for anything.

**Helps You in 3 Ways!**

Even as you learn the fundamentals of radio work you absorb the practical electricity and electrical theory you need to make you an efficient, qualified radioman. And as you go along, the set fills in the mathematics you must know . . . gives you the essentials of algebra, geometry, trigonometry . . . explains in non-technical language Ohm's Law and Kirchhoff's Laws and the other "math" you need to solve practical problems in the radio field.

Send no money; just mail coupon

This basic course includes . . .

1. **ESSENTIALS OF RADIO** by *Morris Slurzberg and William Osterheld*
2. **ELECTRICAL ESSENTIALS OF RADIO** by *M. Slurzberg and W. Osterheld*
3. **MATHEMATICS ESSENTIAL TO ELECTRICITY AND RADIO** by *Nelson Cooke and Joseph Orleans*

Over 1000 illustrations!  
1953 pages!  
29 appendices!

McGraw-Hill Book Co., 330 W 42 St., NYC 18

Send me your 3-volume BASIC RADIO COURSE for 10 days' examination on approval. In 10 days I will send \$4.95 and \$3.00 a month until I have paid \$13.95, or return the books postpaid.\*

Name.....  
Address.....  
City.....Zone.....State.....  
Company.....  
Position.....QST-11-48

\* SAVE! We pay mailing costs if you send first payment with order. Same return privilege.

(Continued from page 106)

**ONTARIO DIVISION**

ONTARIO — SCM, Thomas Hunter, jr., VE3CP — Asst. SCM, M. J. McMonagle, AWJ, SEC; KM, RMs: ATR, BUR, DU, and TM, PAMs: DD and RG, OI is back on after a busy season with tomatoes and trying for DXCC. BEX and FT are new ORS. QB now is District Representative for CAROA and will welcome reports from the gang each month. His job, like this one, can be made much easier by the gang reporting at the end of each month. AWJ carries official bulletins daily on 3535 kc. at 9:00 p.m. The section now has nets going strong on 7, 3.8, and 3.5 Mc. KM did a fine job of attending Ontario hamfests this season as SEC. RG, IL, AIB now are ECs for the Toronto district. The D.O.T. and the Department of National Defence have approved the use of 4200 kc. with special calls for active AFARS. Anyone interested in joining AFARS can obtain full information from VU or CE DU carried away the one prize at the Goderich Hamfest, AUN schedules 2XX and ATR BAJ at Pagwa. The Ottawa gang operated 3CCF at the Central Canada Exhibition. WY is doing a fine job with 7 watts on 7 Mc. TM is QRL studying for Excise Examiner. HK and AIV are on with 500 watts. The section mourns the passing of WIEH, Mr. K. B. Warner, and amateur radio has lost a great man. DE has returned to U. of T. for engineering studies. BSG is new-comer to 3.8 Mc. and probably the youngest. BOY is on OFN. Traffic: VE3ATR 77, BUR 64, APS 61, IA 21, DU 13, NI 12, RG 12, BMG 11, GI 10, CP 9, AWJ 7, VD 6, AUN 4.

**QUEBEC DIVISION**

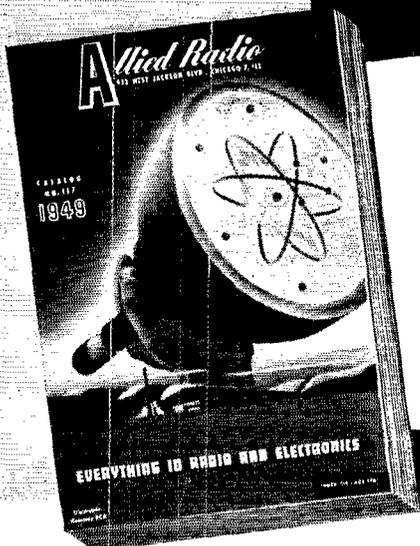
QUEBEC — SCM, Gordon A. Lynn, VE2GL — Congratulations to TH on the arrival of second YL operator at his QTH recently. He also has had the 14-Mc. beam fired up after these many months! LO visited BB and NR after putting his XYL on a boat to England. He reports ham activities are curtailed somewhat as he is trying to keep the shack habitable, but he is on 7 Mc. occasionally. WR has had rig trouble but is on 14-Mc. c. w. working such DX as ZC6EE, ZM6AF, ZP3AW, and EP2B with new VFO. His 3.5-Mc. Zepp fell down, too. XO continues active on 3.5 and 14 Mc. RJ has BC-696 VFO. ACS is new on 7 and 3.5 Mc. with "QRP rig" as per July QST and it works FB. EC still holds the fort on the Quebec 'phone net with EV, ABJ, OD, JAM, WP, AEM, ADB, W1KBV, and W1GXP joining in. AHK is new-comer at Sorel. ABJ, in Grand Mere, had a one-hour QSO with LP, in Ville Jacques Cartier, on 50 Mc. ZG operates on any frequency from 3.8 to 144 Mc., a. m. or f. m. BB has VFO on 7 Mc. and is really handling traffic despite the summer. He schedules LO, WILM, the SSN, and ESN. NR has almost completed new rig and started code practice transmissions the first of October. VE1AQ now is VE2BV in Nitro. XL is on 14-Mc. 'phone again from new QTH in Ville St. Laurent but is having BCI trouble. JZ is old-time land-line man on 3.5-Mc. c.w. at Trois Rivieres. VB has portable rig at Know Lake, way up in Northern Quebec, 400 miles or so north of Seven Islands. Traffic: VE2BB 116, EC 25, GL 3.

**VANALTA DIVISION**

ALBERTA — SCM, Sydney T. Jones, VE6MJ — JP is new OBS. Listen for him on 3803 Tuesday and Friday at 7:00 p.m. LQ is using n.f.m. It sounds very good. Bill, WG is Alberta outlet on Trunk Line "I." BW is the first Edmonton amateur to go mobile with 25-watt rig in his car. FY and YF, of Saskatoon, visited Edmonton and were guests of MJ. EW has new four-element beam in operation on 28 Mc. EY is building VFO and anticipates n.f.m. operation on 28 Mc. soon. RP won a meter in NARC raffle. 10OP visited NARC and gave an interesting talk on VHF rigs as used in Boston area. PV and VJ have new 7-Mc. antenna. KA is a new-comer to Edmonton on 3.5-Mc. c.w. NR now is WAC on 14-Mc. 'phone. JG is building FB VFO unit. SZ is QRL building a new house. GY returned from a pleasant trip to England. SW instructed scouts at Gimli Camp. QS is Calgary contact on Alberta Net. NI is new call in Edmonton. Although inactive, FA receives QSLs. Emergency Coördinators are needed in the Camrose, Lethbridge, and Medicine Hat districts. Membership in the Emergency Corps may be obtained by writing your SCM. Let's get behind this worthwhile venture, gang. Remember, it can happen here.

BRITISH COLUMBIA — SCM, W. W. Storey, VE7WS — Most of the present activity of the Fraser Valley Amateur Radio Club is centered on its club house site. AFB is trying for WAS on 50 Mc. DQ has the makings of a new power supply to replace the one burnt out by the B. C. Electric. WI has moved the station to a new shack in the basement. FQ has acquired a nice 1000-v. power supply. The Victoria Short Wave Club held its first meeting of the fall season Sept. 10th with approximately 15 members present. Various hams in Victoria interested in 144 Mc. have promised to put on a demonstration of two-way communication. FV, HR, TE, ART, and AKV get together each night at 9 and call themselves the Dipwit Net. Don Smith is using a three-element rotary beam with a direction indicator. Also

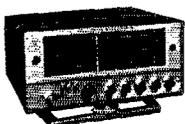
(Continued on page 110)



# Your NEW 1949 ALLIED CATALOG is Ready Now!

180 VALUE-PACKED PAGES

YOU'LL FIND ALL THE NEW GEAR IN THE NEW  
ALLIED CATALOG—GET YOUR COPY NOW!



YOU GET EVERY BUYING ADVANTAGE  
WHEN YOU'RE "EQUIPPED BY ALLIED"

- World's Largest Amateur Stocks
- A Real Break on Time Payments
- A Square Deal on Trade-Ins
- Fastest Service on All Orders
- Ham-to-Ham Personal Help

## Send for the Leading Amateur Buying Guide

It's ready for you—the new 1949 ALLIED Catalog—the greatest Buying Guide in Amateur Radio! Just name what you want—we've got it—all the newest and finest in receivers, transmitters, parts and station equipment, at really low, money-saving prices!

You'll save on our new Time Payment Plan—nothing like it for easy terms. You'll get a square deal through our liberal trade-in allowances. And, of course, you have the benefits of our 15-day trial on all receivers, full 90-day guarantee—and all the help in the world from our gang of old-time Hams. Follow the lead of thousands of Amateurs who depend on ALLIED for all their station needs. Write today for your FREE copy of the new 180-page ALLIED Catalog, the world's Leading Amateur Radio Buying Guide.

It Pays to be "Equipped by ALLIED"

Keep This Buying  
Guide Handy . . .

**FREE**



ALLIED RADIO CORP., D. L. Warner, W91BC  
833 W. Jackson Blvd., Dept. 15-L-8  
Chicago 7, Illinois

- Send FREE 1949 ALLIED Catalog.
- Send Time Payment details and Order Blank.
- Put my name on mailing list for the ALLIED Ham Bulletins.

Name.....

Address.....

City.....Zone.....State.....

# ALLIED RADIO

*Everything for the Ham*

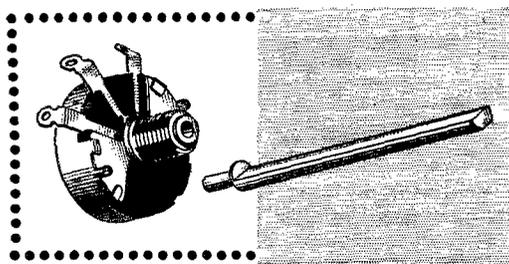


**For Instant  
Positioning  
Easy Calibration**

**IRC CONTROLS with DOUBLE-  
FLATTED, TAP-IN SHAFTS**

Remember the last control you installed in your rig—the tedious filing, tinkering with shaft inserts, tiresome “build-up”? With IRC *double-flatted* tap-in control shafts you avoid all that bother.

With the *double-flatted* shaft you can position for either set screw or push-on type knobs—match knob pointers with dial scale—quickly, easily, accurately the first time. Just insert shaft, calibrate, cut to proper length, and install knob. The whole operation takes just a few moments.



Every standard IRC tap-in control is equipped with the *double-flatted* shaft. And 12 special tap-in shafts provide adaptability for every rig requirement. Specify IRC next time you order controls for your rig. Only IRC offers the *double-flatted* standard shaft for instant positioning and easy calibration. See your distributor—or if more information is desired, write us direct.



**INTERNATIONAL  
RESISTANCE CO.**

401 N. Broad Street, Phila. 8, Pa.

IN CANADA: INTERNATIONAL RESISTANCE COMPANY LTD.,  
TORONTO, LICENSEE

Stewart is active on 28 Mc. Collingwood Club news. We predict a crowded 28-Mc. 'phone band this fall, with approximately 120 stations in and around town on the air. UU is building another converter. OJ also sweated out a converter. AKK finally got his VFO. WH received a fine batch of DX QSLs from the Bureau. AME has converted high power surplus VHF receiver to 144 Mc. ABF is having trouble driving his 815 final on 144 Mc. KC is working them on 14-Mc. c. w. with a pair of 813s. He uses a “V” beam and a 14-Mc. flop-over beam. AIG has a fine new tower and three-element wide-spaced beam. MH has left 28-Mc. 'phone and has gone back to 14-Mc. c. w.

**PRAIRIE DIVISION**

**MANITOBA** — SCM, A. W. Morley, VE4AM — BARC started the fall season with a corn roast at Shilo. DN has three-element rotary and 4D32 on 14 Mc. DH is rebuilding. YW monitors 50 Mc. and hits the odd opening. QD blew modulation transformer. HD, IF, and GE are on 14 Mc. NB and AU are on 50 and 144 Mc. From F'in Flon EO reports he handled traffic for the Schooner *Bowdoin*, near Ellesmere Island. FG is going to school in Saskatoon and will be missing from VE4 Land for a while. EQ is rebuilding for 'phone. OB is building new house for the rig. AR, at Pine Falls, is on with three 6L6s for exciter and 813 final, 'phone and c. w., all bands. BF has three-element rotary completed and now is working on VFO. 5KJ was in Winnipeg. HU bought VD's rig. The RCAF Club at Winnipeg has GY as the club call. AH, FY, EV, SE, and JO are active members. CL runs schedule with 9RIA in St. Paul. HH, of Portage, now is in Winnipeg. KY is heard on 7 Mc. consistently. KW turned golfer and made a hole-in-one. TB uses n.f.m. to lick BC1. ZY now is signing VE7. GQ has 20 states on 50 Mc. Now that the fall season is here there is more activity. PLEASE report yours.

**SASKATCHEWAN** — SCM, N. E. Thompson, VE5CO — RC is awaiting reports of any of the gang on 50 or 144 Mc. YF is active on 7 Mc. FY is building VFO. WS, the XYL of BF, is on 7 Mc. DW is going on 3.8-Mc. 'phone. PV is working lots of DX on 14 Mc. with about ten watts. AS is rebuilding. MQ has n. f. m. on 14 and 28 Mc. UC has band-switching 813, plus antenna troubles. UZ has rebuilt his p. p. 812s 250 watts 'phone with audio clipper. JF has been mobile on 28 Mc. testing ground wave. DR has been building up for p. p. 807s. AJ keeps schedule with ZLSA1 on 14 Mc. MX is going on 7- and 14-Mc. c. w. with 807. RJ has new 28-Mc. beam. FL is on 3.5-Mc. c. w. FG is debugging new bandswitch rig. OB has TBS 50. FD is on 14-Mc. 'phone and has built new receiver. BF has rebuilt shack and final power supply. LF has been working on 28- and 50-Mc. portables. KQ is using 400 watts on 14-Mc. c. w. with centred Zepp. EE has SX-43 and is active on all bands. CW has been heard working 3.5 Mc. portable with about fifteen watts. EK is trying to get on 28-Mc. n. f. m. OM blew cathode modulation transformer just as he was starting to test with CW. HR has been rebuilding. Traffic: VE5HR 19, UZ 2.

**Strays**

Alaska now boasts 458 licensed amateurs among its 80,000 population, according to September, 1948, *Electronics*. On a hams-per-thousand basis, this makes amateurs in the Territory ten times as numerous as here in the United States proper. — W5FNA

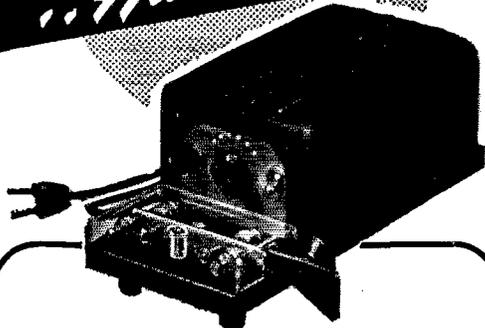
A new high-power water-cooled magnetron, delivering a continuous-wave output of 50 kw. at 1000 Mc., has been developed by the GE Research Laboratory for the Signal Corps.

A comprehensive and highly-informative 296-page catalog of Amperex radio tubes for communications, industry, amateur and electromedical uses is available to engineers, teachers and others in the field. A request on your business letterhead to Amperex Electronic Corporation, 25 Washington Street, Brooklyn 1, N. Y., will bring a copy to you.



**DON'T ENVY A GOOD FIST**

*...Have One!*



## ELECTRONIC MONITOR AND KEY

Flawless CW — smooth and rhythmic as a tape — can now be yours in short order with the new, sensational **MON-KEY!**

Providing you with a short cut to a perfect fist, the **MON-KEY** automatically makes dots — and dashes — both evenly spaced according to their length.

Here's everything you've ever wanted in a key — **MON-KEY!**

### FEATURES

- Automatic dots and dashes
- Dashes equal to 3 dots in duration
- Speed approx. 8 to 45 words per minute
- Speed changed instantly with new dial setting
- No weights to adjust
- 3 tubes — 2, 12AU7; 1, 35W4
- Built in monitor with volume control
- Operation, 115 v. AC or DC

**Only \$29.95** — Amateur Net, Subject to Change Without Notice

Your dealer should be able to make immediate delivery. If he can't, send a check for \$29.95 direct to us. We'll make immediate shipment on a Money Back Guarantee!

### ELECTRIC EYE EQUIPMENT CO.

6 West Fairchild Street, Danville, Ill.

Manufacturers of specialized electronic devices since 1937.  
EXPORT: Rocke International Corp., 13 East 40th Street, New York 16, New York.

## V.H.F. QSO Party

(Continued from page 75)

WIMCR	216-4-54-B	W6WLW	57-3-10-B
WIBDF	189-3-63-B	<i>San Francisco</i>	
W1MUD	162-3-54-B	W6JWF	36-3-12-B
W1OUN/1	156-3-52-B	W6ZZH*	26-2-13-B
W1FRZ	153-3-51-B	<b>ROANOKE DIVISION</b>	
W1GAC	124-4-30-B	<i>Virginia</i>	
W1NUQ/1	120-3-40-B	W4LVA	130-5-26-A-B
W1CPB	105-3-35-B	W4NND	46-2-23-B
W1QQW	102-3-34-B	<b>ROCKY MOUNTAIN DIVISION</b>	
W1FIK	75-3-35-B	<i>Colorado</i>	
W1MEG	66-3-22-B	W6YXS	30-3-10-A
W1LPM	58-4-14-B	W6GTH	8-2-4-A
W1NXY	50-2-25-B	<i>Utah-Wyoming</i>	
W1PZA	47-1-47-B	W7SP	8-2-4-A
W1QPS	44-2-22-B	<b>SOUTHEASTERN DIVISION</b>	
W1QFO	37-1-37-B	<i>East Florida</i>	
W1LS	19-1-19-B	W4EID	14-2-7-A-B
W1ALP	10-1-10-B	W4FNR	6-2-3-A-B
W1CTR	10-1-10-B	<b>SOUTHWESTERN DIVISION</b>	
<i>W. Massachusetts</i>			
W1RO	279-9-31-A-B	<i>Los Angeles</i>	
W1QXE	275-5-55-B	W6VZA	264-3-88-B
W1OQL/1	273-7-39-B	W6CRV	231-3-62-B-C
W1BCT	252-9-28-A-B	W6ZKZ	106-2-53-B
W1QCC	198-7-28-A-B	W6HZ	54-2-27-B
W1COI	184-8-23-B	W6ABN*	18-2-9-B
W1LFP	140-7-20-A	W6BWG	6-1-6-A
W1CCH	51-3-17-B	<i>San Diego</i>	
<i>New Hampshire</i>			
W1HD/1	350-7-38-A-B-C	W6ZDO/6	213-3-71-B
<i>Rhode Island</i>			
W1IQZ	1352-13-104-A-B	W6DKN*	9-1-9-B
W1LPO	276-6-46-A-B	<b>WEST GULF DIVISION</b>	
W1LYE	60-2-30-B	<i>Northern Texas</i>	
W1NOU	36-2-18-B	W5MJD	6-2-3-A
W1BGM	32-2-16-B	<i>Southern Texas</i>	
W1PAH	28-2-14-B	W5SM	46-2-23-B
W1UY	18-2-9-B	W5BCF	13-1-13-A-B
<i>Vermont</i>			
W1OOP/1	1998-18-103-A-B-C	<b>CANADA</b>	
<b>NORTHWESTERN DIVISION</b>			
<i>Washington</i>			
W7DYD	176-8-22-A-B	<i>Maritime</i>	
W7BQX	160-8-20-A-B	VE1QZ	7-1-7-A
W7LYA	154-7-22-A-B	VE1JK	4-1-4-A
W7RT	12-1-12-A-B	VE1TT	4-1-4-A
<b>PACIFIC DIVISION</b>			
<i>Nevada</i>			
W7CX	3-1-3-A	VE1TR	4-1-4-A
<i>Santa Clara Valley</i>			
W6IWS	60-5-12-A	VE1VL	4-1-4-A
<i>East Bay</i>			
W6BTO	120-4-30-B	<i>Ontario</i>	
		VE3AIB	190-5-38-A-B
		VE3AXM	76-4-19-A-B
		VE3RM	16-1-16-A-B
		VE3TI*	4-2-2-B

\*Not entered in contest; report submitted for checking purposes only.

## Single-Sideband Transmitter

(Continued from page 17)

sounds just like any other; they automatically tune slightly to one side of the incoming carrier in order to make the modulation sound the loudest. Reversal of the phase of the voltage fed to one modulator will cause the opposite sideband to be canceled; the receiving operator then finds he must tune to the opposite side of the carrier for the loudest modulation. Another interesting stunt is to ask the receiving operator to narrow down his bandwidth and tune in the composite signal for best reception. If the phase modulator is then disabled, the receiving operator will report a noticeable drop in the strength of the modulation.

First to use this system in the amateur bands

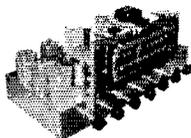
(Continued on page 114)



## Enjoy High - fidelity

RADIO RECEPTION WITH THE

*Browning* FM or FM-AM *Tuner*



Performance to satisfy the man who knows radio . . . provable by both instrument and listening tests . . . is yours with Browning Tuners.

*Model RJ-20* gives you high-fidelity reception on both FM and AM. Armstrong FM circuit gives maximum noise reduction with response to 15,000 cycles • separate RF and IF systems for FM and AM • variable bandwidth IF • two audio stages give 20 db bass or treble boost • 6AL7 eye for precise tuning • self-contained power supply. *Model RV-10* is the tuner for straight FM, delivering stable high-fidelity output to your audio system. You can pre-judge performance of both tuners from the curves in Data Sheet H-811. Write now for your copy.

### ✓ Check with Browning

AMATEUR FREQUENCY METER MJ-9



Reads directly on 7 bands from 3.5 to 148 mc.

Accuracy .05% at all frequencies.

A stable VFO with output voltages comparable to a crystal; lets you work band edges.

Stable — compact — large easy-reading dial — all controls on front panel — low power consumption at 110-120 volts a-c/d-c.



**BROWNING**  
LABORATORIES, INC.  
WINCHESTER, MASS.

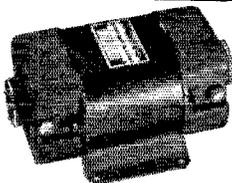
ENGINEERED FOR ENGINEERS

### CARTER GENEMOTOR

Used by Police Depts. over 15 years. Up to 150 watts output 600 volt at 250 MA. 5.5, 6, 12, 24, 32, or 115 volt DC input available. Write for new Bulletin No. 447 and name of authorized Carter distributor.

CARTER MOTOR CO.

2649 N. Maplewood Ave., Chicago 47, Ill.



## ARE YOU A MEMBER?

See Page 123

was station W6ZTE of the Stanford University Radio Club in July, 1947. W2RPU of Long Branch, New Jersey, tried out the circuit extensively on both 10- and 75-meter 'phone in the spring of 1948. As a demonstration of the simplicity and stability of the new modulation system, the writer installed it in a mobile transmitter in his car. At the conclusion of a 10,000-mile vacation trip, the transmitter was checked and found to be in as good adjustment as at the start.

A simplified circuit diagram of this installation is shown in Fig. 4. It consists of a Sonar MB-611 transmitter adapted for amplitude modulation. The 90-degree phase-shift network is driven directly from a T-17D carbon microphone, which serves as an admirable bandpass filter — its output being restricted to the 300- to 3000-cycle frequency range for which the network is designed. The microphone transformer must have a lower-than-normal turns ratio, so that the network is driven from a reasonably low-impedance source. Small output transformers, designed to match push-pull triodes or pentodes to a 200-ohm line, work very well. For close talking, about 0.5 volt peak is available at each of the two output terminals of the phase-shift network.

Where circuit elements are not identified in Fig. 4, they are conventional. The screen by-pass condenser of the 2E26 amplifier in the MB611 must be made smaller, since the original value is too large for a.m. Note the connections marked "To 'Scope." These are the points to which the 'scope must be connected for the phase-shift determination. Any resistances connected in effect across the outputs of the phase-shift network must, of course, be much larger than 60,000 ohms, or the operation of the network will be adversely affected. The same applies to any shunt capacitances. Note that the correcting network is connected to the side of the phase-shift network having the larger inherent shunt capacitance. Thus the shunt capacity of the correcting network will have the least possible effect on the phase-shift network. A better arrangement would have been to use isolating tubes. The values shown for the correcting-network components are only suggestions; the condenser sizes may have to be altered to fit the individual installation.

It is obvious that the composite modulation system will only work if the transmitter in which it is incorporated is free from spurious p.m. or f.m. — a qualification not always met in practice. Stable VFOs, good shielding, adequate buffer stages, and careful tuning of all circuits to resonance will avoid any trouble from this source.

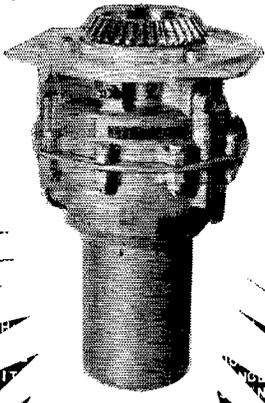
The writer wishes to acknowledge the valuable assistance of Roy Wolfskill, W2RPU, in trying out the circuit. Thanks are also due W6VQB and other members of the Stanford Radio Club for their interest and their helpful suggestions.

## SWITCH TO SAFETY!



**LOOK WHAT  
BIL HARRISON  
HAS NOW!**

**PROP PITCH  
ROTATOR  
FOR  
BEAMS**



**BRAND NEW!**

**THE SMALL ONES!**

BRAND NEW "SPARES"—never installed nor used in any way—clean, perfect. (Worth many times the battered ones removed from worn out planes)

These are the highly desirable SMALL TYPE—POWERFUL enough to easily turn the largest dual beam!

RUGGED enough to support even the heaviest array!

YET — LIGHTWEIGHT enough to mount on the top of your pole or tower — only 42 lbs!

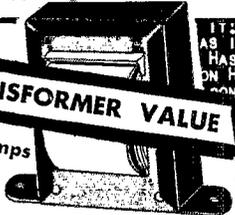
(Do not confuse with the ordinary ones you see around that weigh over 80 lbs)

• COMPACT! — Illustration is 1/7 actual size. (only 15 1/2" high)

- Operates on 24 to 30 V, DC or AC. (3 Amp transformer will do)
- Continuous rotation in either direction, reversible with single pole switch.
- Approximately 1 RPM (With 30 volts)
- 9000 to 1 gear reduction. No free swing, even in high winds.

These sturdy, dependable units, manufactured at a cost of several hundred dollars each, to control the pitch of propeller blades, make an excellent beam rotator! (See pages 22, 23, 29, Nov. '47 QST; page 38, April CQ; Handbooks, etc.)

Brand new, complete with detailed conversion and installation instructions. **\$15.95**  
(Mail orders add 90¢ each for packing)  
ASK FOR INSTRUCTION SHEET — FREE!



**AMAZING TRANSFORMER VALUE**

2 1/2 Volts CT — 10 Amps  
7500 V. Insulation  
For 866A's

**\$1.99**

As distributors for Kenyon, Stancor, Thordarson and UTC, we have the largest and most complete stock of new transformers available anywhere. If you don't see what you want, write to us! Harrison Has It!

**THORDARSON**

- 5 VCT, 15A — 10,000 V Ins. For 872A's T21F20 \$5.77
- 5 VCT, 21A — For PP VT127A, 4-125A, 250TEL, etc. T21F07 \$5.09
- 10 VCT, 5A — For 805, 810, 813, etc. T21F18 \$3.56
- 10 VCT, 12A T21F19 \$5.09

**KENYON**

- Ken-O-Tap Universal Modulation Transformers
- 75 Watts Audio — 150 Watts Class C. T494 \$10.65
- 600 Watts Audio — 1200 Watts Class C. T442 \$39.69

Other sizes in stock!

**UTC**

- 20 Hy Smoothing or 5/25 Hy Swinging
- 225 MA — 120 Ohms \$4.90
- 400 MA — 85 Ohms \$10.29
- 550 MA — 60 Ohms \$13.72

**Plate Transformers**

- 1500-1250-1000-0-1000-1250-1500 300 MA S-47 \$18.62
- 2100-1800-1500-0-1500-1800-2100 300 MA S-49 \$25.97
- 3000-2500-0-2500-3000 300 MA S-50 \$36.26

**YOU'LL WANT THESE**

Accessories for the Beam Rotator

- STEP DOWN TRANSFORMER to operate from 115 VAC. Delivers 30 volts. \$5.95
- SPDT MOMENTARY CONTACT, bat handle switch to control direction of rotation. Neutral center. "OFF" 49c
- DE LUXE DIRECTION INDICATOR KIT: Great circle maps for rear illumination—sloping front desk cabinet, or rack panel (specify choice) — complete with remote transmitter and special 1:1 coupling gear. Operates off the motor transformer. \$14.75

**SPECIAL COMBINATION OFFER!**  
Rotator with all these accessories. \$32.95

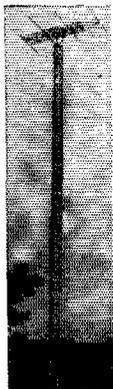
**HARRISON HAM-A-LOG**

Don't miss another copy of this interesting paper full of Ham news and Ham buys! Send us your name and call letters today.

**HARRISON**  
RADIO CORPORATION  
12 WEST BROADWAY, NEW YORK 7  
BARclay 7-9854

# LOOK

## OAK TOWER



- Triangular 12-inch type, weathered oak, finished in aluminum paint, sturdy—can be climbed.
- Quickly assembled—screwdriver is only tool needed. Holes have been drilled thru bracing members and into uprights, all screws furnished.
- Each 10 ft. section has metal plates to join additional sections, up to 60 ft. properly guyed.
- Shipping weight only 19 lbs.

**\$9<sup>95</sup>**

10 ft. section .....

Triangular blocks for top or pipe bearings, pair .....

**\$2.00**

### BC-221 CRYSTAL

1000 KC crystal, in FT-243 holder, ground to exact frequency to duplicate performance of original crystal in BC-221 Frequency Meter.

**\$3.50**

New .....



### 2MFD 1000 VOLT

Oil-filled condenser, single mounting hole, negative can, with nut .....

**59c**

10 for \$5.00

### 10 HENRY 300 MA. CHOKE



A terrific bargain. Audio Development Co. high-quality 10 Henry 300 MA. filter choke. All black-crinkle finish, new, 100 ohms DC resistance, very compact, 4 3/4" x 3 3/4" x 4 3/4", 10 lbs. only .....

**\$3.50**

### STRUTHERS-DUNN RELAY

110 VOLT AC

Control all of your equipment with this one relay. 110 VAC coil, 4-pole, 2 double throw, 2 single throw, 6 Amp. contacts, screw terminals, insulated base, 3" x 3 1/2", a terrific bargain at

**\$2.00**



WE DO NOT EXPORT. ALL PRICES NET, F.O.B. CINCINNATI, OHIO

# Steinberg

633 WALNUT STREET • CINCINNATI 2, OHIO

## F.M. Transmission Techniques

(Continued from page 24)

as received at WIJEL the improvement readability was amazing, and was estimated to be in the neighborhood of 10 db.

Clippers probably will not come into general use until the receiver adapters become more common, but we feel that once a considerable number of 'phone stations have true n.f.m. reception the clipper will be as necessary in the f.m. transmitter as the speech amplifier. We would like to point out that the necessary circuits, equipment and techniques necessary to make n.f.m. nearly as effective as a.m. are not coming in the future. They are already here. All that is necessary is for the n.f.m. operators to start using them now.

## Your Organization

(Continued from page 34)

democratic constitution. In 1925 the amateurs of 22 countries formed in Paris the International Amateur Radio Union, a cooperative federation of national societies like ARRL and whose headquarters society your League has always been. Our apparatus, our performance and our public recognition improved to almost all we would wish. In these rapidly-expanding horizons the League was always in there, fighting for the amateur, consolidating our gains, counseling the individual member, looking after our interests wherever they lay. Amateur telephony came, and took its place in amateur radio. Broadcasting was born in the early 20s, and in the middle 20s, just as we were finding the groove on stabilized vacuum-tube transmission and the higher frequencies, produced an interference crisis that required all of the League's efforts to prevent our extermination as one of the radio services of the nation. With world-wide radio-communication opened up through the developments of amateurs, the whole art increased in complexity, not only technically but in its international regulatory problems. World conferences, in which our whole existence was at stake, became something to be expected every few years. We tackled the very high frequencies and tamed them. Our numbers increased mightily, and with them the size and strength of our organization. With an enviable record for technical contributions, for expert communication in time of need, and as an invaluable training school for operators and technicians, amateur radio became a national institution, recognized as an asset of vast worth to the country. World War II came and went (and never has so much been compressed in so few words); and radio amateurs by the tens of thousands contributed of their skill and knowledge in the nation's hour of need. Although our stations were again closed for the duration, our League this time continued functioning, helping in every manner possible in the national effort, and succeeding in the restoration of our frequency bands and operating rights in a remarkably short while after the conclusion of the war.

And so we find ourselves today some 80,000 strong in this country, half again that many in world total, expert purveyors of reliable two-way communication instantly to any part of the world, the custodians for future generations of the only right a man possesses to talk to his friend farther than his own voice will carry without paying toll to a government or a corporation. The instrument by which this state of affairs has been reached is our common alliance in our mutually-owned society, the American Radio Relay League. It is no accident. It is the result of a democratic American system in which we have all worked hard and skillfully in a cooperative endeavor for over a generation.

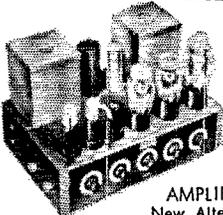
It has not always been easy going. Just take that question of the regulation of radio. We are only one of a large number of radio services that have to be accommodated in a limited spectrum. Both in the national or domestic sense at Washington and in the broader spheres of regional and world-wide regulation, problems and threats to our rights are constant.

(Continued on page 118)

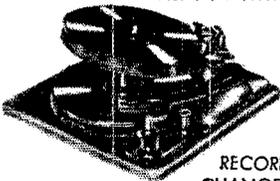
MUSIC OUT OF THIS WORLD...  
AND THE BEST IN TELEVISION

Visit *Sun Radio's*  
**BIG, NEW**

# SOUND & TELEVISION STUDIO



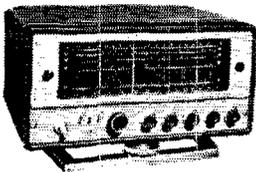
**AMPLIFIERS!**  
New Alltec A323B  
Net . . . \$133.00



**RECORD CHANGERS!**  
New Webster Model 256. For standard and LP records.  
Net . . . . \$33.91



**SPEAKERS!**  
New Alltec 603B  
Net . . . \$63.00



**RECEIVERS!**  
New Hallcrafters SX-62.  
Net . . \$269.50

**For Real Audio & TV Demonstration**  
For Sound values—and for real Sound demonstration—Sun Radio invites you to New York's newest and most complete Sound & Television Studio.

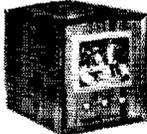
It's *your* new headquarters for the **VERY BEST** in Audio Equipment (especially high-fidelity), as well as the latest in Television Sets and Kits.

Relax in the comfort of Sun Radio's 1000 sq. ft. Studio, and, under ideal conditions for audio reproduction, choose from New York's largest selection of amplifiers, tuners, microphones, changers, speakers, cabinets, recorders, and TV sets and kits.

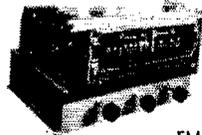
Now, for the first time, you can see and hear *exactly* what you buy—*Before* you buy. "SEE SUN FOR SOUND & TV" for the latest equipment, for the greatest values.

**STOP—LOOK—And LISTEN** to the best in Audio & TV at **SUN RADIO.**

**Hundreds of Components always on demonstration!**  
**All leading manufacturers featured!**



**TELEVISION!**  
New 10" Hallcrafters, T-67. Net . . . \$295.00



**FM TUNERS!**  
Browning Model RV-10  
Net . . . . \$89.50

*at Sun Radio:*

- ★ Choose from the widest selection of nationally famous makes.
- ★ Buy for the lowest prices in town, guaranteed by Sun Radio's 26 years of leadership as radio supply headquarters.
- ★ Personal, unhurried service by our staff of specially trained sound men.
- ★ Exclusive demonstration panel puts 2600 combinations of sound components at your fingertips.
- ★ Free, expert advice on your engineering and installation problems.
- ★ You're always welcome to come in and hear "music out of this world." Never any obligation.

**OUR ONE AND ONLY ADDRESS**  
Conveniently located in the City Hall Section of Downtown Manhattan.

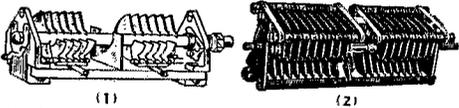
Hours: Open Daily from 9 A.M. to 6 P.M.  
Saturdays from 9 A.M. to 4 P.M.

*Sun Radio* 

AND ELECTRONICS COMPANY, INC.

122-124 DUANE STREET  
NEW YORK 7, N. Y. BARCLAY 7-1840

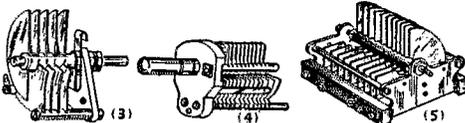
## CRAZY LOW PRICES ON TOP QUALITY CONDENSERS



(1) Hammarlund Type "HFD" Micro<sup>®</sup>. Double spaced, 1500 volts, .030" spacing. Screwdriver slot for tuning, with shaft lock. Soldered brass plates, cad. plated. Aluminum end plates mounted on Isolantite base. Has isolating center shield. Silver plated rotor contacts can be shifted to 3 position for shortest possible leads. \*Made by Johnson.  
\*Type HFD15X, 16 max.-3.8 min. mmmf., 11 plates per section. Stock No. 14A680, size 1 1/16 x 1 1/2 x 3". **99c**  
SPECIAL EACH

\*Type HFD30X, 28 max.-5 min. mmmf., 9 plates per section. Stock No. 14A681, size 1 1/16 x 1 1/2 x 3 3/8". **\$1.19**  
SPECIAL EACH

(2) Johnson Dual 207 Mmf. Type 200FD20 .045" spacing, 2000 volts, 207 mmmf. max.-1.3 min. per section. No. 13A510, size 2 1/4 x 2 1/4 x 8". **\$1.95**  
\$10.00 List Value. SPECIAL EACH

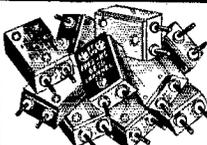


(3) Johnson Type 12G70. 12 max.-6 min. mmmf., 7 plates .225 spacing, 1/2" shaft 1 1/8" long. Has single end plate of steatite, .032" rounded aluminum plates. No. 14A677, size 2 1/16 x 2 7/64 x 2 5/8". Spec. Ea. **\$1.49**  
No. 14A677, size 2 1/16 x 2 7/64 x 2 5/8". Spec. Ea. **\$1.49**  
(3) Johnson Type 50G20. 52 max.-5 min., mmmf., 9 plates .045" spacing, 1 5/32" long otherwise as above. No. 14A679, SPECIAL EACH **99c**

(4) 100 Mmf. ceramic insulated APC type, 1/4" shaft, 7/8" long. Quality make. No. 18B92, SPECIAL EACH **40c**  
140 Mmf., as above. No. 18A880, EACH **50c**

(5) Cardwell "Midway", 74 Mmf., 19 plates air gap .070". Aluminum frame, brass bearings, plates buffed and rounded. Mvalex insulated, 1/4" shaft. No. 18A853, size 2 3/4 x 3 1/4". SPECIAL EACH **\$1.45**

## 80, 75 and 40 Meter CRYSTALS Assortment of TEN only \$3.95



In FT 243 holders, cut from highest quality quartz, accurately ground and acid etched. Frequency marked on each within 2 KC. Sorry we must sell them in assortments our pick of frequencies—But you can't go wrong! There are choice frequencies for 80, 75 and plenty for 40 meters or for doubling to 20 and 10 meters in each assortment.

Every one guaranteed to be an active oscillator. No. 21T391. Assortment of TEN. ONLY **\$3.95**

## SAVE ON 807 TUBES

Jan inspected, quality make, individually boxed, Clean, Perfect, Guaranteed. No. 20A668. SPECIAL EACH **\$1.35**

## 5BP4 CATHODE RAY TUBE \$2.95

Has 5" white screen. Quality make individually boxed in cushioned carton. Brand New, Perfect, Guaranteed. No. 36T206. SPECIAL EACH **\$2.95**

## RECHARGABLE BATTERIES ONLY 95c



Willard 2 volt, compact rechargeable storage battery in Spill-proof Clear Plastic Case only 2 3/8" square and 6" overall height (about the size of the ordinary #6 dry cell) make it ideal for most any need where battery power is desired. Rating 2.4Ah, gangs nicely for other voltages in multiples of 2 volts. Shipped Dry. Uses standard battery electrolyte available everywhere.

No. 5A133. **95c** EACH **6 Lots 75c** EACH

Order direct from this add—include Parcel Post Charges. Many More Outstanding Values in the big New 132 page B-A Catalog No. 491—Write us if you did not receive it!

**B-A BURSTEIN-APPLEBEE Company**  
1012-14 McGEE STREET,  
KANSAS CITY 6, MISSOURI

For 35 years the spokesmen for your League have been on the job fighting for your rights. Your League has represented you at literally hundreds of hearings and conferences in Washington, at any of which disaster might have overtaken the amateur movement in this country. It is not sufficient that we mean well and do good deeds; we must also have skillful and experienced spokesmanship that can tell our story and that knows the way to get results. That is a protection that the League mechanism affords the American amateur, and on innumerable occasions it has saved the day. In this country the problems have run all the way from misguided proposals that would cost us the loss of some small privilege to threats against our message-handling right and outright proposals to abolish the whole amateur institution. On the international front, both in the American region and world-wide, the League has been the only U. S. representative of the radio amateur at a large number of conferences of the first magnitude, at a cost to our amateur treasury of many tens of thousands of dollars, but except for which effort we would have been sunk without a trace long years ago. Washington, The Hague, Copenhagen, Madrid, Havana, Lisbon, Bucharest, Cairo, Santiago, Rio, Atlantic City—where would we be without a League? Starting with the modest efforts of Mr. Maxim as an individual amateur, as I mentioned a short while ago, the requirements upon us in this field have grown to where they are now one of the major activities of the League. Take that affair at Atlantic City last year as an example. Acting along policies laid down by the Board of Directors, your League participated constantly in the three to four years' preparatory work that preceded the actual conference, and then had from two to six representatives present as members of the United States delegation during the whole five months' duration of that bitter conference. With nation arrayed against nation, and service against service, it was a grueling battle, emphasizing anew the difficulties of the world in providing for all its radio needs. The way we came out of that conference is, I assume, well known to you. Did you ever stop to think that each one of us actually practises amateur radio as an individual in the privacy of his own shack, and that the reason we have a League is so that, organized, we may have greater security and enjoyment in our private pursuit of that hobby? You can see how impossible it would be for us individually and unorganized—or organized in separate factions—to have any reasonable hope that we would come through such a conference as Atlantic City with any frequencies left on which to operate. I think we can point at that one conference alone as illustrating beautifully the indispensable requirements of the American amateur to have such an organization as ARRL to work in his behalf.

And don't think that the story is ended. It goes on and on. All this year League representatives have been attending meetings in Washington planning the United States position to be taken at a conference of the whole American region, to be held early next year in South America, where decisions must be made as to what this region will do about the frequencies that Atlantic City left on a regional basis. Should that not sound very important to you, let me point out that the band 3500-4000 kc., for example, has an Atlantic City allocation in this region to fixed, mobile, or amateur service at the discretion of the regional conference, and the whole question of our 80-meter band, to name just one problem, will be on the agenda for this coming South American conference. Moreover, conferences such as Atlantic City decide things for only a few years at a time and so in the early '50s we must expect to see another world conference, this time at Buenos Aires, and the whole thing all over again. Does this not show you the need for organization? More than that, does it not show you our need for internal unity? I can tell you right now, fellows, that this world radio situation gets tougher and tougher and that we require complete cohesion and an undivided front if we hope to hold our own. Otherwise, that peering sound that you hear will be all the horns of the country looking around from behind the 8-ball.

The founding fathers of our League were a great bunch of guys and they did an awfully good job for us. When they started out this amateur organization, they said it's going to be purely amateur and absolutely noncommercial; it's going to be orderly, and high-grade, and on a high ethical plane; it's going to serve nobody's personal or selfish ambition—it's going to be for the good of the whole. They gave not only of their money but of their time and energy and asked nothing in return. Those old-timers recognized their responsibility, and for their vision and their high standards

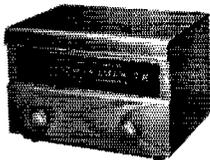
(Continued on page 180)

# HARVEY *Has Them ALL*

## HARVEY SPECIALS

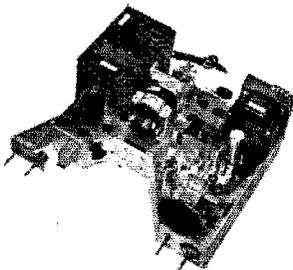
### GE XFM-1 FM TRANSLATOR

Covers 88-108 mc range, tuning dial 12" long, uses guillotine tuning for highest efficiency, high stability. Designed for export and tropicalized, has power inputs for 110 to 250 volts, 60 cycle.



Quantity limited. Shipping weight 30 pounds.  
**HARVEY SPECIAL PRICE.....\$49.50**

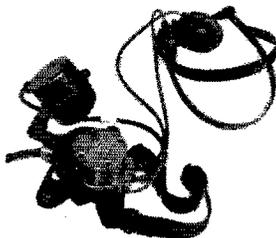
### TECHMASTER TV KIT



Exactly the same as the RCA 630TS chassis, complete kit of parts, including pre-wired and aligned RCA front end, condensers, resistors, punched chassis, all tubes including kine, complete manual with service notes, all RCA.....**\$198.50**

**FREE . . . Circuit and parts list on request.**

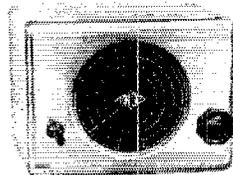
**Crystals**—You can't beat Harvey for crystals. Not off-frequency surplus but crystals right on your frequency, or within a few kc. 20-40-80 meter and 6 and 13 mc bands for only.....**\$1.00**  
 Special 8 mc crystals for 2 meter xtal control, only.....**\$1.50**  
 Also in stock, a complete line of Billey AX-2 & AX-3 crystals. When ordering crystals only, include 10c postage with your order. All crystals mounted in holder with 1/2" pin spacing, lucite adapter for 5 prong socket.....**35c**



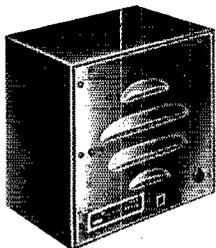
**RCA Sound Powered Phones**  
 —Navy type, self contained, with necessary cords and plug, work up to 2000 feet over any 2-conductor wire; many uses around transmitter, home, barn. Brand New, in original cartons..... each **\$15.00**  
 per pair **\$24.50**



**Type 1616 Tube:** Half wave high vacuum rectifier. Filament 2.5 volts, 5 amps; peak Inverse 5500 volts; peak current .8 amps; surge current 2.5 amps; average plate current .130 amps. List Price **\$7.50**. Harvey special price, while they last.....**95c**



**Gon-Set Converter**—6-10-11-15 or 2-6-10-11 meter bands in one converter without changing coils! 8 tubes, actually 3 separate converters in one with selector switch, large band-spread dial, output frequency 7 mc. Built-in power supply. Specify bands when ordering.  
**Net price..... \$75.00**



**Signal Corps Model 1S-3 Speaker**—6" PM in rugged, crackle finish steel case, complete with self-contained output transformer to match 4000 ohm load. Originally used with BC-312-314-348 receivers. Ideal for many uses around the shack. Speaker voice coil impedance 6-8 ohms.  
**Harvey Special. . . . \$4.95**

**NOTE:** All prices are Net, F.O.B. N.Y.C. and are subject to change without notice.

Telephone: **7** Longacre 3-1800

**HARVEY**  
**RADIO COMPANY, INC.**

103 West 43rd St., New York 18, N. Y.

**Get Your Order In Early For Immediate Delivery.**

# PEERLESS PACKS Value PUNCH!

## PEERLESS TUBE BARGAINS!

2X2A.....	98c	805.....	\$4.79	1603.....	\$5.95
2X2/879.....	49c	807.....	1.09	1619.....	39c
3C24/24G.....	39c	810.....	5.95	1624.....	\$1.19
6AC7.....	89c	813.....	6.95	1625.....	49c
6AG7.....	98c	822A.....	2.65	1626.....	49c
6C4.....	29c	836.....	1.19	1629.....	49c
6J5.....	49c	837.....	1.79	1635.....	98c
6L6.....	89c	872A.....	1.75	8029.....	\$2.95
6SN7GT.....	69c	923.....	98c	9001.....	49c
12A6.....	59c	954.....	49c	9002.....	69c
EF50.....	59c	955.....	49c	9004.....	69c
252A.....	\$1.98	957.....	49c	9006.....	69c
801A.....	79c				

## V.T.V.M. KIT, EICO MODEL 221-K

Completely new, different vacuum tube voltmeter, at unusually low price! Amazing performance sets new standards of accuracy, linearity, and stability for this type of instrument. Electronic AC range to 30 Kc is more linear and accurate than possible with copper oxide rectifier. Meter cannot be burned out. AC, DC ranges: 0-5, 10, 100, 500, 1000 volts. Ohmmeter measures .2 ohm to 1000 megohms in 5 ranges. Kit includes all components, **NOTHING ELSE TO BUY!** With complete set of 11 stage-by-stage wiring and assembly diagrams, and full simple instructions. **OUR LOW PRICE..... \$23.95**

## 15" MAGNAVOX SPEAKER 3.2 lb. ALNICO V MAGNET

Sensational Value! Ideal for heavy duty public address, auditoriums, theatres, etc. 2" voice coil. 6-8 ohms VC impedance. Max. 30 watts. Individually boxed. Reg. Price \$89.50. **OUR LOW PRICE, while limited stocks, \$24.95** last.....

## LS3 MATCHING SPEAKER

6" heavy duty PM speaker. Mounted in weather-proof and wind-proof acoustically treated metal cabinet. 4000-ohm transformer mounted on speaker. Two-circuit jack on front panel. Individually boxed. **OUR LOW PRICE \$5.95**

**SELENIUM RECT., 100 Ma.....Only 59c each**

**MODULATION TRANSFORMER, Stancor A-3871**  
List Price \$4.50. **OUR LOW PRICE \$1.49**

**A. T. R. 12-V INVERTER Model 12RSB**  
12V DC Input, 110 V AC Output, 100 Watts.  
List Price \$44.00. **OUR LOW PRICE.....\$17.60**

## ADJUSTOVOLT, Stancor P-6247

Special metered multi tap autotransformer to correct line differences to operate standard equipment. 300 watts. Pri 9 taps, 55-135 volts, 50/60 cycles. Sec. 115 volts. Individually boxed. **OUR LOW PRICE..... \$11.95**

## TELEVISION COMPONENTS

Horizontal Output — H.V. (Flyback) 10 K.V. Trans.....	\$6.25
Horizontal Blocking Oscillator Trans.....	1.75
Vertical Bleeding Oscillator Trans.....	1.95
Focus Coil.....	5.25
Deflection Yoke, 50 degrees, for 10", 12", 15" Picture Tubes.....	4.95

## WELL KNOWN BRAND

### TELEVISION HIGH-VOLT CAPACITORS

Brand New — Guaranteed Double seal construction

Capacity	3000V	4000V	5000V	6000V
.0005 Mfd.....	51c	54c	58c	60c
.001 Mfd.....	51c	54c	58c	60c
.005 Mfd.....	54c	58c	60c	63c
.01 Mfd.....	58c	60c	63c	66c
.05 Mfd.....	66c	69c	72c	75c

MINIMUM ORDER \$5.00. We carry large stocks of all types of tubes—write for free list—we will be pleased to quote on other types not shown here. All prices F.O.B. Jamaica, N. Y. Please add postage. Write Department G



**92-32 Merrick Road Jamaica 3, N. Y.**  
Branch: 71 Murray Street, New York 7, N. Y.  
**Peerless Electronics Distributors Corp.**  
76 Willoughby St., Brooklyn 1, N. Y.

we owe them a great debt. However, that first constitution of ours was not democratic in the way we mean the term today. In effect, that first Board of ours was self-perpetuating. The Board would suggest a nationwide slate of competent amateurs to be the directors, and although any member could scratch a name and substitute one of his choice, the Board's slate always got elected. Whenever a vacancy occurred, the Board reached out for the best amateur they knew and invited him to join them. They demanded that everybody tend up and help carry the load, and they ruthlessly fired off of the Board any director who lived within a reasonable distance and would not attend meetings—and at his own expense. They fired Thomas Edison's right-hand man off the Board for that reason though he was an excellent amateur and a man of affairs. They fired the dean of electrical engineering of one of America's greatest universities for that reason though he was a world-famous figure. They worked wholeheartedly and sincerely, and they demanded that all their associates do the same. But devoted as this early Board was and much as the League progressed under its administration, the system wasn't democratic, in that we didn't have territorially-representative government with every member having an equal voice. I remember that in 1922 I made a long trip all over the nation, studying this situation, and when I returned I told the Board that I thought we had reached the numbers and strength where we could operate and ought to operate under a thoroughly representative form of government. At the direction of the Board, I made a first draft of a new constitution, our first provisions for partitioning the country into divisions, with an ARRL director to be nominated and elected from each of those divisions. A committee of directors, and the Board itself, worked over that draft for a year or more, and finally late in 1923 it was adopted, the first divisional elections were held, and in early 1924 the old Board voted itself out of office and gave up the reins to the territorially-elected representatives of the members. I'm proud to say that I was a member of that old Board.

Let us now see how this system of government we have works. The first thing we note is that we have a membership of people interested in amateur radio, who have organized an association and adopted a set of by-laws that constitute their working rules. Under these rules the country is partitioned into divisions and in each division the members elect a spokesman for themselves. There are 15 of these spokesmen from the United States and one from Canada. These sixteen spokesmen—or directors, as they actually are—then elect the president and the vice-president and the latter also become directors. Thus we have a Board of 18 directors who are the absolute bosses of ARRL. While each one of these divisional directors possesses but one vote, between them by their majority opinion they have control over every detail of the affairs of our whole organization. We members oblige these directors by the rules in our by-laws to inform themselves on our needs and desires, but we lodge in them as individuals the function of controlling our organization. It isn't possible for the entire membership to participate in personal voting on every question that comes up in our affairs, so we select spokesmen for ourselves and delegate to them the right to speak for us. It is almost exactly as it is in the Congress of the United States. The private citizen doesn't have an opportunity to vote on the adoption of every proposed law. He has elected a Congressman to do that for him and has delegated his power to the Congressman. But while he cannot vote on each such matter, he does have the right to express his opinion to his Congressman and to let him know how he feels about it, and if he and his fellow-citizens don't like that Congressman's representation of them they can replace him at the next election.

And so we have a Board in responsible control of the League, possessing all the powers that the law provides for the directors of a corporation. It even elects the president and vice-president of the League. It also hires the secretary and the communications manager and the treasurer, fixes their salaries, requires reports of them, tells them what to do, and can fire them at any time it wishes. Perhaps it's worth mentioning here because many amateurs seem not to understand it: the Headquarters officers are not directors. They are ordered to attend meetings of the Board for the purpose of reporting what they have done to accomplish what the Board wanted, and to receive their instructions for the future, but they are employees of the Board, they have no vote, and they have to get permission even to speak. As

(Continued on page 122)

# CRYSTALS!

All crystals have Army MC harmonic ratings but Sun encloses directions for deriving the correct fundamental frequency in kilocycles.

## CRYSTALS WITH A MILLION USES

Fractions Omitted

kc	kc	kc											
412	420	430	437	444	453	473	483	491	497	506	515		
413	422	431	438	446	459	474	484	492	498	507	516		
414	423	433	440	446	466	475	485	493	501	508	518		
415	424	434	441	447	468	477	487	494	502	509	519		
416	425	435	442	448	470	479	488	495	503	511	522		
418	426	436	443	451	472	481	490	496	504	512	523		
419	429												

**49¢**  
each

### I.F. Frequency Standards

kc	kc	kc
450	459.259	464.815
451.388	461.111	465.277
452.77		

**99¢ each**

### Crystal Frequency Standards 98.356kc

Easily altered for 100 kc Standard Mounted in low loss 3 prong holder.

**\$3.89 each**

### For Crystal Controlled Signal Generators 525kc

526.388	531.944	536.111
527.777	533.333	537.500
529.166	534.722	538.888
530.555		

**99¢ each**

### ASSORTED MISCELLANEOUS CRYSTALS

Fractions Omitted

372kc	376kc	381kc	384kc	387kc
374	377	383	386	388
375	379			

**39¢ each**

priced at a fraction of the cost of their holders alone.

### FOR HAM AND GENERAL USE

Fractions Omitted

390kc	394kc	402kc	405kc	408kc
391	395	403	406	409
392	396	404	407	411
393	401			

**79¢ each**

### CRYSTALS

#### FOR SCR 522

5910kc	7350
6378	7480
6450	7580
6610	7810
	7930

**\$1.29 each**

### CRYSTALS FROM BC 610

3/4" Spacing—2 Banana Plugs

2045	2258	2360	2532	3250
2105	2260	2390	2545	3322
2125	2282	2415	2557	3510
2145	2300	2430	3202	3520
2155	2305	2435	3215	3550
2220	2320	2442	3237	3570
				3580
				3945
				3955
				3995

**\$1.29 each**

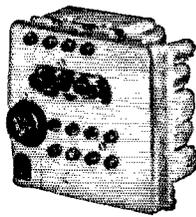
• Payments must accompany order. Enclose 20¢ for postage and handling. Minimum order—\$2.00 plus postage.

# Hot Radio Values AT SUN RADIO

## 2-6 MC PB RECEIVER

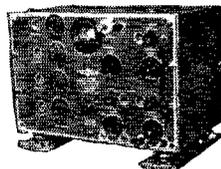
6 Tubes (3—1T4, 1—1R5, 1—1S5, 1—3S4) 2-6 MC in 4 Bands. Sold as pictured including 4" speaker and schematic. Easily converted to broadcast with instructions furnished. Has R.F. stage and audio output stage to drive speaker. Used but guaranteed operative.....

**\$9.95**



## 100 WATT BENDIX TRANSMITTER

4 Separate ECO



These can be easily converted to 20-40-80 meters. Crystal required for 10 meters. Each electronic coupled oscillator dial has 3000 divisions enabling quick precision shifting. This transmitter was constructed of the highest quality of precision parts, with laboratory precision. Four separate output tanks; one 4-position selector channel switch having seven sections which changes the ECO, IPA and output tanks simultaneously.—BRAND NEW, complete with tubes.....

**\$39.95**

## CLOSEOUT SPECIALS ON PART KITS

- KIT 1 Asstd Mica Condensers—Unmarked. 100 for...**\$1.50**
- KIT 2 Asstd Resistors 1/2W-1W. 100 for.....**\$1.00**
- KIT 3 Asstd Condensers—Tubular Bypass. 25 for...**\$1.00**
- KIT 4 Asstd Condensers—Electrolytic. 25 for.....**\$2.00**
- KIT 5 Asstd Potentiometers—with or without switch. 10 for.....**\$1.00**
- KIT 6 Asstd Ballast Tubes—Line Ballasts. 10 for...**\$1.00**
- KIT 8 Octal Sockets—Wafar. 25 for.....**\$1.00**
- KIT 9 Octal Sockets—Plastic with Flange. 20 for...**\$1.00**

**SPECIAL!! ALL 8 KITS FOR \$8.00**

## PANEL METERS

ALL BRAND NEW AND GUARANTEED

- GE 2" Round 0-500 D.C.-M.A.....**\$2.97**
- Simpson 2" Round 0-15 D.C.-V.....**2.97**
- Triplett 2" Square 0-40 D.C.-V.....**2.97**
- Sun 2" Round 0-300 D.C.-V.....**2.97**
- GE 3" Square 0-150 A.C.-V.....**3.49**



## SIMPSON 3" ROUND PANEL METER

Build your own laboratory type dynamic mutual conductance tube-tester... calibrated in micromhos with good-bad scale. Complete with schematic. **\$9.50**

### ALSO AVAILABLE!

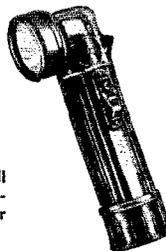
- BC 1068A—Radar Receiver covering 174-210 MC Television band.....**\$39.95**
- BC 1073A—150-210 MC Wavemeter 19 tubes 110 VAC.. **14.95**
- TU9—108 RF Tuning Units.....**2.89**
- BC645—UHF Receiver Trans.....**14.95**
- SCR 195 Walkie Talkies with spare parts. Each.....**59.95**
- P20 Magnetic Headphones, 2000 ohms, 8' cord.....**2.49**
- T17 Microphones.....**.99**
- TS13 Handset 6' cord with PL55 and PL-68 plugs.....**2.95**

• TERMS: All items F.O.B., Washington, D. C. All orders \$30.00 or less, cash with order. Above \$30.00, 25 per cent with order, balance C. O. D. Foreign orders cash with orders, plus exchange rate.

## ARMY SURPLUS FLASHLIGHTS

**SPECIAL 97¢**

A sensational value for both Radio and all around worth. Complete with bulb and non-shock Army green case. Cost the Army over \$3.75 each.

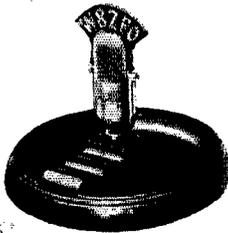


# SUN RADIO

OF WASHINGTON, D. C.

938 F STREET, N. W. WASH. 4, D. C.

# GIFT ASHTRAYS



Beautiful MAN SIZE Ashtray of black bakelite and cast aluminum Miniature Microphone complete with Nameplate and Call Letters raised and highly polished on both sides. 7-inch diameter, 6 inches high. A perfect gift for your fellow ham. Packed in gift box. Accommodates up to five letters.

Type AT-36

\$5.00 Postpaid

Solid cast ORNAMENTAL BRONZE Ashtray with cast silhouette call letters. Edges of tray and letter faces highly polished. Well designed for rich appearance. Size: 5" x 2 1/2". Accommodates up to six 1-inch letters.

Type AT-72

\$3.70 Postpaid



# CALL LETTER PLATES



Type A-18 - For Your Car

Type A-19 - For Panel Mounting

\$2.95 POSTPAID

A large sturdy cast aluminum plate with satin-finished letters and

border against a black baked enamel background. Red, green, blue and gray -- 50¢ extra. Size 2-3/4" x 8 1/2" with 1 1/2" letters.

# LAPEL BUTTONS

An attractive metal button with highly polished raised letters against a black background. Other colors 50¢ extra.



ACTUAL SIZE \$1.10 POSTPAID

Type A-26L With Screw Backing

Type A-26P With Pin Backing

CASH WITH ORDER

Allow 3 weeks for delivery

# SREPCO

STANDARD RADIO & ELECTRONIC PRODUCTS CO.  
135 E. Second St. DAYTON 2, OHIO. Tel. FUlton 2174

its chief piece of machinery for accomplishing the desires of the League, the Board has caused a Headquarters service office to be set up. This Headquarters establishment consists of the three hired officers and their staffs. There are about 65 people at Headquarters now, all working for amateur radio, and so far as I know we are the largest aggregation anywhere devoted to the advancement of a hobby. The activities of the Headquarters are those that have been found necessary to carry out the general plans and policies that have been ordered by the Board. If you will keep it in mind that the reason we have a League is so that each of us at our personal stations may have more enjoyment and security than we would have if we were unorganized, you will have a good idea of the nature of the many departmentized activities that go on at the Headquarters office -- with which I assume you are generally familiar. You'll know about the Communications Department with its operating activities, contests and awards, its training aids and club helps, its planning and coordinating of our emergency communications service, its maintenance of our model Headquarters station, WIAW. You will know of our technical and editorial gang, equipped with laboratory and shop as well as typewriters, turning out *QST* and our other publications; of our business departments that keep the wheels turning; and of the work of the League in the fields of legislation, regulation, public relations and the assistance of the individual member. (As a side note, you may be interested to learn that last year, with the greatest membership in its history, the League's operations in the promotion, protection and correlation of amateur activities cost the equivalent of \$8.26 for each member.) Headquarters is in constant contact with the membership, with Washington and with the radio art generally, receiving and implementing the ideas of the directors and in turn letting the directors know what is done to carry out their plans. In preparation for each of their meetings, the directors themselves make elaborate soundings of the opinions of their division members on the questions of the day, to be able to give effect, so far as possible, to those wishes when they sit down with each other in a formal meeting.

This is a pretty good system and it has always stood us in mighty good stead. It isn't perfect, any more than anything else in the world is perfect, but still it works very well. I'd like to carry you through a test check on the operating of the system so that we can see how it works and perhaps get a clearer impression of some of the troubles that occasionally come up. I'm going to take an example that you will instantly realize is strictly hypothetical. Let us imagine that some club or group of hams in some division gets the idea that, for some stated reason, it would be a good thing to raise the code-speed requirement from 13 words per minute to 14 words per minute in order to possess the right to operate on the first 10 kilocycles of the 7-Mc. band. . . . The idea gets talked up in that division and the first thing you know a considerable number of the fellows are going to their director with it and asking him to put it forward as a proposal for League action. The director notifies his fellow directors that he intends to propose League action in that direction at the next meeting. If time permits, the proposal is published in *QST* and all members in all divisions are invited to inform their own directors how they feel about it. But in any event, preparatory to the Board meeting, each director travels around his division, visiting amateur meetings, or writes letters accompanied by a questionnaire, or otherwise solicits and collates the opinion of his division on this topic. When the directors assemble, each director knows what he thinks and what his members think. When the subject comes up, the directors discuss it pro and con, for hours if necessary, and at the end they take a vote on it and the majority view prevails -- as of course it must. Let's say that the motion passes, and the secretary is directed to ask FCC to amend the amateur rules to provide for this change. Now the secretary of the League will have the job of endeavoring to get that regulation adopted. Through its long experience, the Headquarters will know something about how to get the reasonable requests of the Board adopted. There is no great mystery about it, it being based in the long run, of course, on human relationships. We go to see the Government administrator who directs amateur radio. We know him well and we'll talk it over, explain the need, and show how our directors had sounded out sentiment in their divisions and felt that it was in the inter-

(Continued on page 124)



**RECEIVING SENDING**  
**CODE Speed** *without strain*

**CHAMPIONS ENDORSE CANDLER WAY**

Get skill, accuracy, speed with the highly endorsed Candler System. Learn to send and receive by telegraph or radio code. Government service and commerce need thousands of better trained operators. Air commerce, mail, freight, etc., demand expert, reliable operators. Good pay. Get the Candler System, the maker of champions. It teaches you the "knack" of sound sense, alertness, speedy sending and receiving without strain. Adventure -- good pay. Learn at home or wherever you are. Rush name today for free book.

**FREE!**

**CANDLER SYSTEM CO.**

Dept. 4-M; Box 928, Denver 1, Colorado, U.S.A. and at 121 Kingsway, London, W. C. 2, England



# EVER PLANNING

*for the Future . . .*

In Washington this past summer a half-dozen study groups of Government and military communications experts have been meeting, with industry representatives, to plan various phases of United States participation in the forthcoming Inter-American Telecommunications Conference. The sessions began in April and have been held every several weeks since; they will continue, with increasing frequency, right up until the opening of the conference itself sometime in 1949.

This regional radio conference is, like its predecessors, of vital concern to amateur radio. The continuance of our 80-meter band as exclusively amateur in this country is an example of those privileges which will depend on the outcome of this conference.

A major reason why we amateurs possess these privileges is that ARRL has planned well in advance for past conferences and sent expert representatives to speak for the amateur service in the U. S. delegations.

The continuance of these privileges to a large extent will depend on amateur spokesmanship during the planning and execution of the 1949 conference.

**That is why ARRL holds membership in all of the Washington planning groups dealing with subjects of concern to the amateur service . . . that is why ARRL has had representatives at all meetings of these committee groups . . . and that is why your ARRL, under instructions of your Board of Directors, will provide skilled representation for amateur radio at the conference itself.**

*Are you doing your part in supporting organized amateur activities by membership in the League?*

ARRL, 38 LaSalle Road  
West Hartford, Conn.

Enclosed is \$..... (\$4 in the U. S. and possessions; \$4.50 in Canada; \$5 elsewhere) for ARRL membership dues for one year. Start QST with the.....issue. I prefer a membership  certificate  card.

Name.....Call.....

Street and number.....

City.....State.....

# NEW . . . .

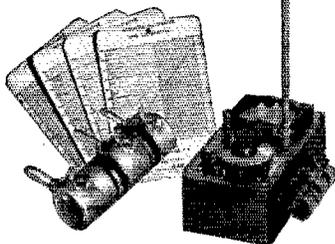
## SIMPSON MODEL 380

### Wavemeter and Modulation Indicator

Enables transmitter to be spotted at any desired point on the band, keeps constant check on percentage modulation, monitors quality of transmission, plots antenna field patterns. Serves, also, to search regions between bands for harmonics and parasitics, and to indicate changes in actual radiated power output. Instrument is band-spread for each ham band and has individual hand-drawn calibration curves.

Size: 2" x 2 1/4" x 5 1/4".  
Wt.: 2 1/2 lbs.

Price, complete with 4 coils, 2 ft. antenna, and hand-drawn calibration charts, \$37.85



## W. D. BRILL CO.

198 TENTH ST. • OAKLAND 7, CALIFORNIA

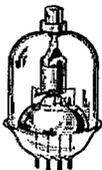
W6KLO

W6PYH

W6FIX

## FOR S.S.S.C. OR MOBILE

### The EIMAC 4-65A



Here's the current favorite for Single Sideband Suppressed Carrier because it can handle extremely high peak powers, has reserve supply of emission and freedom from internal insulators.

It's also excellent for high power VHF operation — up to 225 MC. At 600 volts, output is 50 watts with 2 watts drive. At 3,000 volts, output is 265 watts. Net, \$14.50

### Hytron 5514 Is Tops

We also carry the complete Hytron line including the popular 5514. High efficiency with 400 to 1500 volts. It's an all-purpose ham tube designed for hams. Net, \$4.95

Write for descriptive literature  
Distributor for complete ham line

### CENTRAL RADIO PARTS CO.

1723 W. Fond Du Lac Ave., Milwaukee 5, Wisconsin

Wendell Ciganek • W9SYT

ests of amateur radio to have this requirement. Let's say that the administrator approves the suggestion and that it moves through the tortuous machinery of the Commission. As a member of the League, you'll be getting progress reports on the subject from time to time in *QST*, and some night you will hear on a bulletin from WIAW that the rule has been adopted and is effective on a stated date. That is a very hurried outline of the process whereby the desires of individual amateurs can get translated into an FCC action through the directors of the League, their instructions to the secretary at a meeting, and the Headquarters representations at Washington.

Now all of those amateurs who approve of that regulation are likely to think that this is a pretty fine system we have, and an ideal piece of machinery. But what about those who don't like the regulation? Naturally, in a country as big as ours, there are bound to be some who will not like it. They forget that the Board of Directors has to make its decisions in terms of the greatest good to the greatest number, and that it has to do business by a majority rule, and that the matter was really settled, as far as the League is concerned, when the directors voted to make the request. But some members will accuse the officers of the League, particularly the secretary, of fostering a restrictive regulation which denies amateurs some of their liberties. Headquarters will be criticized for taking a position on the matter, overlooking the fact that the secretary didn't ask for these instructions but received them in positive language, and that he has no alternative but to follow his specific instructions. And yet that very matter would already have been decided in a democratic way by the vote of the spokesmen whom we ourselves nominate and elect in our own divisions.

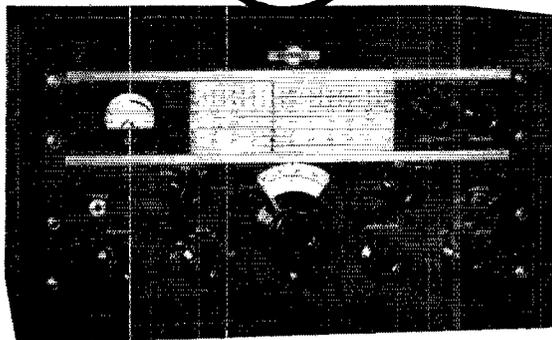
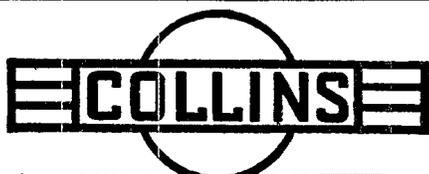
Sometimes, of course, a proposal comes up during the course of a Board meeting that has not been formally introduced that year as a subject for advance study. But that does not mean that it is a cold subject on which the directors have no information. All these regulatory matters interlock, so that over the years the Board has developed a well-defined philosophy of basic principles concerning amateur regulation, fitting the pieces so that they best protect and advance our art. Over the years, countless suggestions are received by the directors from their members, covering almost every imaginable idea, and they have sounded membership opinion on so many of them that the Board is constantly prepared to reflect membership wishes into its decisions, even though the proposition had not been formulated in that identical form just in advance of that year's meeting.

Sometimes at Headquarters we get letters from indignant members because we do not comply with their pet demands and their particular point of view about some such matter. It is a particularly difficult problem when it is a question on which there is a big difference of opinion in the various divisions of the League. One can imagine a hypothetical case where absolutely every member of a certain division was in favor of doing a certain thing but all the other divisions were opposed to it. Even if the first division was 100% for it, they could only have one vote at the Board meeting and the Board's decision would have to be on the basis that all the other divisions were opposed. That kind of a situation is very difficult to comprehend in the division that is alone on the subject, since every ham there knows that every other amateur there thinks as he does and they're all for it. It is hard to realize that the rest of the country may feel quite differently. Now if such a situation arises there is only one thing for us to do at Headquarters: We try to explain why the League has its present policy and what the underlying reasons were that impelled the Board to decide the matter the way it did. We're not necessarily trying to justify that point of view. I think that our Boards down the years have been very sound but I should like to point out to you that as a matter of fact it is not our job at Headquarters to wonder why, and that it doesn't make any difference whether we like our instructions or not.

As I say, it is so very difficult for us to realize that an idea which seems sound to us may seem wholly undesirable to the majority. Democratic self-government is no more capable of satisfying everybody on every issue than is any other form of government, yet its very essence is that majority will must prevail and that, once the voting is over, the minority has responsibilities the same as the majority. The machinery of government in our League, being patterned on that of our national government, is essentially sound and will work out

(Continued on page 188)

**ELECTRONIC WHOLESALERS INC.**  
**EXCLUSIVE DISTRIBUTORS IN THE WASHINGTON AREA FOR**



**NOW READY  
FOR DELIVERY**

- 30K-1 500 WATT TRANSMITTER
- 32V-1 150 WATT TRANSMITTER
- 70E-8A VFO
- 75A-1 RECEIVER
- 310B EXCITER UNITS

**WHAT ARE YOUR NEEDS?**

**CORRESPONDENCE  
ANSWERED PROMPTLY!**

25% deposit required on C.O.D. Orders,  
F.O.B. Washington, D. C.

**Washington's Big New Radio Parts Distributors  
Has All The Greatest Names In Radio!**



**Complete  
Stocks of  
Ham Parts &  
Equipment**

***Electronic* wholesalers, inc.**

**2010 14th STREET, N. W. • WASHINGTON 9, D. C.**

DEcatur 9041



THIS MONTH'S **BIG SPECIAL AT E-M-I:**

# BARGAINS in TRANSFORMERS

## PLATE TRANSFORMERS

Type No.	Sec. Rms. Volts	Sec. DC Volts	DC Sec. M.A.	Price ea.
P 157	660-660* 550-550	500 400	250	<b>\$5.44</b>
P 158	1080-1080 500-500	1000† 400	125 150	<b>7.06</b>
P 159	900-900 800-800	750 600	225	<b>5.88</b>
P 167	1450-1450 1175-1175	1200 1000	300	<b>17.49</b>
P 062	2900-2900 2385-2385	2500 2000	300	<b>31.95</b>

\* Has 40-v. bias tap. † For dual operation with simultaneous use of both sec. ratings.

### and CHOKES!

Smoothing		Svinging		Both	
Type	Hy	Type	Hy	M.A.	Price
C-180	10	C-187	4-16	150	<b>\$2.65</b>
C-181	10	C-188	4-16	300	<b>3.38</b>
C-182	10	C-189	4-16	250	<b>5.24</b>
C-183	8	C-190	3-14	300	<b>5.73</b>

All with 3000 volts insulation

EMI is famous for Bargains, New Electronic Items, Service, the finest equipment of National, Millen, Weston, Thordarson, Johnson, Cornell-Dubiller, Cinaudograph, Radlart and many others. Order by mail, phone, wire or in person.

Terms: 20% cash with order — balance C.O.D.

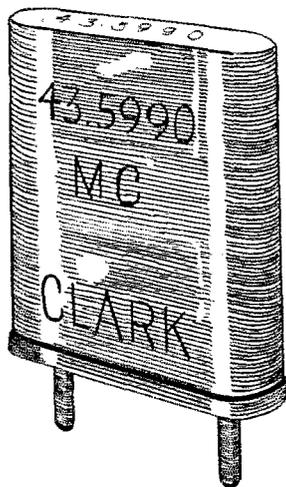
If "not in stock" we'll refund by check — not credit slip.



## ELECTRONIC MARKETERS, Inc.

190 VARICK STREET, NEW YORK 14, N. Y.

Phone: WAtkins 4-4540



**CLARK**  
**CRYSTAL**  
**COMPANY**

Marlboro,  
Massachusetts

### TYPE HSM-2 CRYSTAL

One of the most STABLE transmitter crystals on the market • silverplated • hermetically sealed • resistance 50 ohms or less • capacity 10 mmf or less • only 1" x 3/4" x 1/2", with 1/2" pin spacing • fundamental frequencies 1 mc to 13 mc • 3rd harmonic 10 mc to 40 mc • 5th harmonic 40 mc to 75 mc • frequency stability ±.005% over —55°C. to +90°C. temperature range.

Fundamentals for 80 and 40 meters	±.01%	<b>\$2.80 ea.</b>
3rd harmonic for 20 meters	± 5 kc	<b>3.95</b>
3rd harmonic for 11 or 10 meters	±10 kc	<b>4.95</b>
5th harmonic for 6 meters	±25 kc	<b>6.95</b>
5th harmonic triplers for 2 meters	±25 kc	<b>6.95</b>

in our interests every time. One difficulty we do suffer is the same one that characterizes the democratic process everywhere, namely, insufficient participation by the individual in the affairs of his organization. Some wise man remarked a few years ago that most of society's troubles are caused by workers who won't think, or thinkers who won't work, or loafers who won't do either. There is a place for you to work and think in ARRL affairs; the process is already set up for you and all you have to do is avail yourself of it. Our directors and their alternates and our section communications managers are elected within each division. You can be a nominator or a candidate or a voter, and it is your duty, as it is that of good citizens of a community, to participate. Your suggestions for the betterment of the craft will be welcomed by your director at any season; and the expression of your views on the pending questions of the day, in advance of their determination at Board meetings, is a duty under our form of government, so that the decisions the directors make may best reflect majority opinion.

There is nothing new about this. It is simply the old American system at work. The principles of the League are unchanging, enduring. I think I can prove this to you by now citing to you a fact that I believe you will find very interesting. This talk that you are now hearing, modernized only as to statistics and examples, is a composite of a talk given by our founder-president, Hiram Percy Maxim, before the first convention of the then-new Hudson Division in New York on March 8, 1926, and of a talk given by me in nine Middle Western cities during February, 1935. Does that startle you? It should not, for these are the undying verities, the principles that have made both our country and our League great in the affairs of man. If you stop to think about it, we amateurs really have something mighty important and precious in this American Radio Relay League of ours. By banding ourselves together we have set up machinery to service ourselves and to watch out for our interests in every field where they may be affected, and we have made the mechanism such that it provides an opportunity for all of us to participate in reaching our decisions. Whatever our future problems turn out to be, we can meet them. We have organizational flexibility to meet any conditions, we have shown that we can lick any sort of technical problem likely to confront us, we own the best radio magazine in the world, we have stature and standing and recognition. Our amateur organization is frequently pointed to by people, even outside of radio, as a uniquely successful organization of some tens of thousands of persons cooperating in a common purpose, a gorgeous American example of democracy at work. The country watches us, the amateurs of other countries look to us for leadership. You can be proud of what we have built for ourselves. It is a fine League. All it requires is loyalty on your part.

## Houston Host to West Gulf Division Conventioneers

The Eighteenth Annual West Gulf Division ARRL Convention, held at Houston on August 20th, 21st and 22nd, was a rousing success, judging by the large volume of compliments received by the committee. The number of paid registrations totaled 628, and this figure was swelled to more than 1200 during the technical sessions, which were open to members of IRE and AIEE.

Highlights of the meeting were addresses by West Gulf Director Wayland M. Groves, W5NW, ARRL Communications Manager F. E. Handy, WIBDI, FCC's Robert W. Percy, W4IQR, Dr. J. S. Waters, Rice Institute, and Professor H. C. Dillingham, Texas A. & M. College.

There was great merrymaking during Saturday night's grand ball and buffet dinner, a full attendance being realized. Equally successful was Friday night's cocktail party which was enjoyed by over 400 conventioneers. The 200 YLs and XYLs attending the conclave found the ladies' teas and the XYL party highly popular affairs, with full credit for arrangements going to the XYL Club of Houston.

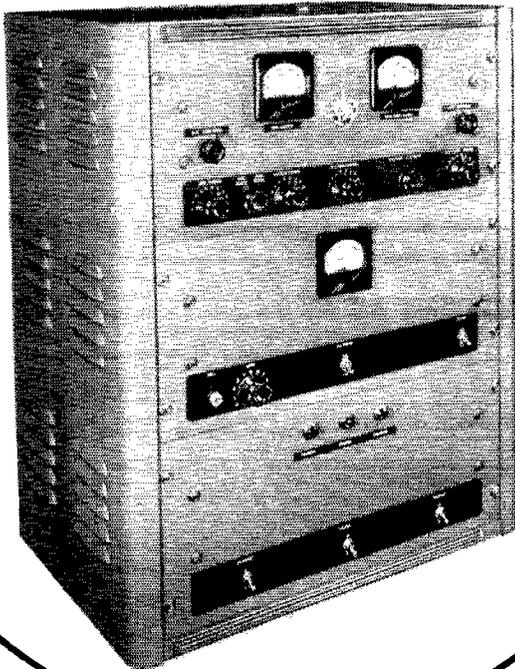
Financially, the convention went over in a big way too. The convention committee was able to spend \$12.00 for each \$9.50 ticket, and after all bills were paid a modest 5% profit was realized by the sponsoring groups, the Houston Amateur Radio Club and the Houston XYL Club. — W5BKW



LEO I. MEYERSON  
WØGFQ

# fellow-here's the NEW 275 WATT "GLOBE KING"

*"More Watts  
per  
Dollar"*



**275 WATTS** PHONE OR CW

**KIT FORM**

**\$379.45**

**WIRED-TESTED**

**\$399.45**

Above is complete "Globe King" Transmitter with all tubes, meters and one set of coils in cabinet—packed in special wooden shipping crate.

The "Globe King" is a versatile advanced design XMTR Kit giving efficient performance on 10-11-15-20-40 and 80 meter bands on phone & CW. Also available in individual sections.

## ✓ CHECK THESE FEATURES...

- Provisions for Eco.
- Automatic Protective Bias on final and buffer.
- Front Panel control of link to final input.
- Voltage controlled osc and Buffer stages.
- New Speech Modulator circuit—modulates up to 300 watts.
- Dual power supply for OSC—buff and R. F. Stage.
- Most compact Xmtr on the market—stands 28 1/4 inches high.
- XMTR available complete or in individual sections. Write for prices.

### E-Z PAYMENTS

It is easy to buy from WRL. In most cases your present rig will serve as sufficient down payment. Tell me what you have to trade in—the kind of payments you would like to make and I will quote prices and terms by return mail. Let me equip your Ham Shack—you'll get on the air faster and for less money.  
Leo I. Meyerson, WØGFQ.

*Free*

Deal with the "World's Most Personalized Radio Supply House". Send for your new complete WRL Catalog containing everything new in radio.



## GIANT RADIO REFERENCE MAP

Just right for your control room wall. Approximately 28" x 42". Contains time zones, amateur shortwave stations, monitoring stations. Mail coupon today & **25c**



WRITE—WIRE  
PHONE 7795

WORLD RADIO LABORATORIES  
744 West Broadway  
Council Bluffs, Iowa

Q-11

Please send me:

- Radio Map  
 New Catalog

Send information on popular W.R.L. Transmitters.

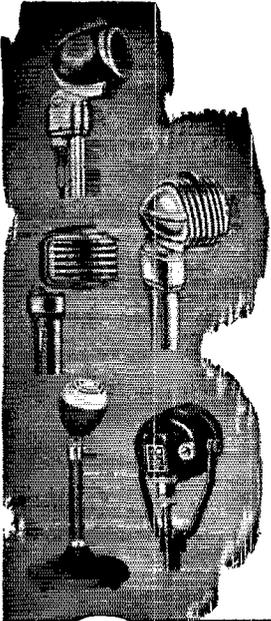
Name .....

Address .....

City..... State.....

**World**  **Radio**  
LABORATORIES INCORPORATED  
COUNCIL BLUFFS, IOWA

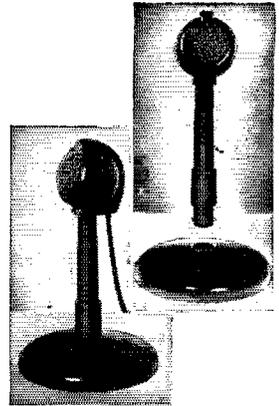




# TURNER MODEL 35X FIREBALL

as convenient as  
a fountain-pen desk set

The Turner 35X is both a desk mike and a hand mike. A quarter turn releases handle from base or locks it securely. Designed for all-around use with high quality crystal circuit. Ideal for amateur communications. Response: 70 — 7000 c.p.s. Level: 52 db below 1 volt/dyne/sq. cm. Richly finished light-weight die-cast-case. Complete with handle, base, and 7 ft. attached cable for only \$13.25 list.



Ask Your Dealer

## THE TURNER COMPANY

917 17th STREET, N. E. • • • CEDAR RAPIDS, IOWA



# Microphones BY TURNER

Microphones licensed under U. S. patents of the American Telephone and Telegraph Company, and Western Electric Company, Incorporated. Crystals licensed under patents of the Brush Development Company.

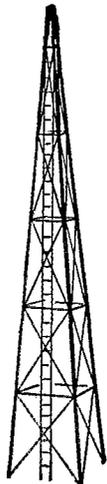
# NOW! Famous VESTO ANTENNA TOWERS

Available for Rotary Beams, FM, TV

## ON EASY MONTHLY PAYMENTS!

At last, you are able to buy the famous Vesto towers on a monthly payment plan, and satisfy that desire for a good-looking, safe, permanent antenna tower. No guy wires. Simple to erect.

Easy to move. Comes to your home knocked down, with easy-to-follow directions. Made of sturdy galvanized steel. Ladder to top. Built to withstand heaviest winds.



Width at base equal to 1/5 height.

### ORDER NOW—THIS NEW, CONVENIENT WAY

Schedule of Prices Effective Sept. 15, 1948

Size	Sh. Wt.	Cash Price	Down Py't	Balance	These payments include finance chg.		
					6 mo.	9 mo.	12 mo.
22 ft.	355 lbs.	73.50	23.50	50.00	....	6.16	....
28 ft.	430 lbs.	92.25	32.25	60.00	10.75	7.42	5.75
33 ft.	530 lbs.	109.75	39.75	70.00	12.50	8.47	6.53
39 ft.	630 lbs.	129.75	43.45	86.00	15.20	10.41	8.03
44 ft.	730 lbs.	149.75	49.75	100.00	17.66	12.11	9.33
50 ft.	860 lbs.	175.00	58.00	117.00	20.67	14.06	10.92
61 ft.	1260 lbs.	239.75	79.75	160.00	28.26	19.37	14.93
Tilt-Top mounting head may be ordered with tower:							
	21 lbs.	27.75	9.25	18.50	3.27	2.22	1.73

Here's all you do to obtain one of these easy-to-erect towers: Just select the size you want, note the price, and send the down payment shown. Papers for your signature will be sent by return AIR-MAIL. Your order will be handled quickly, and the tower shipped from Kansas City, Mo., by

freight collect. Sample freight rates from K. C. to various points are as follows: N. Y. area, \$2.09 per cwt.; Pacific coast, \$4.37; Denver, \$1.62; Cleveland, \$1.50; Detroit, \$1.44. Send your order now, or write for complete information. Prices subject to change. No C.O.D. shipments.

WRITE FOR COMPLETE  
FREE INFORMATION AND  
PHOTOS OF INSTALLATIONS

The VESTO Co., 101 Main St., Parkville, Mo., Phone 258

# THE AMATEUR'S First Choice



A good volt-ohm-milliammeter is usually the first test instrument purchased by any radio-man. Chicago Feather-weights offer so great a value in accurate quality, small size, in a wide selection of ranges and sensitivities, that they are the first choice of amateurs everywhere.

Chicago volt-ohm-milliammeters are priced from \$5.25 to \$26.00 depending on sensitivity, ranges, etc. At our modest prices, no ham shack need be without the benefit of this most useful instrument.



See your Jobber or write us today for Bulletin No. 11

## Chicago Industrial Instrument Co.

536 W. Elm Street . . . Chicago 10, Ill.

### ATTRACTION APPROPRIATE PERSONALIZED

Cards

An unparalleled array of 20 snappy, zany—and dignified—QSL cards in three distinctive colors. Printed on Kromekote. There's one "just right" for you.

Write today for our new catalogue of 20 colorful QSL cards. Send 10¢ for handling and postage.

## STANDARD PRESS

325 HOLLISTON STREET, N. E.

ATLANTA, GEORGIA

### HUDSON DIVISION

<b>E. New York</b>	<b>W2SCK</b> 48-4-4	<b>No. New Jersey</b>	<b>80,840-94-291</b>
<b>W2RYT</b> 55,675-85-220	<b>W2NH</b> 3-1-1	<b>W2BKA</b> 34,504-93-110	<b>W2DVR</b> 24,460-68-120
<b>W2DSU</b> 432-12-12		<b>W2IUV</b> 13,689-39-117	<b>W2FBJ</b> 12,789-49-87
<b>W2WTU</b> 312-8-13		<b>W2F2</b> 10,836-43-84	<b>W2JJI</b> 10,800-18-20
		<b>W2PMQ</b> 810-10-27	<b>W2PMS</b> 621-8-23
		<b>W2WJW</b> 264-8-11	<b>W2SNQ</b> 90-5-6
		<b>W2VJU</b> 75-5-5	<b>W2GKE</b> 3-1-1
		<b>W2WJQ</b> 256-8-12	<b>W2GME</b> 3-1-1
		<b>W2WJL</b> 256-8-12	<b>W2AEB</b> 3-1-1
		<b>W2WJN</b> 256-8-12	
		<b>W2WJM</b> 256-8-12	
		<b>W2WJH</b> 256-8-12	
		<b>W2WJG</b> 256-8-12	
		<b>W2WJF</b> 256-8-12	
		<b>W2WJE</b> 256-8-12	
		<b>W2WJD</b> 256-8-12	
		<b>W2WJC</b> 256-8-12	
		<b>W2WJB</b> 256-8-12	
		<b>W2WJA</b> 256-8-12	
		<b>W2WJ9</b> 256-8-12	
		<b>W2WJ8</b> 256-8-12	
		<b>W2WJ7</b> 256-8-12	
		<b>W2WJ6</b> 256-8-12	
		<b>W2WJ5</b> 256-8-12	
		<b>W2WJ4</b> 256-8-12	
		<b>W2WJ3</b> 256-8-12	
		<b>W2WJ2</b> 256-8-12	
		<b>W2WJ1</b> 256-8-12	

### MIDWEST DIVISION

<b>Iowa</b>	<b>W0ANF</b> 2268-27-28	<b>Nebraska</b>	<b>13,100-50-88</b>
<b>W0SQQ</b> 26,718-73-122	<b>W0VAV</b> 768-16-16	<b>W0JED</b> 2325-25-31	<b>W0MCGV</b> 1275-17-25
<b>W0MKE*</b> 1350-18-25		<b>W0WIP</b> 350-10-12	<b>W0MHV</b> 576-12-16
<b>W0TFM*</b> 125-6-7		<b>W0RQK</b> 576-12-16	
<b>Kansas</b>			
<b>W0GTV</b> 6936-34-68			
<b>W0GWS*</b> 12-2-2			
<b>W0FDY*</b> 3-1-1			
<b>Missouri</b>			
<b>W0NCG</b> 5371-41-44			

### NEW ENGLAND DIVISION

<b>Connecticut</b>	<b>W1AJY</b> 8215-31-89	<b>W. Massachusetts</b>	<b>32,856-74-148</b>
<b>W1ATE</b> 75,272-97-260	<b>W1LMB</b> 2835-27-35	<b>W1QDE</b> 27,328-64-146	<b>W1QDE</b> 27,328-64-146
<b>W1BEQ</b> 21,882-42-175	<b>W1HX</b> 2700-25-36	<b>W1JIT</b> 6528-32-66	<b>W1QO</b> 234-6-13
<b>W1EQ</b> 16,544-47-118	<b>W1PAF</b> 1995-19-35	<b>W1QO</b> 234-6-13	
<b>W1DY</b> 13,356-36-127	<b>W1PB</b> 1160-10-40		
<b>W1OND</b> 8250-33-85	<b>W1QWI</b> 459-9-17		
<b>W1OMW</b> 6256-26-81	<b>W1QO</b> 312-8-13		
<b>W1DEP</b> 5248-32-56	<b>W1NWO*</b> 108-6-6		
<b>W1HDO</b> 2952-24-42	<b>W1HS*</b> 48-4-4		
<b>W1PST*</b> 975-13-25	<b>W1GDY*</b> 27-3-3		
<b>W1HMV</b> 363-11-11	<b>W1QCI*</b> 18-2-3		
<b>W1WR</b> 162-6-9	<b>W1BB</b> 3-1-1		
<b>W1PRA/1*</b> 12-2-2			
<b>Maine</b>			
<b>W1MCW</b> 20,445-47-145	<b>W1ZD</b> 32,856-74-148		
<b>W1CKJ</b> 3775-25-51	<b>W1QDE</b> 27,328-64-146		
<b>W1CPS*</b> 468-11-14	<b>W1JIT</b> 6528-32-66		
<b>W1MFIJ*</b> 120-5-8	<b>W1QO</b> 234-6-13		
<b>E. Massachusetts</b>		<b>New Hampshire</b>	<b>33,345-65-171</b>
<b>W1JCK</b> 80,325-105-258	<b>W1BET</b> 33,345-65-171	<b>W1KKT</b> 5760-32-60	
<b>W1ME</b> 54,315-85-213			
<b>W1KLE</b> 44,625-85-178			
<b>W1MUA</b> 33,040-58-187			
<b>W1FJN</b> 20,956-62-114			
<b>W1ONK</b> 20,280-40-169			
<b>W1JFG</b> 20,064-48-142			
<b>W1BPH</b> 17,907-47-127			
		<b>Rhode Island</b>	<b>56,072-86-218</b>
		<b>W1CJH</b> 60,378-87-232	
		<b>Vermont</b>	<b>784-16-21</b>
		<b>W1QNM</b> 784-16-21	

### NORTHWESTERN DIVISION

<b>Idaho</b>	<b>W7QP</b> 4104-24-57	<b>Washington</b>	<b>46,992-88-178</b>
<b>W7DV</b> 15,600-52-100		<b>W7ESK</b> 8720-35-84	<b>W7GJL</b> 2392-23-36
<b>W7KK</b> 3900-26-52		<b>W7KKS</b> 2940-20-34	<b>W7BLX</b> 390-10-13
		<b>W7CFA</b> 192-8-8	<b>W7KEM</b> 90-5-6
<b>Montana</b>		<b>W7FWR</b> 90-5-6	
<b>W7IVY</b> 144-6-8			
<b>Oregon</b>			
<b>W7HTB</b> 41,535-65-213			

### PACIFIC DIVISION

<b>San Francisco</b>	<b>W6DZE</b> 108-6-6	<b>East Bay</b>	<b>71,010-90-263</b>
<b>W6MUF</b> 224-6-13		<b>W6TT</b> 50,589-77-219	<b>W6AVD</b> 44,517-71-211
<b>W6ASL</b> 48-4-4		<b>W6RVU</b> 41,184-76-176	<b>W6IDY</b> 22,528-64-117
<b>Sacramento Valley</b>		<b>W6UZX</b> 4200-28-50	<b>W6IKO</b> 4200-28-50
<b>W6WTL</b> 84-4-7			
<b>Nevada</b>		<b>San Joaquin Valley</b>	<b>7320-40-61</b>
<b>W7JUO</b> 624-13-16		<b>W6FTM</b> 3-1-1	<b>W6BQ*</b> 3-1-1
		<b>W6EPQ*</b> 3-1-1	
<b>Santa Clara Valley</b>			
<b>W6MLY</b> 47,424-76-208			
<b>W6ZZ</b> 644-14-16			

### ROANOKE DIVISION

<b>North Carolina</b>	<b>W4KWY</b> 99,456-112-296	<b>Virginia</b>	<b>58,532-119-276</b>
<b>W4LAY</b> 60,681-113-185	<b>W4OM</b> 1710-19-30	<b>W4JNY</b> 1350-20-24	<b>W4IWO</b> 1040-16-22
<b>W4ASQ</b> 3666-26-47	<b>W4JNY</b> 1040-16-22	<b>W4KVP*</b> 3-1-1	
<b>W4MKT</b> 144-6-8			
<b>South Carolina</b>		<b>West Virginia</b>	<b>18,095-47-129</b>
<b>W4BPD</b> 32,260-69-180	<b>W8VAN</b> 18,095-47-129		
<b>W4IMW</b> 14,577-43-113			

### ROCKY MOUNTAIN DIVISION

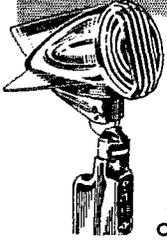
<b>Colorado</b>	<b>W7PA</b> 7254-39-64	<b>Utah-Wyoming</b>	<b>7254-39-64</b>
<b>W0AZT</b> 216-6-12			
<b>W0IQZ</b> 72-4-6			

(Continued on page 152)

**Most HAM RIGS  
ARE EQUIPPED WITH**



**Astatic  
MICROPHONES**



**Conneaut Crystal Microphone**—the ultimate in streamlining, bright chrome finish, shown with Type "S" Off-On Switch.



**Velvet Voice Crystal, Dynamic or Ceramic Microphone**—sparkling beauties in gold-finished case and handle, with dark brown, detachable base for convertibility to desk stand, floor stand, hand use.

THE FINAL TEST of product quality and performance is the acceptance of users. Small wonder that Astatic takes extreme pride in the preference among amateurs for Astatic Crystal, Dynamic and Ceramic Microphones. The Astatic Corporation guards this acceptance zealously, spares no effort to produce superior products that will warrant your continued approval. Illustrated are the most popular models, new and old. If you would like more information, write us.

*Astatic Crystal Devices manufactured under Brush Development Co. patents*



**Cardinal Crystal, Dynamic or Ceramic Microphone**

—a major new accomplishment in terms of quality performance at modest cost, has die-cast case in bright gold finish, compact to fit the hand, rests in streamlined CB base (as shown) or lies flat on felt-covered back.



**D-104 Crystal Microphone**—first practical crystal microphone developed, with few changes still the top favorite of amateurs.



**Make your Hobby into a Good-Paying Job**

**GET YOUR FCC COMMERCIAL RADIO OPERATORS' LICENSE**

Add the FCC COMMERCIAL License to your ham experience and you can fill broadcast jobs that pay \$3000 to \$7500 yearly. You know yourself that a majority of men in radio electronics started their careers as hams. Get your FCC ticket in a few short weeks by using CIRE simplified training and coaching methods at home in your spare time. Get the full story by mailing the coupon right now.

**EARN \$3000 to \$7500 YEARLY**



**WHAT BROADCAST MEN EARN**

*(Reported by FCC Nationwide Survey)*

**AVERAGE SALARIES**

Position	Big Stations	Little Stations
Transmitter Engineer	\$4800	\$3000
Studio Engineer	\$5000	\$3650
Chief Engineer	\$7700	\$4300

*Other Jobs Requiring FCC Commercial License Pay Similar Salaries*

If you've had any practical radio experience, I can train you to pass FCC COMMERCIAL License Exams in a few short weeks. My time proven plan can help you, too, to make your hobby into a good paying job. Mail the coupon below for full details, free of charge.

Edw. H. GUILFORD  
Vice President

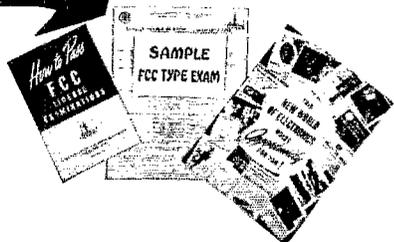
**MAIL COUPON TO GET THESE 3 FREE**

CLEVELAND INSTITUTE OF RADIO ELECTRONICS QT-11  
4900 Euclid Ave., Cleveland 13, Ohio

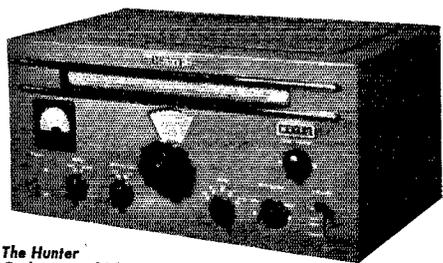
I want my FCC COMMERCIAL license. Send FREE booklet, "How to Pass FCC License Examinations," (does not cover exams for amateur license) as well as sample FCC type exam, and Catalog A showing opportunity in growing field of radio electronics.

Name .....  
Address .....  
City ..... State .....

Veterans check for enrollment information under G.I. Bill  
NO OBLIGATION — NO SALESMEN



## ANNOUNCING A GREAT ADVANCE IN BAND SWITCHING EXCITERS



The Hunter  
Cyclomaster 20A

- Output approximately 20 watts  
3.5 to 29.7 mc.
- Accurate frequency calibration
- Metering of final grid and plate circuits
- Permeability Tuned oscillator and multipliers
- Built in 100kc Crystal Calibrator
- Gang tuned oscillator and multiplier stages
- Control circuits for the 1 kw final
- Individually lighted bands
- Variable output control
- All this and Beauty too!

Price \$169.50 • See your distributor or send direct to

**THE HUNTER MFG. CO., INC.**  
IOWA CITY, IOWA

Write for descriptive folder today

## EXPERT DIAGNOSIS and TREATMENT

..... for ailing receivers by specially  
..... trained, skilled technicians

When trouble comes and your receiver acts up, don't blame  
sun spots... let factory trained experts check your set's  
health. It's "WINTERS" for quick quality service.

**HALLICRAFTERS  
NATIONAL  
HAMMARLUND**

**PIERSON  
COLLINS  
RME**

Complete Realignment—Bandspread Calibration  
Sensitivity Measurements—Image Rejection Ratios  
S Meter Calibration

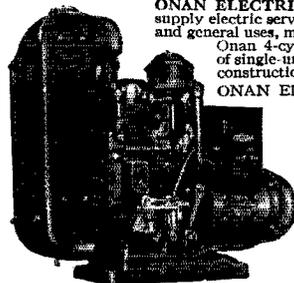
Authorized National, Hallcrafters, Collins and RME  
Service Center

**WINTERS RADIO LABORATORY**

11 Warren Street

New York 7, N. Y.

## ELECTRICITY FOR RADIO AND ELECTRONIC APPLICATIONS



ONAN ELECTRIC GENERATING PLANTS  
supply electric service for electronics applications  
and general uses, mobile or stationary. Driven by  
Onan 4-cycle gasoline engines, they are  
of single-unit, compact design and sturdy  
construction.

ONAN Electric Plants are available in  
many sizes and models.  
ALTERNATING CUR-  
RENT: 350 to 35,000 watts in  
all standard voltages and  
frequencies. DIRECT CUR-  
RENT: 600 to 15,000 watts,  
115 and 230 volts. BATTERY  
CHARGERS: 500  
to 6,000 watts; 6, 12, 24, 32  
and 115 volts. Write for de-  
tailed literature or engineer-  
ing assistance.

**D. W. ONAN & SONS** 4677 Royalston Ave.  
Minneapolis 5, Minn.

## SOUTHEASTERN DIVISION

<b>Alabama</b>	W4HA W4LX W4FIJ	17,700-50-118 6188-34-58 924-14-22	W4DDX* W4BXL	27-3-3 12-2-2
<b>E. Florida</b>	W4FUM W4CFO W4MVQ W4EHU W4AGB W4LW W4BMR W4FNR	39,360-82-160 30,444-59-172 24,168-57-142 23,622-62-127 8640-40-72 5940-36-55 1701-21-27 1386-21-22	W4EQR W4HIZ W4EUY W4BOC W4LXE W4ESB W4LDB W4GDQ	<b>W. Florida</b> 10,434-47-74 468-12-13  <b>Georgia</b> 46,170-81-190 28,341-67-143 26,265-51-173 4896-34-48 3450-25-46 1287-13-33

## SOUTHWESTERN DIVISION

<b>Los Angeles</b>	W6SA W6DI W6ITA W6AM W6BPD W6UQQ W6HG W6LYQ W6NHK W6MI	103,880-106-328 103,680-108-320 82,160-104-264 34,648-61-190 6834-34-67 2950-25-40 2244-22-34 1957-19-35 1482-19-26 855-15-19	W6LEE W6FWO W7PUM W6IUY W6CHV W6CTP W6FHW*	48-4-4 3-1-1  <b>Arizona</b> 2148-24-34  <b>San Diego</b> 37,114-77-161 33,024-64-172 3915-27-49 2736-24-38
--------------------	---	--	--	---

## WEST GULF DIVISION

<b>Northern Texas</b>	W5BGP W5HDJ W5FKQ W5MCF*	43,885-79-185 2835-27-35 360-10-12 3-1-1	W5LWV W5EDX W5JWM W5OP W5LBC	<b>Southern Texas</b> 38,844-83-158 4320-32-45 1540-20-26 1120-16-24 986-17-19
-----------------------	-----------------------------------	---	--	---

## Oklahoma

W5JME W5GZK W5WVS/5	9240-40-77 7686-42-61 108-6-6	W5NFX*	<b>New Mexico</b> 256-8-11
---------------------------	-------------------------------------	--------	-------------------------------

## CANADA

<b>Maritime</b>	VE1ET VE1FQ	40,824-63-216 3614-26-47	VE6HI*	168-7-
<b>Ontario</b>	VE3HC VE3BBN VE3FB VE3AMK VE3YYS VE3BFZ VE3ANS* VE3ND VE3AQW	68,816-88-264 18,564-42-149 2226-21-38 2139-23-31 720-12-20 243-9-9 48-4-4 18-2-3 12-2-2	VE7VO VE7EB VE7VT VE7WL VE7IM* VE7AIT	<b>British Columbia</b> 6402-33-62 1710-15-38 756-14-18 240-6-10 12-2-2 6-1-1 3-1-1
<b>Quebec</b>	VE2OG VE2DX VE2UV VE2WV VE2CE VE2FI VE2HM*	19,125-45-142 15,210-45-114 4389-19-77 3402-21-42 1776-16-37 12-2-2 3-1-1	VE4GE VE4RO VE4RP VE4OV VE4NI VE4MJ VE4KF VE4CQ VE4TW	<b>Manitoba</b> 14,832-47-103 12,496-44-96 6494-34-64 6300-35-60 5841-33-59 5046-28-58 3915-28-45 495-11-15 368-8-16
<b>Alberta</b>	VE6FK VE6CR	10,086-41-82 882-14-21	VE5JG VE5BF VE5VJ VESHU*	<b>Saskatchewan</b> 3105-23-45 702-13-18 84-4-7 60-4-5

## AFRICA

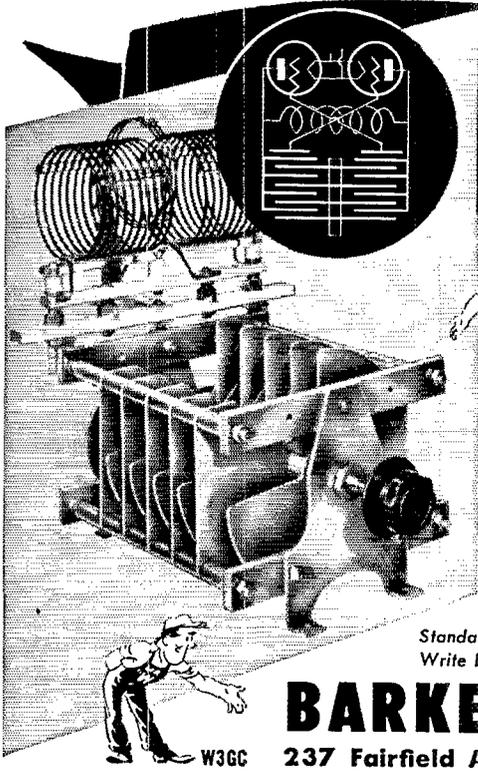
<b>Algeria</b>	FA3JY	413-7-20	ZD2KC*	<b>Nigeria</b> 36-3-
<b>Anglo-Egyptian Sudan</b>	ST2FU	7322-14-175	ZE2JN	<b>So. Rhodesia</b> 2864-16-61
<b>Egypt</b>	MD5KW*	225-5-15	VQ3HGE* VQ3HGE*	<b>Tanganyika</b> 3003-13-77 480-8-20
<b>Eritrea</b>	MI3ZJ	10,647-21-169	VQ5PBD*	<b>Uganda</b> 230-5-16
<b>French Morocco</b>	CN8BA	20,462-26-267	ZS6DW ZS6TP ZS5BZ ZS1BF ZS1M ZS6FN ZS6G1 ZS1DA ZS2AQ ZS2AA ZS6HO*	<b>Union of South Africa</b> 82,960-34-814 31,484-34-312 25,228-28-303 2601-17-51 1260-7-60 1160-8-51 466-8-25 360-6-26 330-5-22 126-3-14 48-2-8
<b>Gold Coast</b>	ZD4AH	2820-10-100		
<b>Kenya</b>	VQ4ERR	52,256-32-549		
<b>Liberia</b>	EL5A	86,934-41-658		

## ASIA

<b>China</b>	C1CH	24,370-30-278	HL1AA HL1AB*	<b>Korea</b> 4431-21-73 624-8-26
<b>Japan</b>	J3GNX J2AFA J2GHQ J2AHI J2IMR J5IBE*	34,947-33-353 30,420-30-348 28,028-28-340 168-4-14 84-4-7 36-2-6	ZC6LA ZC6JP  ZC1AL ZC1AF*	<b>Palestine</b> 5010-14-120 225-5-15  <b>Transjordan</b> 84-4- 60-4-

(Continued on page 134)

# The B & W Capacitor that Made AMATEUR HISTORY!



W3DGP

Hailed as "radically different" because of its many innovations a few years ago, B & W Type CX Variable Capacitors are now standard in much of the finest transmitting equipment. Unique design featuring split stator and butterfly rotor sections permits mounting B & W Inductor Coils directly on capacitors for absolute maximum efficiency. This "complete tank circuit" arrangement, pioneered by B & W, eliminates wiring and reduces tuned circuit lead lengths to a minimum.

Today, these forward-looking design practices, which established B & W as the leader in coils and capacitors for amateurs, still identify B & W parts as those preferred by amateurs who insist on the best!

Standard Type CX Capacitors for powers of 500, 750 and 1000 watts. Write Dept. Q-118 for catalog.



W3GC

## BARKER & WILLIAMSON

237 Fairfield Avenue

Upper Darby, Pa.

### AMATEURS — ENGINEERS — EXPERIMENTERS! Immediate delivery RADIO COMPONENTS HANDBOOK

Over 200 pages of practical design application and specification data covering all major components. \$1.50 Cloth bound. Post paid

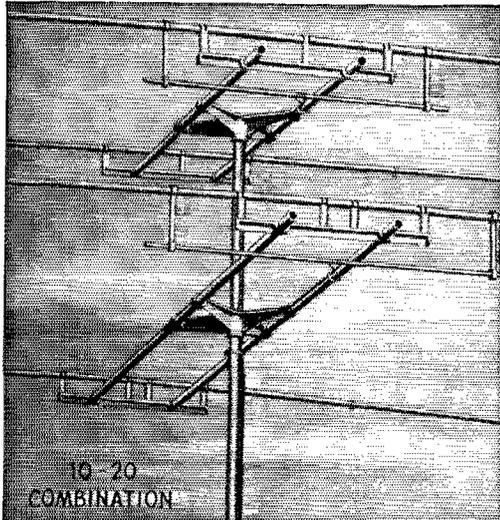
TECHNICAL ADVERTISING ASSOCIATES  
CHELTENHAM, PENNSYLVANIA

### WANTED . . .

Western Electric Vacuum tubes, types 101F, 102F, 272A, 274A, or B, 310A, or B, 311A, 313C, 323A, 328A, 329A, 348A, 349A, 352A, 373A, 374A, 393A, 394A, 121A, Ballast Lamps.

Box 132 QST

### STACK 'EM ANY COMBINATION OF STACKED ARRAYS CAN BE MADE STARTING WITH YOUR PRESENT HY-LITE. GET OUR CATALOG PRICE SHEET FOR DETAILS



IF YOUR DEALER CAN'T SUPPLY YOU — WRITE

## HY-LITE Antennae INC.

Makers of Fine Antennas for AMATEUR • FM • TELEVISION  
528 TIFFANY ST., BRONX 59, N.Y.

## Ham Post!

- National NC 57 Receiver . . . . . \$89.50
  - Columbus Model 610 Converter . . . . . 79.50
  - Millen 90810 HF Transmitter . . . . . 69.75
  - Millen 90811 HF Amp Unit . . . . . 33.00
  - Sonar CFC Exciter . . . . . 59.75
  - Hammarlund FS-135-C Standard \$14.25
  - McMurdo Silver 908 "Micro Match" . . . . . 29.90
  - Elnicor No. 400EA — 10 Meter Beam . . . . . 31.20
- DELIVERY FROM STOCK

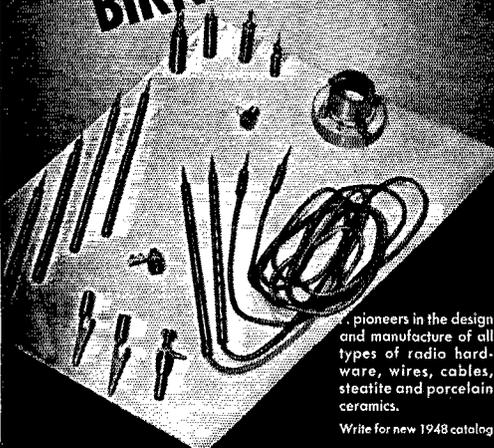


## CONTINENTAL SALES COMPANY

195-197 CENTRAL AVENUE, NEWARK 4, N. J.

*Quality Products since 1923*

**BIRNBACH**

Pioneers in the design and manufacture of all types of radio hardware, wires, cables, steatite and porcelain ceramics.

Write for new 1948 catalog

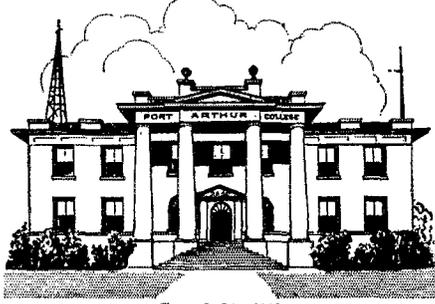
**BIRNBACH RADIO CO., Inc.**  
145 HUDSON ST. NEW YORK, 13, N. Y.

**W8GFK**

**ALUMINUM CALL PLATES**

Your call cast in aluminum with black background and polished 1 1/4" letters. Plate size 2" by 6 1/4", 3 styles; P for panel mounting, L for car license and D for desk use. \$1.75 each postpaid.

**P & H SALES CO.**  
619 Jasper St. Kalamazoo 31, Michigan



Founded in 1909

**RADIO TELEPHONY**  
**RADIO TELEGRAPHY**

Courses ranging in length from 7 to 12 months. Dormitory accommodations on campus. The college owns K&PAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass F. C. C. examinations for first-class telephone and second-class telegraph licenses, write for details.

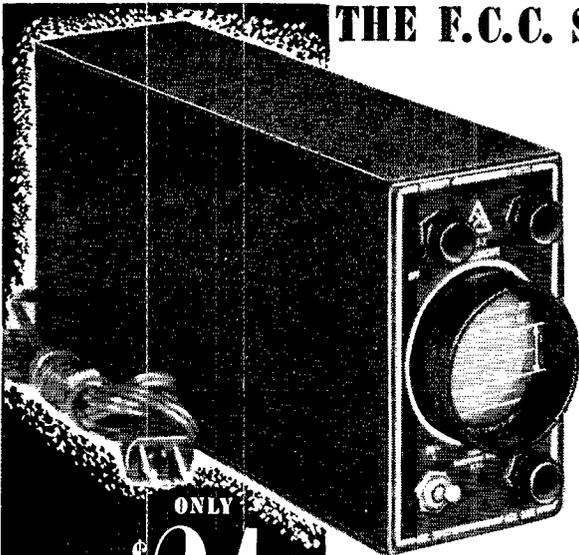
**PORT ARTHUR COLLEGE** PORT ARTHUR TEXAS  
Approved for G. I. training

EUROPE			
<b>Belgium</b>	16,896-22-256	<b>HAAAB</b>	<b>Hungary</b> 1080-10-36
ON4CC	9024-16-188		
ON4DM			
<b>Czechoslovakia</b>	869-11-27	<b>IIRM</b>	<b>Italy</b> 17,040-24-252
OK1BM	732-9-29	<b>IIPL</b>	14,222-26-183
OK1VA	532-7-26	<b>IINO</b>	10,787-23-161
OK1JB	66-3-8	<b>IIMT</b>	2256-16-51
OK1RW		<b>IIRO</b>	1485-9-55
		<b>IIPQ</b>	1421-5-71
		<b>IKN*</b>	234-6-13
		<b>IIOB*</b>	3-1-1
<b>Denmark</b>	23,730-30-269		
OZ9Q	17,394-26-225		
OZ7G	4824-18-90	<b>LX1JW</b>	<b>Luxembourg</b> 35,873-29-425
OZ7EU	1925-11-59		
OZ2FR	1881-11-57		
OZ6PX	27-3-3		
OZ4UL*		<b>PA9GN</b>	<b>Netherlands</b> 48,480-32-505
		<b>PA9ALO</b>	22,518-27-296
<b>Eire</b>	63,350-35-606	<b>PA9RE</b>	15,312-14-216
EI2L	18,607-23-273	<b>PA9MZ</b>	9828-27-52
EI9G	11,937-23-179	<b>PA9BE</b>	2720-17-54
EI7M	710-15-47	<b>PA9CB</b>	712-8-30
EI4Q		<b>PA9Q*</b>	138-6-9
		<b>PA9EA</b>	72-4-6
<b>England</b>	67,431-39-583		
G2PU	64,232-37-600	<b>G16TK*</b>	<b>Northern Ireland</b> 24-2-4
G4JZ	57,696-32-601		
G6PD	30,537-29-351		
G8QW	29,348-27-367		
G5CP	26,649-27-335	<b>LASC</b>	<b>Norway</b> 18,044-26-232
G2ALN	21,970-26-389	<b>LA5J</b>	2048-16-44
G2XV	20,880-24-304	<b>LA4BA*</b>	3-1-1
G3ZI	12,375-25-166		
G6BQ	10,419-23-151	<b>CT1HP</b>	<b>Portugal</b> 41,064-29-499
G2DYV	8460-20-149	<b>CT1QF</b>	17,664-24-256
G6CB	3906-21-62	<b>CT1FM</b>	12,638-21-87
G2EC	3616-16-76	<b>CT1EM</b>	726-11-22
G2MI*	3234-11-98	<b>CT1QN</b>	60-2-10
G2FSP*	882-9-34		
G3RI	675-9-25		
G8SW*	18-2-3		
G3AQQ*		<b>GM2JU</b>	<b>Scotland</b> 40,176-36-376
		<b>GM8MN</b>	24,564-23-356
<b>France</b>	40,170-30-455	<b>GM3AVO</b>	17,472-21-286
F3WV	30,478-29-357		
F3WT	10,693-17-213		
F9LJ	8020-20-135	<b>SMSLU</b>	<b>Sweden</b> 4797-13-123
F8SI	8008-22-124	<b>SMSWJ</b>	3760-16-81
F8MY	2904-11-78	<b>SMSL*</b>	48-4-4
F8XP	2709-21-44		
F8BO	2700-12-75	<b>HB9CX</b>	<b>Switzerland</b> 31,449-33-319
F8XT			
<b>Germany</b>	5508-17-108		
D4ALN	4541-17-81	<b>GW2UH</b>	<b>Wales</b> 42,786-21-264
D4AZY	1917-9-71	<b>GW3QN</b>	5236-14-125
D4AYO	1020-10-33	<b>GW3AX</b>	3960-15-88
D2FV		<b>GW8GJ</b>	408-6-26
		<b>GW8UH</b>	128-4-12
<b>Greece</b>	1980-12-55	<b>GWACK*</b>	75-5-5
SVIWE	684-9-26	<b>GW3BAZ</b>	3-1-1
SVIRX			
<b>NORTH AMERICA</b>			
<b>Alaska</b>	11,490-30-128	<b>HH2CW</b>	<b>Haiti</b> 195,615-63-1039
KL7NA	1937-13-51	<b>HH2LD</b>	1710-9-84
KL7LE			
<b>Barbados</b>	142,662-62-779	<b>XF1A</b>	<b>Mexico</b> 314,364-68-1541
VP6CDI		<b>XE2W</b>	4806-18-91
		<b>XE1TE</b>	1656-9-82
<b>Bermuda</b>	2412-12-67		
VP9P		<b>VO4T</b>	<b>Newfoundland</b> 23,928-24-337
TI6TA*	105-5-7		
<b>Costa Rica</b>		<b>KP4ES</b>	<b>Puerto Rico</b> 102,084-47-724
VP9P		<b>KP4CL</b>	57,447-39-491
TI6TA*		<b>KP4EZ*</b>	27-3-3
<b>Cuba</b>	14,850-33-150		
CM9AB		<b>KV4AD</b>	<b>Virgin Islands</b> 18,941-31-205
OX3BD	3-1-1		
<b>Greenland</b>		<b>VP2GE</b>	<b>Windward Islands</b> 6286-14-150
OX3BD			
VG9AD	33,046-31-360		
<b>OCEANIA</b>			
<b>Australia</b>	47,886-46-347	<b>KH6MI*</b>	3-1-1
VK2ADT	43,764-42-347		
VK7AJ	12,267-29-141	<b>KG8CJ</b>	<b>Marianas Islands</b> 2445-13-65
VK2VA	5219-17-103	<b>KG8CS</b>	162-3-18
VK3QK	5184-27-64		
VK3HG	584-9-22	<b>KG6AW/VK9</b>	<b>New Guinea</b> 47,473-29-555
VKSLQ	368-8-16		
VK5YQ*	360-8-15		
VK5FM	270-6-15		
VK5RS	196-3-22	<b>ZL2RP</b>	<b>New Zealand</b> 19,372-29-224
VK7LZ	92-2-15	<b>ZL1HY</b>	16,771-31-183
VK2WD	12-2-2	<b>ZL3C</b>	14,328-24-199
VK5YQ		<b>ZL1MQ</b>	14,250-25-199
		<b>ZL2GX</b>	4774-14-115
<b>Hawaiian Islands</b>	16,020-36-151		
KH6FF	7180-20-121	<b>PK4VD</b>	<b>Sumatra</b> 102-2-17
KH6IJ			

(Continued on page 158)

**THE F.C.C. SAYS - - -**

*\$12.133. Purity and stability of emissions. In the case of A-3 emission, the amateur transmitter shall not be modulated to the extent that interfering spurious radiation occurs, and in no case shall the emitted carrier wave be amplitude-modulated in excess of 100 per cent. Means shall be employed to insure that the transmitter is not modulated in excess of its modulation capability for proper technical operation.*



**MM-2**

**MODULATION MONITOR**

Here is a high quality basic oscilloscope, slightly larger than a standard multimeter, that provides a continuous, visual, on-the-air check of your phone transmitter. The MM-2 permits adjustment of your transmitter for maximum efficiency and helps you keep it there. Check these top-flight features: Weighs only 4 1/2 lbs. Full set of controls including centering and horizontal gain. Built-in AC supply. Built-in 60 cycle sweep with automatic return trace blanking. Calibrated modulation percentage scale. Beam switch for cutting off trace during standby periods. Reversible front panel for vertical or horizontal mounting. 2" screen with fine stable green trace. Table-top or rack mounting. Standard 19" punched rack panels available for permanent installation with rack mounting equipment. (See Oct. Ad for complete details.)

ONLY  
**\$24**<sup>95</sup>

COMPLETE WITH TUBES  
REVERSIBLE PANEL-CALIBRATED  
TRACE-INTENSIFIER WINDOW  
INSTRUCTION BOOK

3" x 5" x 10"

IF YOUR DEALER CAN'T

SUPPLY YOU

... **WRITE**



**LAMBDA ELECTRONICS CORP.**

BOX No. 55

DEPT. Q11

CORONA, N.Y.

**COMPLETE RADIO TRAINING!**

Prepare now to accept a responsible position in Commercial Radio. New developments will demand technicians with thorough basic training, plus a knowledge of new techniques discovered during the war. Training open to high school graduates, or those with high school equivalency. Courses 6 to 18 months' duration in RADIO AND ELECTRONICS. Approved Veteran training in Radio. Write for Particulars.

VALPARAISO TECHNICAL INSTITUTE  
DEPT. TN Valparaiso, Ind.



**RADIO and TELEVISION**

Thorough Training in All  
Technical Phases

APPROVED FOR VETERANS

WEEKLY RATES DAYS-EVENINGS

RCA GRADUATES ARE IN DEMAND

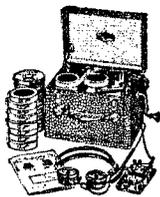
For Free Catalog write Dept. ST-48

**RCA INSTITUTES, INC.**

A Service of Radio Corporation of America  
350 WEST 4th ST., NEW YORK 14, N. Y.

**EASY TO LEARN CODE**

It is easy and pleasant to learn or increase speed the modern way — with an Instructograph Code Teacher. Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.



**ENDORSED BY THOUSANDS!**

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the Instructograph System. Write today for full particulars and convenient rental plans.

**INSTRUCTOGRAPH COMPANY**

4709 SHERIDAN ROAD, CHICAGO 40, ILLINOIS

**THIS STURDY ROOF-MOUNTED  
SELF-SUPPORTING TOWER**



ONLY  
**\$37-50**

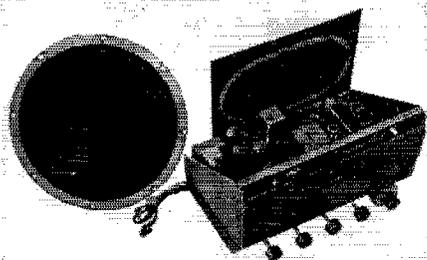
*Photo Courtesy  
W3EAN  
Drexel Hill, Pa.*

Why struggle with unsightly "plumbing?" Install a neat, sturdy, professional-looking tower that is a credit to your rig and your hobby. Tower illustrated is a TRYLON standard 5-ft. spread utility base, 10-ft. high. It's self-supporting and additional straight 10-ft. sections with guys may be added at any time. Approx. Shipping Wt. 100 lbs.

Write to Tower and Antenna Div., Wind Turbine Co., West Chester, Pa. for Complete Details

**TRYLON  
LADDER TOWERS**

# A REMARKABLE NEW LINE!



## High QUALITY—High POWER Custom-Built AM-FM Chassis

You need no longer hesitate to replace your outmoded radio receiver with a modern, low priced, powerful ESPEY replacement chassis. The Model 511 (illustrated) is typical of the complete ESPEY line, and features 12 tubes, plus Rectifier and Tuning Indicator. This high quality AM-FM receiver, drift compensated, is supplied complete with 25-watt speaker, both antennas, and all necessary hardware. It's your best bet! Consult your nearest radio service-dealer for full details, or write to Dept. B-11 today.

**ESPEY MFG. CO., INC.**  
528 East 72nd Street, New York 21, N. Y.  
ESTABLISHED 1928

# RADIO

TECHNICIAN and RADIO SERVICE COURSES  
FM and TELEVISION

Approved under the G. I. Bill of Rights  
**AMERICAN RADIO INSTITUTE**  
101 West 63rd St., New York 23, New York

TEACHING RADIO SINCE 1935

**WANTED** — 12 sets of ARC5 equipment as follows:  
R25 receiver (1.5-3 Mc.) MT7A receiver rack; MT5 receiver base; T18 Transmitter (2.1-3 Mc.); MT69 Transmitter Rack; MT68 Transmitter Base; MD7 Modulator; DV8 Dynamotor; MT76 Modulator; Base MT77; Relay Base T17; Microphone; HS33 Headset; E39; Receiver local tuning knob; PL152 Plug; PL147 Plug; PL151 Plug; PL148 Plug; 9377 Plug. BOX 130, QST.

## Mass. Radio School

271 Huntington Ave., Boston 15, MASS.

For over 28 years the educational radio center of New England. Prepares for all U. S. Government Radio Operators' Licenses. Also gives Radio Technician Training. (Pre-Television). Approved courses for Veteran Training under G.I. Bill.

Send for Catalog

Licensed by Commonwealth of Mass.  
Department of Education

## SOUTH AMERICA

LU1DH	Argentina	19,910-22-303	HCLJW	Ecuador	58,840-40-493
LU1EL		1290-10-43	HC2KJ		31,720-26-418
			HCKLP		27,275-23-400
			HC2OL		9138-16-192
PY2AC	Brazil	107,400-50-716		Paraguay	100-5-8
PY2CK		63,580-34-652			
PY2NX		13,338-27-169	ZP8AC		
PF1FM		1365-13-35		Peru	42,816-32-446
PY2AJ		544-9-24			
VP3LF	British Guiana	1080-9-40	OMAAK		
				Uruguay	19,808-32-209
CE2AX	Chile	7710-15-172	CX1FB		1020-12-29
CE4RP		1056-11-33	CX3BH		
CE2BQ*		837-9-31		Venezuela	4536-14-100
CETAF*		210-7-10			18-2-3
HK7GM*	Colombia	216-6-12	VY5AT		
			VY5ABZ		

<sup>1</sup> W6BBR opr., <sup>2</sup> W6PBV opr., <sup>3</sup> W6LHS opr., <sup>4</sup> Classified multioperator station entry by Award Committee.

## Addendum, 1947 DX Contest

It is with pleasure that we announce the winners of country awards for the 'phone section of the 1947 DX Competition. The awarding of medallions was delayed in accordance with our request for resubmission of logs as announced in the QST article covering results of the 13th DX Contest. The tabulation below supplements the score listings previously published. In each case the call listed is that of the winner for the country indicated together with his score. Our belated but hearty congratulations to each high scorer!

AFRICA			NORTH AMERICA		
Belgian Congo	OQ5AR	10,192	Barbados	VP6YB	70,496
Gold Coast	ZD4AB	1243	Canal Zone	KZ5AZ	7992
Kenya	VQ4ERR	19,368	Cuba	OM2JK	770
U. of S. Africa	ZS6DW	79,648	Guatemala	TG9RC	196,968
			Mexico	XE1A	306,504
ASIA			OCEANIA		
China	C1CH	2310	Australia	VK2ADT	47,520
Hejas	HZ1AB	56	Fiji Islands	VR2AB	462
Japan	J3GNX	22,178	Hawaii	KH6IJ	48,300
EUROPE			New Zealand	ZL1MQ	10,902
Belgium	ON4MS	4992	Palmyra	KP6AA	20,702
Denmark	OZ9Q	31,096	Islands		
France	F8QD	25,375	Papua	VK4KS	7266
Great Britain	G2PU	49,120	SOUTH AMERICA		
Italy	I1BU	4768	Argentina	LU5CK	27,068
Germany	D4AEP	6864	Brazil	PY2CK	23,150
Netherlands	PA6GN	29,000	Chile	CE3AG	51,801
Norway	LA6J	4905	Peru	OA4M	59,653
Scotland	GM8MN	40,950	Uruguay	CX2CO	57,752
Sweden	SM5UM	3534			
Switzerland	HB9D	2096			

In addition to the winners above, the following resubmitted scores were omitted from the previous listing: Brazil, PY2AJ, 19,584; Chile, CELAU, 1410; France, F8SL, 2142; Norway, LA7Y, 3757.

## 50 Mc.

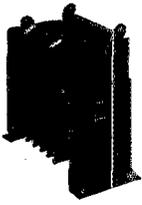
(Continued from page 65)

seems to be approximately comparable with that of lower v.h.f. bands. W2QGH, Larchmont, N. Y., reports working W2QKW, Bayville, L. I., mobile-to-mobile, a hop of 12 miles or so across Long Island Sound. W2QKW has a 16-element array which he can set up on his car for stationary operation, but only a simple dipole was in use for the above contact.

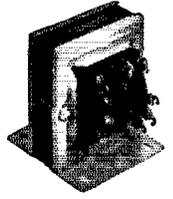
Since organization of activity in your own locality seems to be the key to developing satisfactory utilization of the 420-Mc. band, let's

(Continued on page 138)

# BY POPULAR DEMAND AGAIN WE PRESENT THE R.P.S. POWER CONVERSION UNIT



"Converts All War Surplus d-c Receivers and Transmitters, etc., into a-c use." No rewiring necessary—installed in a few minutes—units available for any rating—a few popular model sets easily adapted to the R.P.S. Power Conversion Units: BC-453, BC-454, BC-455, BC-312, BC-348, BC-433, BC-624, BC-733, BC-946, BC-1206, R-89AR/N-5A, ARB, BC-457, BC-458, BC-459, BC-375, BC-625, BC-654, SCR-522.



**Instant Warm Up—No Tubes—Cool Operation  
Low Cost — No Maintenance**

**Free Installation Diagram Sent With Each Purchase**

**R.P.S. Power Conversion Units Are Available For Any Voltage And Amperage Rating. IMPORTANT—HOW TO ORDER—**The input rating of your dynamotor *must not exceed d-c output* rating of the rectifier. For example, dynamotor series DMDX-12 v. 2 amps.—requires Rectifier No. S-295A and Transformer RPS-8883.

### ALL NEW

#### FULL WAVE VICKERS SELENIUM RECTIFIERS

Code No. Rectifier	d-c Volts	Output Amps.	Ship. Wt. in Lbs.	Amateurs Net Price
S-295-A	14	2	1.25	\$ 6.95
S-458-A	14	4.5	1.75	7.25
S-167-A	14	10	3.75	10.95
S-292-A	14	40	12	29.95
S-296-A	28	1.8	1.25	5.75
S-344-A	28	5	5.75	11.50
S-172-A	28	10	6	16.50
S-291-A	28	20	12	29.95
S-297-A	28	40	23	52.25

### ALL NEW—THERMADOR TRANSFORMERS 50, 60 Cycle—117 Volt Primary Rating

Code No. Transformer	Secondary Volts	Amps.	Ship. Wt. in Lbs.	Amateurs Net Price
RPS-8883	18	3	3.5	\$ 3.75
RPS-8884	18	5.2	5.5	4.25
RPS-8885	18	12	12	6.15
RPS-8886	18	46	35	19.65
RPS-8888	36	2	5	4.15
RPS-8889	36	6	12	6.75
RPS-8892	36	12	25	11.65
RPS-8890	36	23	32	19.25
RPS-8891	36	46	78	51.25

**NOTE A:** All transformers have 3 extra tappings—for example: 20, 19, 18, 17 volts and 38, 37, 36, 35 volts

All prices F.O.B. Los Angeles (California purchasers add 2 1/4% sales tax). Include 25% with order—balance on delivery. Foreign orders cash. Address correspondence Dept. C7.

LOS ANGELES  
CALIFORNIA

**RADIO PRODUCTS SALES, Inc.**

1501 SO. HILL ST.  
PROSPECT 7471

## RADIO COURSES

- RADIO OPERATING
- RADIO SERVICING
- CODE
- FM TELEVISION

### • REFRIGERATION SERVICING

Personal Counselling Services for Veterans  
Write for Catalog and Picture Brochure

**Y. M. C. A. TRADE & TECHNICAL SCHOOLS**  
15 W. 63rd Street (Near Broadway) New York City

## COMMERCIAL RADIO INSTITUTE

**A RADIO TRAINING CENTER FOR 28 YEARS**

**Resident Courses Only** • Broadcast, Service, Aeronautical, Television, U.H.F., Preparatory Course, Frequency Modulation and Marine telegraphy. Classes now forming for mid-year term Feb. 1st. Entrance examination Jan. 17th.

Literature upon request. Veteran training

**Dept. B, 38 West Biddle Street, Baltimore 1, Maryland**

### LEARN CODE!

**SPEED UP YOUR RECEIVING**

with

**G-C Automatic Sender**

Type 5

**\$24.00 Postpaid**  
in U. S. A.



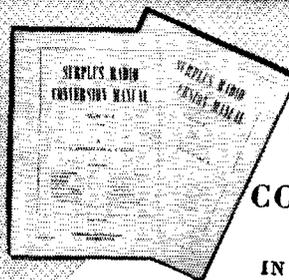
Housed in Aluminum Case. Black instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycle A.C.

Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

**GARDINER & COMPANY**

STRATFORD

NEW JERSEY



*Now Ready*

**SURPLUS  
RADIO  
CONVERSION  
MANUAL  
IN TWO VOLUMES**

Proven conversions of surplus military equipment to practical amateur and commercial uses are described in detail in these only-books-of-their-kind.

#### VOLUME 1

BC-221 Frequency Meter  
BC-342 Receiver  
BC-312 Receiver  
BC-348 Receiver  
BC-412 Radar Oscilloscope  
BC-645 Transmitter/Receiver  
BC-946 Receiver  
SCR-274 (453A Series) Receivers  
SCR-274 (457A Series) Transmitters  
SCR-522 Transmitter/Receiver  
TBY Transceiver  
PE-103A Dynamotor  
BC-1068A/1161A  
Electronics Surplus List  
Cross Index of A/N Vacuum Tubes  
Miscellaneous Data

#### VOLUME 2

Selenium Rectifier Power Units  
ARC-5 BC-454 Receivers for 30 Mc.  
ARC-5 VHF Transmitter/Receiver  
Phono Amplifier from AM-26  
GO-9/TBW Transmitter 30 Mc  
357-type Beacon Receiver  
APS-13 H.F. Transmitter  
BC-375 Transmitter  
Surplus Beam Rotating Mechanisms  
Hi-Fi tuner from BC-946B Receiver  
ARC-5 Transmitter for 30 Mc.  
TA12B Transmitter  
ART-13 Transmitter  
Simplified Coil Winding Charts  
LM Frequency Meter

**250**

for either volume at your favorite radio parts dealer. Heavy paper binding.

**TECHNO-GRAPHIC PUBLICATIONS**

POST OFFICE BOX 877 • LOS ANGELES 35, CALIFORNIA

**JUST PUBLISHED!**

## PRACTICAL TELEVISION SERVICING

By J. R. JOHNSON and J. H. NEWITT

375 pages, 6 x 9, Over 230 illustrations \$4.00 (\$4.50 foreign)

At last you can get a practical book that really gives the lowdown on television servicing — one that tells just what to do and guides you on precautions to take and mistakes to avoid. The authors — one a radio editor, the other a well-known engineer — actually operated a television shop to obtain the data this book contains.

### MAKES TELEVISION REPAIR EASY TO UNDERSTAND

This isn't a book of theory, mathematics and general discussions. In addition to giving a clear explanation of how television components, construction, and operation differ from radio, the authors show exactly how to perform all specific operations in troubleshooting, diagnosing, and remedying television receiver troubles as well as in making both set and antenna installations. Dozens of case histories are particularly valuable to the man who wants to learn the work from a practical down-to-earth standpoint.

### READ IT 10 DAYS AT OUR RISK

We'll gladly send PRACTICAL TELEVISION SERVICING for 10 days' free examination. All we ask is that you agree either to return book postpaid at end of 10 days or pay for it (\$4.00 plus a few cents postage. (Postage paid on cash orders; same return privilege. Books sent for examination in U. S. only.)

Dept. Q118, MURRAY HILL BOOKS, INC.

232 Madison Avenue

New York 16, N. Y.



#### Practical help on

- R-f, i-f, detector sections
- video amplifiers
- synchronizing and sweep circuits
- power supplies
- antennas; wave propagation
- installation
- test equipment; alignment
- repair techniques
- receiver troubles
- service hints
- case histories, etc.

have the dope on what you and your associates are doing. Let us know the equipment, power, antenna polarization, operating schedules, and any other pertinent information. We'll run it in this department in the hope that it will help to gain additional recruits.

### Get on V. H. F.

(Continued from page 48)

check for uncontrolled oscillation, as the capacitance of the crystal and holder is required to complete the feed-back circuit.

If crystals near band edges are used the actual frequency of operation should be checked with an accurate measuring device. With this mode of oscillation the frequency may not be an exact multiple of that marked on the crystal holder.

Provision is made for measuring the grid and cathode current in the amplifier stage by means of  $J_1$  and  $J_2$ . If they are wired as shown the polarity of the meter will not require changing in going from one to the other. When the rig is operated on 50 Mc. the grid current need not be more than about 2 ma., and the 6J6 will provide this readily with about 150 volts on its plates. Cathode current, with no load, will be about 35 ma. at resonance, with a 400-volt supply. It may be loaded up to about 70 ma.

If 144-Mc. output is desired the final should not be operated at much more than 300 volts, but at this level it will provide more than enough output to drive another 832, or even an 829. For 144-Mc. use the whole unit may be operated from a single 300-volt supply, the additional voltage on the oscillator and doubler being helpful in securing sufficient drive to make the 832 triple effectively. Grid current for satisfactory tripling should be at least 4 ma. It is not recommended that the 832 be modulated for 144-Mc. use, as there is not enough drive for operation as a modulated tripler.

The over-all drain is so low that the unit is ideally suited to 50-Mc. portable or mobile use. With a 300-volt supply the total drain, with the amplifier loaded to full output, is only 88 ma. Under these conditions the 832 delivers an output of about 10 watts, with a total input to the entire transmitter of less than 27 watts — a degree of over-all efficiency hard to equal by any other approach. Output on 144 Mc. is of the order of three to five watts.

### Hints & Kinks

(Continued from page 85)

A sure remedy is to apply a small layer of white shellac with a camel's-hair brush over the spot where the decal is to be placed. In five or ten minutes the shellac will be dry enough to permit application of the decal in the usual manner.

Shellac can also be applied to bare metal surfaces such as bakelite, metal, or fiber, allowing decals to be placed on these surfaces as easily as they are on painted surfaces. — William J. Kuehl, W9VQX

### WANTED •

Teletypewriters complete, components or parts. Any quantity and condition.

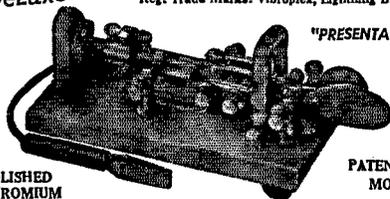
Box 138, QST

## Amazing NEW 1948

Super DeLuxe

## VIBROPLEX

Reg. Trade Marks: Vibroplex, Lightning Bug, Bug



"PRESENTATION" MODEL

WITH SUPER-SPEED CONTROL MAIN SPRING

PATENTED JEWEL MOVEMENT

POLISHED CHROMIUM PARTS 24-K GOLD-PLATED BASE TOP



The "BUG" Trade Mark identifies the Genuine Vibroplex. Accept No Substitute

You'll be surprised how easy it is to send with this New, Super-DeLuxe Vibroplex key. You'll be able to send better, faster, easier. No strain. No special skill required. Suits any hand or any style of sending. Speed range from 10 wpm to 40 wpm and beyond. Polished chromium parts mounted on 24-K gold-plated base top. Colorful red switch knob, finger and thumb piece. DIE CUT contacts and main spring. Extra large contacts. Non-slip rubber feet. Cord and wedge. \$25.00. Immediate delivery. Money order or registered mail. FREE catalog.

THE VIBROPLEX CO., Inc.

833 Broadway, New York 3, N. Y.

# HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(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.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. 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, if by a member of the American Radio Relay League takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (3), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one add in one issue.

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

**QUARTZ**—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 19 World Bldg., New York City.

**QSL**, 100, \$1.50 up. Stamper, for samples. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore 29, Md.

**COMMERCIAL** radio operators examination, question-and-answer. One dollar per element. G. C. Waller, WSATV, 6540 E. Washington Blvd., Tulsa 15, Okla.

**SELL** perfect Tenoco 500CA commercial kilowatt, complete for all-band operation, one or cw, \$1000. No lower offers, please. Reason: marriage. W3ILD, 4912 Quebec NW, Washington, D. C.

**BEAMS** pre-focused and matched to typical lines. Large diameter duro-aluminum tubing for elements and boom. Peter C. Houskeeper, 956 Paulding St., Peekskill, N. Y.

**AMATEUR** radio licenses. Complete theory preparation for passing amateur radio examinations. Home study and resident courses. American Radio Institute, 101 West 63rd Street, New York City.

**CRYSTALS:** Precision low drift units. Type 100A in 80, 40, and 20 meter bands. I vo units plug in one octal socket. Plus or minus 5 Kc. One dollar each. Exact frequency. \$1.95 ea. Rex Bassett, Inc., Ft. Lauderdale, Fla.

**10-METER** Beams, \$19.50. Send card for free information, Riverside Tool Co., Box 87, Riverside, Illinois.

**QSL**, Samples. Albertson, WAHUD, Box 322, High Point, N. C.

**SURPLUS:** Deluxe crystal finishing kits containing holders, quartz blanks, abrasive, etching fluid, complete instructions. \$2.00 each postpaid. Formerly sold \$8.75. Vesto Company, Parkville, Missouri.

**QSL** Quality cards priced right. Samples. Ferris, W9UTL, 1768 Fruitdale, Indianapolis, Ind.

**SUBSCRIPTIONS.** Radio publications a specialty. Earl Mead, Huntley, Mont. W7LCM.

**QSL:** Kromkite cards at a fair price. Dauphinee, W1KMP, Box 219, Cambridge 39, Mass.

**BEAM** control cable, new material. Two #16; six #20 rubber insulated, coded, tinned conductors. Weatherproof rubber jacket. Heavy armor shield, 1/2" diameter. Price 10¢ foot. F.o.b. Chicago. Trans-World Radio-Television Corporation, 6639 S. Aberdeen St., Chicago 21, Illinois.

**QSL, SWL.** Large variety of samples for stamp. Also your own designs. W2DEE, Maple Shade, New Jersey.

**BEAM** motor operates on 110V. AC 60 cycles. Requires 12 µfd condenser. Reversible Hi-Torque 1/2 RPM. No free swing. Flat mounting surface. Light weight, sturdy. Brand new. Surplus, \$5.95. Postpaid in S. Alvarado, Dept. ST-5, 904 S. Alvarado, Los Angeles 6, Calif.

**TWIN** City radio hams: I offer the three big c.w. transmitters at W9CO, in place at my station, and in "as is" operating condition, for cash, as follows: 40-meter, 1000 watts input, \$350.00; 80-meter 800 watts input, \$200.00; 20-meter 750 watts input, \$200.00; all three together, \$650.00. These rigs all crystal and temperature controlled. Make appointment to operate transmitters if interested. Sumner B. Young, W9CO, "Maplewoods", Wavzara, Minnesota.

**ART-13** dynamotor or A.C. supply with cables, converted for 10 meters, also broad band converter. Corbett, West Sayville, N. Y.

**LAPEL** pins. Your ham call engraved in white on black plastic, 1 1/4 in. by 3/8 in. with white border. 35¢ each postpaid. Lange, W2YVQ, 34 Union Ave., Belleville 9, N. J.

**NATIONAL** NC-46 with speaker. Like new, \$80.00. BC-348C converted A.C. Selective I.F.'s. \$75.00. R. Fite, 233 W. Beech St., Hillsboro, Ohio.

**QSL'S, SWL'S.** Finest stock. Fairest prices. Dossett, W9BHV Factory, 857 Burlington, Frankfort, Ind.

**SELL:** Complete set of spares for Meissner 150-B transmitter. Band-switching 30-watt CW transmitter or exciter 809 final, with power supply, 4 bands, modeled after National NTX, \$30.00. BB-144 2-meter converter. New unused surplus, bargain. Receivers BC453B, BC454B. Transmitters ARO-5 3.4 Mc., ARC-5 7-9 Mc. Many tubes and parts. Write for list. W9GBT.

**EX-W5GWN** is now KH6RU, John R. Sanders, 1427 Aalapapa Drive, Lanikai, Oahu, T. H. Misplaced friends please write.

**OUR** business: Buying and selling amateur radio transmitters. Transmitter Exchange, Wakefield, Rhode Island.

**WANTED:** Teletype 1/40TH HP synchronous motor. W6ITH, Tibbetts, Moraga, Calif.

**SELL:** SX-43 receiver, R-44 speaker and Bendix TA-12 transmitter. Best offer. Bill Foley, 52 Richardson St., Bath, Maine.

**WANTED:** Complete home-study course in radio-television; will pay cash or trade 3-tube home-built signal generator broadcast band, guaranteed to work. Balter, 880 Bergen Ave., Jersey City, N. J.

**FOR** Sale: SX-24, in good condition, with speaker, less crystal. \$65.00. M. Alexander, 123-08 Hillside Ave., Richmond Hill, N. Y.

**WANTED:** SX-28A, must look like new, but need not be "hot". Give full information. Prefer to sell locally. Best price not required. Also interested in other junk. W7YK, 304 Columbia, Coulee Dam, Washington.

**FOR** Sale: RME-45, with Cal-O-Matic dial. Laboratory aligned and noise limiter improved. Excellent performing set. \$125 or Gon-Set 10 meter converter and cash. H. Sayers, W9N2S, 6804 Northwest Highway, Chicago, Ill.

**FOR** Sale: A complete 2-meter station 35-watt xtal control transmitter (not 522); Workshop 6-element beam, antenna and B supply relay, converted 522 receiver, power supplies for both units included for \$125.00. F.o.b. W1JFF, 74 Bedlow Ave., Newport, R. I.

**HT-9** transmitter, 1946 model, 80, 40, 20, 10 coils, 28 crystals, complete set new spare tubes. Extra transformers, condensers, etc. \$300.00. W5LV, 1916 Fern, New Orleans, La.

**SWAP:** Complete station, HQ-129X, 150-watt xmitter, T3 mike, many extras, like-new value, \$300.00, for good camera. Also Sonar XE10, mike, 42" cabinet for \$38.000. Write for details. All inquiries answered. Al Hoffmann, W2JFT, 275 Woodbine St., Brooklyn 21, N. Y.

**WIRELESS** Motorola record-player. Plays eight records automatically. In good condition. Prefer to sell locally. Best price \$44.50. My price \$17.50. Also, American carbon mike, \$2.00. George M. Clark, Jr., W2JBL, 222 Hicks St., Apt. 4C, Brooklyn 2, N. Y.

**INSTRUCTION** books for BC-224, 312, 342, 348. 150µ fd a 2" meter, \$3.00. 12-28V DC power supplies, also selenium rectifiers. Weston 504 voltohmmeter, \$18.00. Ham type handset, \$2.00. 130 foot beaded copper coax, 3/4 and 1/2 lip gasoline engines for field day power plants. W2SI, 490 Fairfield, Ridgewood, N. J.

**SELL:** Patterson PR-15 communications receiver, 15 tubes, 540 Kc to 40 Mc. \$75, or will consider a trade. Need VHF-152A, signal shifter, typewriter, etc. W9OBW, 4644 Adams St., Chicago, Illinois.

**FOR** Sale: 350-watt 'phone transmitter, Pair HK54's in final. Modulated by 811's. Fully regulated. Built-in Varitran. Coils for 10-20 meters. Oscillator, crystal or Meissner ECO controlled. 3-element 10-meter beam. Electric beam rotator and indicator. \$300.00. James McKee, 45-22 39th Place, Long Island City 4, N. Y.

**WANTED:** Late model Hallicrafters S-39 portable receiver. Describe fully and state price. B. Evans, W2YJV, Cranberry Lake, N. Y.

**SX28A**, new, perfect condition, \$150.00. Super-Pro with speaker in 28" rack, 540 Kc to 20 Mc. perfect condition. \$175.00. Miller Exciter, coils for 80-40-20-10, with two 7 Mc. crystals, one variable, \$30.00. C. B. Schwab, W8ALT, 508-19th St., NW, Massillon, Ohio.

**BC-610E** Hallicrafters transmitter and speech amplifier. Used very little in past two years. Owner has been attending college. \$500 F.o.b. Timonium, Maryland, W4JSO.

**SELL:** Meissner exciter (VFO) from 150-B transmitter new condition, 40-75, 80 meter coils \$30.00. Receiver, S20-R, \$50. V. Houser, North Liberty, Ind.

**SELLING** whole works. Complete ham station, Collins 32V-1, Collins 75A-1, perfect condition, 3 Element 10M (Elincor) All aluminum beam, heavy duty (Ereco) beam rotator including indicator and strong 1/4 aluminum waterproof box, 6 ft. Bud delux relay rack and castors. SCR522 complete and on the air 110 AC operation, push button 4 preselected frequencies and many others. Sell all or parts, or exchange for property NYC, L.I. or S.E. area. Will answer all letters in detail. W2QBM, John B. Gardner, 2229 Creston Ave. Bronx 53, N. Y.

**SX-28A** complete less speaker, just realigned, new appearance and excellent operating condition. Best offer between \$150.00 and \$175. Wanted: RCA-AR-88 ham rcvr. Dr. F. Bullington, W4JQW, 737 E. Main St., Richmond 19, Va.

**FOR** Sale: First money order takes S-38, \$25, converted SCR-522 transmitter, \$20, 10-11 M. Gonset, \$27.50, Supreme #385 set tester \$60. W9DSV, Webster, Wis.

**TRANSMITTER** 701, good condition, coils 10-20 three 6AQ5's carbon mike, \$20. Express collect. W2ONK, R.D. #1, Box 119, Red Bank, N. J.

**BC-1267** transceiver, brand new, in original carton, \$25.00. Bendix TA 12-D transmitter, like new, \$35; BC-191 (12 V. AC model) in good condx. with cables, tuning unit, \$25.00; FLB filter, \$1.00; Elmac 24G #1 pair, new, W8GU, Donald B. King, 18944 Sarrenbo, Detroit 21, Mich.

**FOR** Sale: 3 kilowatt, 110-volt, 60-cycle generator. Complete unit ready to operate with built-in governor, frequency meter, volt-meter and ammeter. Easily operates all normal household equipment such as toasters, irons, refrigerators, water pump, vacuum cleaner, etc. Sam Harris, R.F.D. #1, Burton, Ohio, W8UKS.

**SELL:** Super-Pro 0.54 to 20 Mc. with power supply and DM-36 five and ten converter, \$175.00. BC-221 with power supply and modulation, \$50.00. New electronics converter 6 volts DC to 110 volt AC at 100 watts, \$15.00. F.o.b. Canton, Ohio. W8NWP, 4108 4th, N. W.

SUPER-PRO power supply, new surplus, \$25.00; new Pro panel, \$50.00. Send for listing of my surplus. W6KZX.

OSCILLOSCOPE 5", \$65.00. W2RLN, Ritter, 3918 Lewiston Rd., Niagara Falls, N. Y.

TRANSFORMERS: 1875-1560, each side 325 Ma. \$15.00; 500 Ma. \$20.00. Spear, 3003 121st St., Toledo, Ohio.

FOR Sale: HRO 10-meter bandspread coil. Best offer takes it. T. Kain, WIJWN, 39 Hartwell St., Fitchburg, Mass.

FOR Sale: QSTs, 1925-1941. Three issues missing. Make offer. Newhouse, 4442 Walton, Chicago 51, Illinois.

KILOWATT all-band fone-cw transmitter. Enclosed Bud 7 ft. cabinet. Complement: Sonard VFX 680 exciter. FM modulator into PP 307A into PP 813 final. Beautifully constructed, metered, fused, relayed. Link coupled throughout. Only best brand parts used. Everything over for safety and performance. R "O" reports every time. Nearly new. Going overseas. Must sell. Complete with all coils 10-80 tubes, extras. \$400.00. Picture, particulars on request. Chuck Mowat, 533 North Virginia, Reno, Nevada.

BC-348 pre-war Meisner signal shifter. Sell or trade for Hammarlund Four 20-11 transmitter, kit or what have you? R. Rickles, 901 Shahan, Alabama City, Ala.

TECHNICAL writers, to 30 years. Knowledge of electronics required, also apprentice writers with basic radio experience. Boland & Boyce, Publishers, 460 Bloomfield Ave., Montclair, N. J.

HAMMARLUND, HQ-129X, with 10" speaker, also built-in 4" speaker, extra set of tubes and phone. Used very little. \$125.00. George W. McCarthy, Veterans Center, VAF, Bath, New York.

USED BC-344 11V. Ac. 150-1500 Kc. with phones, \$60.00. F. Maki, 532 S. Catalina St., Los Angeles, Calif.

SALE: BC-221-M, metal case, new, \$60.00; Navy RBL-3, 15-600 Kc. Rec. set, spares. Good \$35.00. Two Elmac 4-65A, unused, \$10.00 each. BC-457A, \$3.00; BC-733-D, \$5.00. 1 trim featherweight head-set, \$3.00. All F.o.b. Mrs. McMurdock Silver, Simsbury, Conn.

TRADE Omega C enlarger Rolleicord 4.5 lens for 10-meter Hy-Lite 3-element beam with Mungo or other commercial rotator. Local hams only. W2PUB, 94-01 Roosevelt Ave., Jackson Heights, L. I., Queens, N. Y.

SELL Hallicrafters SX-25, complete with speaker and instruction book. Excellent condition. 12-tubes, 540-42,000 Kc. \$75.00. W4KCT.

WANTED: BC-453 or Qser. Also BC-454, converted, and Dec., 1947. QST, Talbutt, RD #4, Norristown, Penna.

QSTs: 1930 except January, August, 1932 through 1938, 1939 except October. Best offer whole or part. John Knaut, 531 East 20th, New York 10, N. Y.

SELL: 60-watt fone/cw xmtr, complete, coils for 10, tubes, meters, bug, crystals, mike, RME-84 converter for 10, \$200.00. Write C. Oneke, W5MHI, 6631 Day, Dallas, Texas.

HALLICRAFTERS 5310 receiver, excellent condition, \$50.00. Contd. W2CBB, Oradell, N. J.

FOR Sale: BC-342, \$65 prepaid in U. S. Write for details. WIRJN, c/o W1BQ.

FOR Sale: 700-watt 10 and 20 meter phone rig in seven ft. enclosed rack cabinet on dolly. 807, 813 push-pull 100 THF. Modulated by Class B 813. Signal shifter and Thordarson speech amplifier. Eleven square Weston meters. Five separate power supplies all Thordarson transformers and chokes. \$500.00 or trade for BC-610 or Collins 32V-1. Going overseas. Col. G. H. Rockey, W4YJK, Maxwell Field, Alabama.

MECK T-60: 60-watt AM/CW transmitter complete, including coils for 80-40-20-10, like new, \$125.00; Hallicrafters R-42 bass reflex speaker, \$20.00; Eugene Walter, 205 Clinton Ave., Brooklyn, N. Y.

QSLs, SWLs. For distinctive cards, write to McEachron, 1408 Brentwood, Austin, Texas.

GIVE Hallicrafters receivers. Lay-away plan. Easy. Atlas Radio Jobbers, Tel. 6-3800, Nashville, Tennessee.

SELL BC-348Q, \$50.00 F.o.b. Richmond, California. Connected to AC. Lewis, W6YFI, Terrace W-18, Richmond, Calif.

FOR Sale: BC-312N QST converted. A.C. powered. \$50.00 or trade for 16 MM projector. W6UYP, RI Box 210A, Redlands, Calif.

CHANGING frequency? Fine commercial units for SCR-522's, Police, Taxi, Aircraft, Marine, Geophysical, and other services, except amateur. Commercial regrounding; many crystals can be economically reground to new frequencies. Inquire Over twelve years of satisfaction and fast service! Try us first. Edison Electronic Company, P.O. Box 31, 1802 North Third St., Temple, Texas.

FOR Sale: 'Phone-CW transmitter, test equipment, many transmitting and receiving parts and tubes. List available. W8CBS, 904 Mahabau, Greenfield, Ohio.

QSL's? Color-tone QSL's! New design! Modernistic Cartoon! Rainbow! Beautiful samples free! Color-tone Press, Tupelo, Miss.

SELL: Type 810-45C0 Colo-Coil Inductocap turrets, all bands, never used. National Type 1-10 receiver with coils, National Velvet Type 5380-A 20 power supply, all in excellent condition. Best offers. Glauber, W2CFE, 183 Gregory Avenue, West Orange, N. J.

URGENTLY Wanted: SCR-522. Does not have to be converted; state condition and price. S. J. Semel, W2SHE, 111-55 77th Ave. Forest Hills, N. Y.

WANT: BC-221, signal generator, audio oscillator, WIOMT.

QSL's. Samples free! Fritz, 1213 Briargate, Joliet, Illinois.

EXPERIMENTERS, Amateurs. 3 issues "Radiobuilder", — 25¢ Laboratories, (Eye-Q), San Carlos, California.

VOIGHTLANDER rangefinder Bessa F3:5 Compur-Rapid shutter 1/450 second. Cost \$185.00. Exchange for communications receiver. W6NFV, 2408 Malabar, Los Angeles, Calif.

FOR Sale: Collins 30F8X, rebuilt exciter and final, PP T2-40s, 300 watts phone and CW, like-new. \$200.00. Leed-Northrop resistance bridge, \$50.00. Navy frequency meter LM-8 with supply and calibration book with complete spares, \$70.00. Stancor 10-P transmitter complete, \$30.00. Also radio books. W2MVR, James Geras, 373 8th Ave., New York, N. Y.

NEW pocket signal generator. All types of trouble-shooting. Only \$4.50. Money back guarantee. Howard Products, Dept. Q-11, 2754 Diversey, Chicago 47, Ill.

FOR Sale: NBFM/CW — VFO rig, 175 watts complete with individual power supplies. Capable of running 450 watts. Best offer. Morris Rosen, W2KNP, 240 First Avenue, N.Y.C., N. Y.

HRO Sta-1 with coils, power supply and National speaker in excellent condition \$159.00. All inquiries answered. J. J. Cransky, W2MHE, 7110 Hallock St., Farmingdale, Long Island, N. Y.

DON'S QSLs. "The finest". Samples. Don Hill Press, 2106 South Sixteenth Ave., Maywood, Illinois.

THORDARSON plate transformer, 1950-830-0-830-1950 volts. T44015. \$25.00. W9LSY, Schultz, 6440 N. Nordica, Chicago, Illinois.

SELL or trade: 100 6AK5 tubes, surplus, cartoned, 55 cents each or trade for converted BC-348, John Hoffman, W4MVN, 1226 E. Breckinridge St., Louisville, Ky.

TRADE: 522 Receiver for 10M Gon-Set. W6ANC, Jack Margolis, 721 No. Fuller, Los Angeles, Calif.

FOR Sale: Collins 310-B3, new, under warranty, \$190.00. Motorola Mobile T69-20A converted for 10, perfect shape, \$65.00. SX-24, good condition, \$55.00. Will ship. W6LBJ, C. B. Naylor, Box 602, Isleton, Calif.

QSL's? SWL's? Distinctive designs, glossy stock, one-day service samples. Narvestad, Granite Falls, Minn.

FOR Surplus: write Spera Radio Labs, 37-10A, 33RD St., Long Island City, N. Y.

HAMMARLUND Super-Pro 400 model, practically brand new: \$325.00. W7MDG.

FOR Sale: Meisner bandswitching signal shifter. J. Ralph Strite, W3HFF, 31 North Grant, Waynesboro, Penna.

HOUSTON, Texas, and vicinity. One S-20R in good condition, \$45.00. 40 and 80 meters ARCS receivers for 12 volt operations with dynomors, tuning knobs, volume controls. Both receivers like new, in triple rack. \$30.00, ready to go. Louis Lechenger, W5IHL, 5118 Linden Street, Bellaire, Texas.

SELL: Meisner DeLuxe Model 9-1090 signal shifter, factory assembled unit. Automatic band changing, coil, turret, output on 80-40-20-10. Used 6 hours, new, and A-1 condition. Cost \$120.00. Will sell for \$85.00. W6OMG, 1103 Gardner St., Poplar Bluff, Mo.

FOR Sale: QST, 1936 to 1941 inclusive, complete, including 4 volume binders. Some 1935, 1942, 1946, all 1947 and 1948 to date. \$25.00. W2RO, 413 Basex Ave., Spring Lake, N. J.

SELLING ARK5 receiver, complete with supply, and speaker, \$75.00. New Butler mobile transmitter, ten meters, with tubes, antenna, PE103 Generator, \$50.00. Butler ten-meter converter, new, \$25.00. New Webster Model 80-1 wire recorder, \$75.00. Munger beam rotator, complete, \$30.00. New James Knights frequency standard, Model FS-344, \$45.00. Triplet modulation monitor, Model 3296, New, \$50.00. Write to Joe Tabor (W8ABS), 20420 Riopelle, Detroit, Michigan.

SELL: Hallicrafters SX-28 with speaker; best offer. Green, W4KLN, 226 Broad Street, Oxford, N. C.

SELLING out: complete rig. Need the dough. 9-tube receiver with crystal filter and pre-selector. V.F.C. and rack mounted 3-stage transmitter with PP740's final. \$100 for all. W3EXS-V, R. Ayer, 5406 Rutland St., Philadelphia 24, Penna.

COMPLETE 30-watt fone/cw transmitter, new R-9er. 100TH's other assortment. Best offer. Write for details. Make an offer. Will send list on request. W6LV, W. A. Baker, 2919 23rd Ave., San Francisco, Calif.

FREE QSL-SWL samples. Cushing, WIHJ1, Box 32, Manchester, N. H.

FOR Sale: SX-28A. No speaker. \$150.00. Excellent condition. Ready to go. Write to: Euzo, N. Y. Henry Cizek, 1st Signal Troop, APO 201, c/o Postmaster, San Francisco, Calif.

SELL: Jensen bass reflex cabinet and speaker, 25 watts. \$60.00. Trade? W4AVU.

MOTOROLA police mobile xmtr T69-20A plate mod. complete, ready to go on ten. \$45.00. F. L. Jones, W6STM, Unlontown, Kansas.

SELL Electro-Tech 777 Telekit with all tubes and 12" kinescope for \$75.00, or trade for Hallicrafters or similar panoramic adaptor. John F. Bunting, 21 Brook St., Mt. Kisco, N. Y.

W6YHZ (ex-W9YHZ) is now W6BYX, near Escondido, Southern California.

FOR Sale: BC-696 (slightly used), BC-459 and BC-458 both brand new, heavy duty power supply for above, all connecting cables, etc. Sell complete. Write for details. R. L. Falk, W6YCG, Brainard, Nebraska.

FOR Sale: Hallicrafters T-54 television \$150.00. Transvision 77 assembled kit. \$100. W. Thiel, 7304 38th Ave., Kenosha, Wis.

BARGAINS: New and used transmitters, receivers, parts. New 150-watt phone, \$199.00; 60-watt phone, \$99.00; Globe Trotter, \$57.00; Abbott 10A, \$29.50; Collins 75A, \$299.00; NC-173, SX-28, \$149.00 ea.; HQ-129X, \$139.00; RME-45, SX-25 \$99.50 ea.; RME-9D, \$39.50; RME-69, \$95.00; SX-24, \$75.00; S-40, \$65.00; S-20R, \$49.00; NC-44, S-38, \$35.00 each; many others. Large stocks. Trades. Free trial. Terms financed by Leo, W6GFO. Write for bargains and best deal to World Radio Laboratories, 740-42-44 West Broadway, Council Bluffs, Iowa.

TRANSFORMERS: Thordarson T-19P60; 3750CT/3120CT, 300 ml, \$20.00. T-19P59, 3120CT/2500 CT, 300 ml, \$15.00. F.o.b. Ideal pair for 500-w tone. Also 50 ft. cable fourteen No. 16 conductors. Weatherproof. J. Lane Ware, 5401 SW 4th St., Miami, Fla.

FOR Sale: QST from Jan. 1927 to December 1939 inclusive. Complete except for September 1930 and December 1931; January 1932 January 1939. Best offer. Bill Truland, 13 Gerry Ave., South Portland, Maine.

LISTEN out to Britain! "Practical Wireless," Britain's top radio journal, packed with helpful "links" and new radio viewpoints from British, European radio, television field. Articles by leading British radio men, detailed analyses of newest transmitters and receivers, special television features, full data "ham" activities, etc. Annual subscription (12 issues) \$2.00 from George Newnes, Ltd. (FW 25), 342 Madison Ave., New York 17, N. Y.

**SELL:** Pre-war Hallicrafters HT-9 transmitter complete with remote control unit tubes, xtals and coils; Meissner bandswitching signal shifter (used only 4 months); Sylvania modulation meter; Electro-Voice microphone; Universal mod. 312 microphone; TR-4 transmitter, \$350.00. O. F. Dedrick, W6NGK, 116 West 7th St., San Pedro, Calif.

**NEW,** quality Mac Key, black crackle heavy oval base, won't tilt, no fastening required. Circuit closing lever, chrome plated parts, adjustable bearings 3/16" silver contacts, \$1.00 postpaid. Slug tuned low-loss ceramic coil forms, single hole mounting as used in R-9er. Wound to use on 6-10-11-15. Can be rewound for other bands. Instructions. Four for \$1.00 postpaid. Ed Doherr, 96 Highland Street, Boston 36, Mass.

**HALLICRAFTERS** SX-28, good condition, \$100 or trade. Ralph Colton, 504 West 110 St, New York City, N. Y.

**FOR Sale:** SX-42 receiver, Meck T-60 transmitter, Turner Dynamic Microphone, ATR inverter. All near new. Highest offers take. Vernon Phillips, W0BQQ, c/o KICD, Spencer, Iowa.

**SIGNAL** shifter plug-in coils for all bands. Rodgers & Harris, 727 Main Street, Mt. Carmel, Illinois.

**SWAP** or sell 3KVA G-E cased pole transformer, primary 115/230, secondary 4800 CT. Want 2KVA or larger Variac or transtat for 230 volts, pair new 250TH or 450TH. S. C. Macy, W4KTZ, Eupedon Farm, Clarksville, Tenn.

**IN STOCK:** New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Sonar, Meck, other receivers, transmitters, etc. Reconditioned S-38, \$35.00; S-40, \$59.00; S-36, \$129.00; SX-28, \$139.00; SX-42, \$199.00; NC-37, \$69.00; HQ5TA1, \$179.00; VHF152A, \$69.00; RMF-45, \$99.00; HT-5, \$250.00; BC-610, \$545.00; HQ-129X, Super-Pro, S-39, SX-24, SX-25, SX-28A, SX-43, S-53, SX-16, NC-173, NC-183, HRO7, NC-240D, BC-348, other receivers, transmitters, VROs, etc. Easy terms. Shipped on approval. Write for free list. Henry Radio, Butler, Mo.

**SELLING out:** Reason: going back to sea. One SX-43 and speaker, 500 W. Millen final 812s, one HT-18 VFO, one S22 xmtr rigged for 6 meters, one N.C. HFS, one 420 rev; none used more than 100 hours. Best offer. R. Beck, W3OAS, 2813 North Second St., Philadelphia 33, Penna.

**FOR Sale:** DeForest's radio and television course. \$15.00. Fred Humke, 1523 1/2 Central Ave., Dubuque, Iowa.

**WANTED:** Diagram 75 Mc tuning unit, TU-70-A. Will pay cash. L. R. Mitchell, W1HLL, Sidney Street, Wakefield, Mass.

**ENGRAVING,** lathe work, drilling jobs. Fred J. Streichenwein, W2DVB, 69-71 70th St., Maspeth, L. I., N. Y.

**SELL** Lazy Kilowatt, all-band phone/cw xmtr relay rack mounted, 250TH's final and Class B 100TH's modulators. Well metered rig, complete with remote exciter and speech amplifier. Highest quality parts. Also complete beam rotator and remote indicator unit. Total price \$350. W2SYC, 61 Blue Spruce Road, Levittown, Long Island, N. Y.

**SELLING out** entire station: Temco 500GA, all bands and accessories, HRO-5, Panadapter and R9er; Gordon rotator and UHF 10-meter 3 El. beam; Sylvania overmodulation meter; Cardax mike; Stancor 10-m. mobile and vibrator supply and mike. All equipment year old or less. Prefer to sell as lot, reasonable, to be picked up. \$1750. No less. 81-85 Utopia, Parkway, Jamaica, N. Y. Sid Hack.

## WANTED

Middlewestern manufacturer has excellent openings for two engineers:

### CIRCUIT ENGINEER

Must be experienced in measurement work, FM and television frequencies, and have thorough knowledge of the performance characteristics and correct application of ceramic capacitors.

### CERAMIC ENGINEER

Must be experienced in all phases of the development and manufacture of high dielectric ceramic body capacitors.

Kindly give full information covering your educational background, practical experience, age, dependents, and compensation expected.

ADDRESS

BOX 140 • QST

BC-610-D converted for 10. Tuning units and coils, speech amplifier, complete complement of tubes spare 250TH. Has approximately 50 hours on it. A good buy for the first \$500.00 presented. Hank Carey, ex-OADC, 3612 S.W. 3rd Ave., Miami, Fla.

**WANTED:** ITH i.f. transformer for BC-112. M. A. Perry, R. #1, Hamilton, Michigan.

**FOR Sale:** 7 BC610E's, converted for all bands at 750 watts input. Price \$50.00. P.o.b. Belmar, W2STK. P. C. Sherman, RFD 1, Box 230, Belmar, N. J.

SX-42, excellent condition. Sell \$180.00. Bill Robertson, 55 Edgemoor, Asheville, N. C.

**CRYSTALS:** Precision, low drift mounted units, 3500 to 9000 kilocycles  $\pm$  5 Kc. \$1.00. Exact frequency, \$1.50. Specify mounting. Write for quotations all other frequencies. Breon Laboratories, Williamsport, Penna.

**SELL:** BC-312-N, A.C., Manual, \$45.00, 813, \$4.00. Both plus shipping. Stolberg, 1024 E. Knapp, Milwaukee 2, Wis.

**QSLs, SWLS.** Meade, W6KXL, 1507 Central Avenue, Kansas City, Kansas.

**SELLING out:** 750-watt phone transmitter, all bands; ECO metal tower, HQ-129-X, bug, extras, worth \$300.00. No junk! Best offer. Will consider Mercury 10 Hp. outboard or equal if extra good. Homer Howe, W5JOD, Tonkawa, Okla.

**FOR Sale:** National NC-200 receiver, original owner selling. Pink of condition. Specially priced to sell, \$150.00. W6ZVY, Stanley Read, 5768 Scarborough Drive, Oakland, Calif.

**CONVERTED** BC-348, shockmount, instruction book, \$60.00. Also S-20-R, good condition, \$30.00, W9PVE, Frank Merlik, 10 West First St., Hinsdale, Illinois.

77 GOLD bronze decal transfers, any call 50¢; three sets for \$1.00. Pleasant, W9UDZ, Mattoon, Illinois.

**BARGAIN:** T-60-1, coils, mike, xtals; XE-10; HF-10-20; NC-101X; frequency standard; modulation meter; extras; all perfect. First \$275.00 takes works F.o.b. F. A. Timberlake, W9RZP, 406 Washington St., Gary, Ind.

**QSLs? SWLS?** "America's Finest"! No cheap trash! Samples, 10¢. QSL Printer Sakkers, W8DED, Holland, Michigan. "Made-to-order QSL Cards."

**FOR Sale:** Hammarlund HQ-120 X, \$110.00; National RA06, NC-120, \$125.00, with speakers in fine cond. J. Dubinsky, W2LVR, 94 Astoria Blvd., Jackson Heights, L. I., N. Y.

STANDARDIZED METAL EQUIPMENT FOR ELECTRONICS

STANDARDIZED METAL EQUIPMENT FOR ELECTRONICS

**BUILD BETTER ELECTRONIC EQUIPMENT**

with **STANDARDIZED**

**PAR-METAL**  
ELECTRONIC HOUSINGS

for **ALL P. A. NEEDS**

**READY-TO-USE CABINETS**

**CHASSIS PANELS**

**RACKS**

Par-Metal Equipment is preferred by Service Men, Amateurs, and Manufacturers because they're adaptable, easy-to-assemble, economical. Beautifully designed, ruggedly constructed by specialists. Famous for quality and economy.

Write for Catalog.

**PAR-METAL PRODUCTS CORPORATION**

32-62-49th ST., LONG ISLAND CITY 3, N. Y.

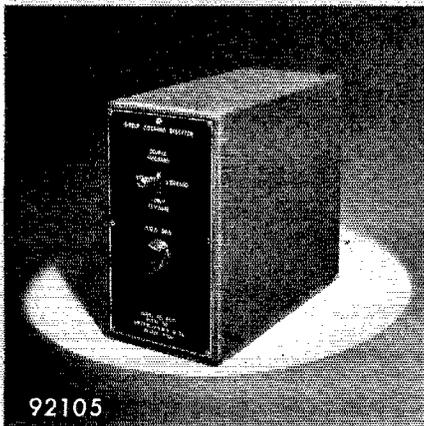
Export Dept.: Rocke International Corp.  
13 East 40 Street, New York 16



# Designed for



# Application



92105

**THE NO. 92105**

**"SSSR"**

**Single Sideband Selector**

The No. 92105 is designed to permit Single Sideband Selection with existing receivers. Full technical details in April 1948 QST. Produced in co-operation and under exclusive U. S. patent license (2,364,863 and others) with the J. L. A. McLaughlin Research Laboratories.

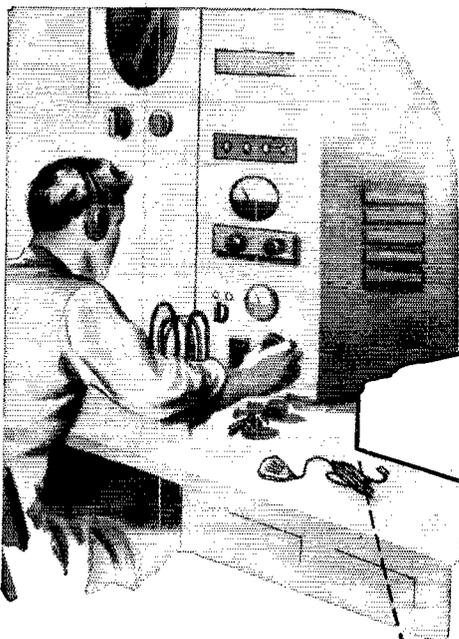
**JAMES MILLEN  
MFG. CO., INC.**

MAIN OFFICE AND FACTORY  
**MALDEN**  
MASSACHUSETTS



## Index to Advertisers

Allied Radio Corporation.....	109
American Phenolic Corporation.....	86
American Radio Institute.....	136
Arrow Electronics, Inc.....	105
Astatic Corporation, The.....	131
Barker & Williamson, Inc.....	133
Belden Manufacturing Company.....	83
Birnbach Radio, Incorporated.....	134
Bliley Electric Company.....	84
Brill Company, W. D.....	124
Browning Laboratories, Inc.....	114
Burstein-Applebee Company.....	118
Candler System Company.....	122
Capitol Radio Engineering Institute.....	89
Carter Motor Company.....	114
Central Radio Parts Company.....	124
Chicago Industrial Instrument Company.....	130
Clark Crystal Company.....	126
Cleveland Institute of Radio Elec.....	131
Collins Radio Company.....	2
Commercial Radio Institute.....	137
Condenser Products Company.....	99
Continental Sales Company.....	133
Drake Manufacturing Company.....	102
Eitel-McCullough, Inc.....	4
Electric Eye Equipment Company.....	112
Electronic Marketers, Inc.....	126
Electronic Wholesalers, Inc.....	125
Electro-Voice, Incorporated.....	Cov. II
Espey Manufacturing Company, Inc.....	136
Gardiner & Company.....	137
General Electric Company.....	1, 90
Greenlee Tool Company.....	128
Hallcrafters Company, The.....	5
Hammarlund Manufacturing Co., Inc.....	97
Harrison Radio Corporation.....	115
Harvey Radio Company, Inc.....	119
Harvey Wells Electronics, Inc.....	104
Henry Radio Stores.....	103
Hunter Manufacturing Co.....	132
Hy-Lite Antennae, Inc.....	133
Hytron Radio & Electronics Corp.....	85
Instructograph Company, Inc.....	135
International Resistance Company.....	110
Jensen Manufacturing Company.....	144
Johnson Company, E. F.....	80, 92
Ken-Rad.....	91
Knights Company, James.....	88
Lambda Electronics Corporation.....	135
Leeds Radio Company.....	106, 107
McGraw-Hill Book Company.....	108
Mallory & Company, Inc., P. R.....	81
Marion Electrical Instrument Co.....	7
Mass Radio & Telegraph School.....	136
Meisner Manufacturing Company.....	96
Merit Coil & Transformer Corp.....	93
Millen Manufacturing Co., Inc., James.....	142
Munger Company, Rex L.....	128
Murray Hill Books, Inc.....	138
National Company, Inc.....	77, Cov. III
New York YMCA Schools.....	137
Newark Electric Company.....	94, 95
Ohmite Manufacturing Company.....	87
Onan & Sons, D. W.....	132
P & H Sales Company.....	134
Par-Metal Products.....	141
Peerless Radio Distributors, Inc.....	120
Petersen Radio Company.....	79
Port Arthur College.....	134
Precision Apparatus Co., Inc.....	98
RCA Institutes, Inc.....	135
Radio Corporation of America.....	Cov. IV
Radio Products Sales, Inc.....	137
Radio Shack Corporation.....	100, 101
Shure Brothers, Inc.....	82
Standard Press.....	130
Standard Radio & Electronic Products.....	122
Steinbergs, Inc.....	116
Sun Radio & Electronics Corporation.....	117
Sun Radio of Washington.....	121
Technical Advertising Associates.....	133
Techno-Graphic Publications.....	137
Terminal Radio Corporation.....	111
Turner Company, The.....	129
Valparaiso Technical Institute.....	135
Vesto Company.....	129
Vibrapolex Company, Inc., The.....	138
Webster-Chicago Corporation.....	143
Wind Turbine Company.....	135
Winters Radio Laboratory.....	132
World Radio Laboratories, Inc.....	127



*What's missing  
in this  
Ham Shack?*

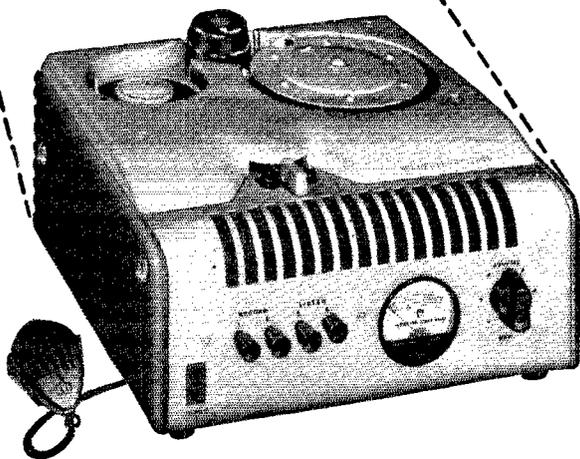
**RIGHT!**

**A WEBSTER-CHICAGO  
MODEL 78  
WIRE RECORDER**

The Webster-Chicago Model 78 Wire Recorder is a real asset in ham radio operation. It takes input from microphone, phono pickup or direct from your receiver. Outputs for external amplifier or speaker. Push-button control makes Model 78 easy to operate while you are on the air, and provides all desirable recording, playback, and erasing combinations.

Record your QSO's. Test your modulation levels and the quality of your rig. Model 78 is ideal for handling traffic . . . no chance of error in relaying important messages.

Model 78 makes a *Complete* ham shack. Try it and you won't be satisfied without one.

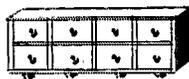
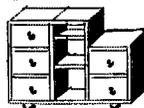
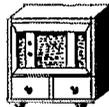
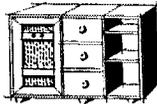
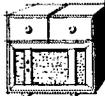
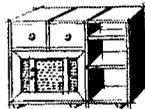
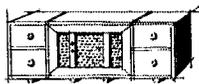
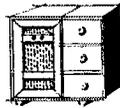
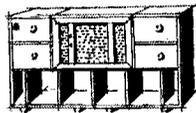


Stop in tomorrow and see the Webster-Chicago Model 78 Wire Recorder at your favorite ham supply house. If you use a wire recorder now check on Webster-Chicago Pre-tested Recording Wire. It pays to use the best . . . pre-tested for your protection.



**WEBSTER-CHICAGO**

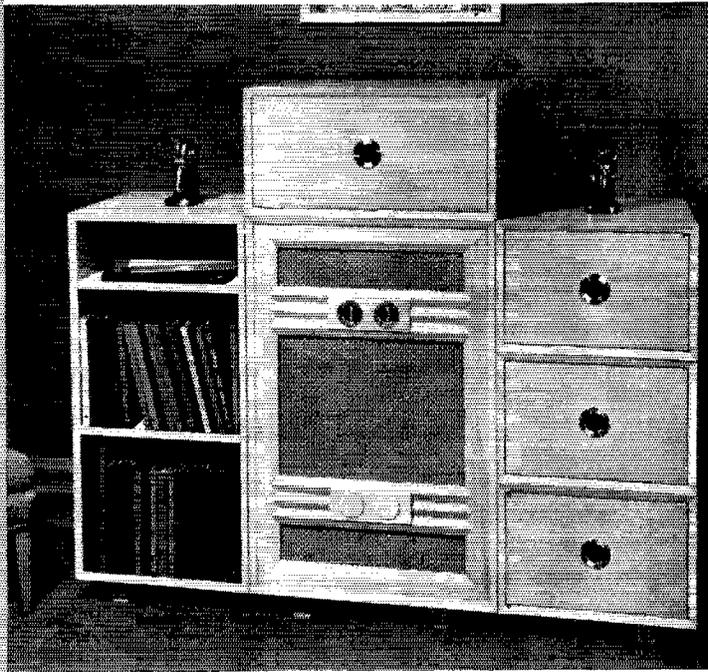
5610 BLOOMINGDALE AVENUE • CHICAGO 39, ILLINOIS



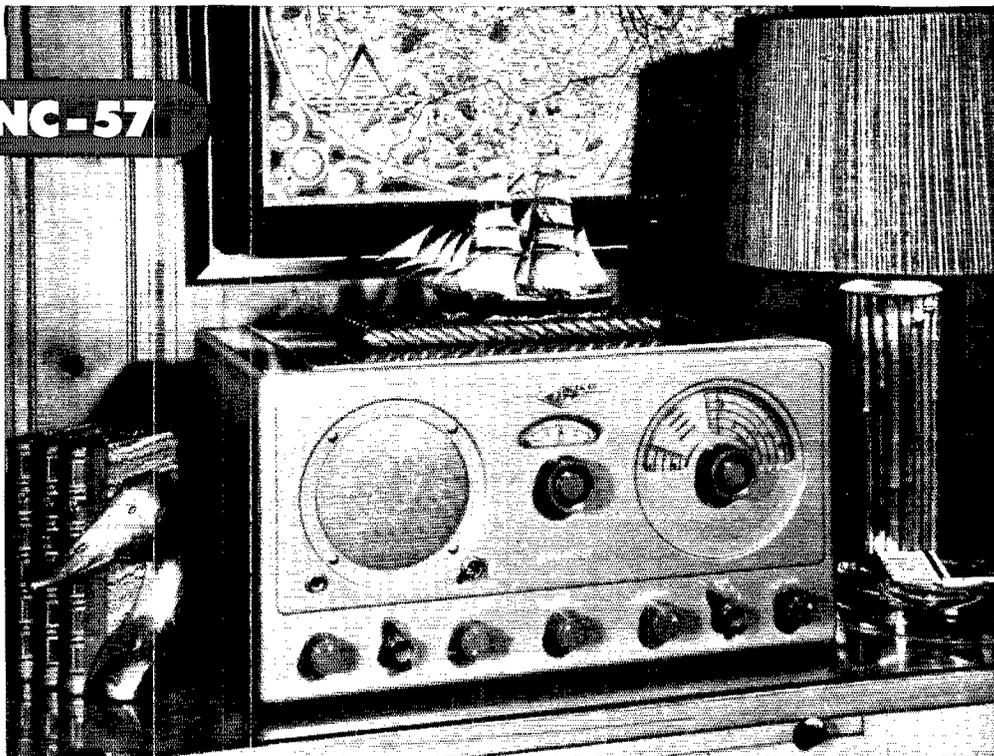
# Jensen Customode

Customode is the answer to the ever expanding requirements of audio and video equipment. Today, you may install a 15" speaker, communication receiver, tuner, and a record changer. Tomorrow, you can add a television set, a pick-up for Micro-groove records, and a record cabinet. The illustrations show only a few of hundreds of cabinet variations for Home Entertainment Centers. Designed by leading furniture stylists and electronics engineers, Customode's "building block" versatility enables you to create your own layouts as you wish, when you wish.

Write today for literature and scale cut-up illustrations. Jensen Manufacturing Company, 6611 S. Laramie Ave., Chicago 38, Illinois



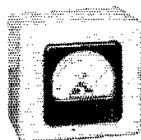
**NC-57**



at this price, only **NATIONAL** offers

## A QUALITY RECEIVER WITH AN RF STAGE!

Here is a complete receiver covering all frequencies from 540 kc to 55 mc — built with world-renowned National engineering skill and craftsmanship, and incorporating features you'd expect to find only in the most expensive receivers — yet priced far below sets of comparable quality! See it at your dealer's and discover why it's one of today's hottest ham buys!



SM-57 Signal Strength Meter  
Plugs into socket on NC-57  
**\$14.95**

### COMPARE THESE FEATURES!

- Separate 6SG7 RF amplifier
- Complete coverage 540 kc to 55 mc
- Bandsread tuning over entire range
- Separate RF gain control for adjusting sensitivity
- Pitch control to adjust beat note on CW
- Voltage regulated oscillator circuit
- Automatic threshold noise limiter to minimize ignition noise, static, etc.
- Simple 5-position switch for band switching
- RF trimmer control to match various types of antenna for maximum efficiency
- Provision for battery operation
- Accessory socket for SM-57 signal strength meter



**\$89.50**  
(slightly higher west of  
the Rockies)



# RCA RECEIVING TUBES

Tube Type	Max. Plate volts	Max. Screen volts	Max. Grid volts	Max. Plate Ma.	Max. Screen Ma.	Max. Grid Ma. (Note 1)	Max. Plate Dissipation (watts)	Max. Screen Dissipation (watts)	Power Output (watts) (Note 2)	Max. Freq. in Mc. (Note 3)	Grid Bias Calculator Factor (approx.) (Note 4)
RCA-6AG7	375	250	-75	30	9	5	9	1.5	7.5	30	22
RCA-6AK6	375	250	-100	15	4	3	3.5	1	4	60	9.5
RCA-6C4	300	—	-100	25	—	8	5	—	5.5	60	18
RCA-6F6	400	275	-100	50	11	5	12.5	3	14	30	7
RCA-6L6	400	300	-125	100	12	5	21	3.5	28	30	8
RCA-6N7	350	—	-100	30 (per plate)	—	5 (per grid)	5.5 (per plate)	—	14.5 (total)	30	35
RCA-6V6GT	350	250	-100	47	7	5	8	2	11	30	9

Note 1: 100,000 ohms maximum grid resistor

Note 2: Based on 70% plate efficiency

Note 3: Maximum frequency for full power output and input

Note 4: For pentodes, this is the grid-screen amplification factor

Plenty of R-F power  
*inexpensively...*

with RCA Receiving Tubes

● Just take advantage of the new increased high-frequency cw ratings for the seven popular RCA receiving types, listed above. These ratings are your guide to even greater receiving-tube performance and maximum life in r-f service, such as crystal oscillators, buffers, doublers . . . and low-power finals!



*These seven RCA receiving tubes are tops for r-f driver applications in amateur transmitters.*

For the full story on how to use the ratings in your particular application, see Ham Tips, Nov.-Dec. 1946. If you do not have a copy, ask your RCA Tube Distributor, or write RCA, Commercial Engineering, Section KM-54, Harrison, N. J.

*\*Absolute maximum ratings for amateur use exclusively.*

THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA

**TUBE DEPARTMENT**

**RADIO CORPORATION of AMERICA**

HARRISON, N. J.

