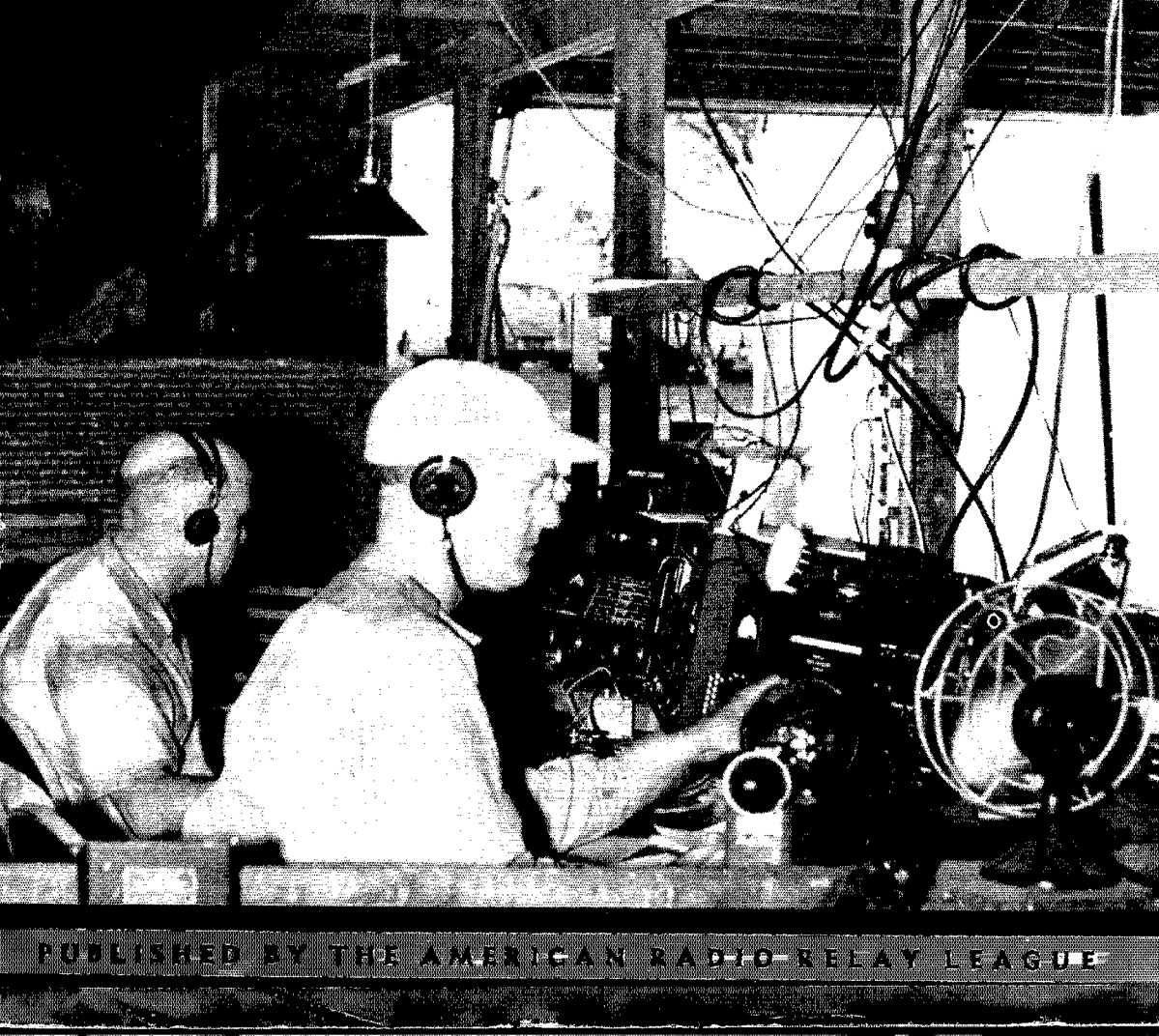
QST

September 1957
50 Cents
55c in Canada

devoted entirely to

amateur radio



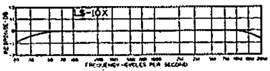
PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

THE STANDARD OF COMPARISON FOR OVER 20 YEARS

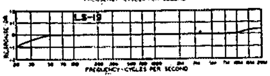
HIGH FIDELITY TRANSFORMERS

FROM STOCK... ITEMS BELOW AND 650 OTHERS IN OUR CATALOGUE B.

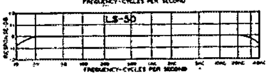
TYPICAL UNITS



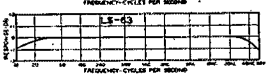
LS-10X Shielded Input
Multiple line (50, 200, 250, 500/600, etc.) to 50,000 ohms . . . multiple shielded.



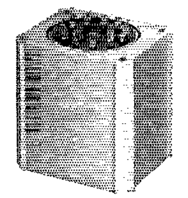
LS-19 Plate to Two Grids
Primary 15,000 ohms.
Secondary 95,000 ohms C.T.



LS-50 Plate to Line
15,000 ohms to multiple line . . . +15 db. level.



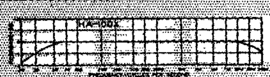
LS-63 P.P. Plates to Voice Coil
Primary 10,000 C.T. and 6,000 C.T. suited to Williamson, MLF, ul.-linear circuits. Secondary 1.2, 2.5, 5, 7.5, 10, 15, 20, 30 ohms. 20 watts.



CASE	LS-1	LS-2	LS-3
Length	3⅛"	4-7/16"	5-13/16"
Width	2⅝"	3½"	5"
Height	3¼"	4-3/16"	4-11/16"
Unit Wt.	3 lbs.	7.5 lbs.	15 lbs.

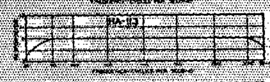
HIPERMALLOY series

This series provides virtually all the characteristics of the Linear Standard group in a more compact and lighter structure. The frequency response is within 1 db. from 30 to 20,000 cycles. Hipermalloy nickel iron cores and hum balanced core structures provide minimum distortion and low hum pickup. Input transformers, maximum level +10db. Circular terminal layout and top and bottom mounting.

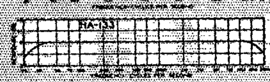


HA-100X Shielded Input
Multiple line to 60,000 ohm grid . . . tri-alloy shielding for low hum pickup.

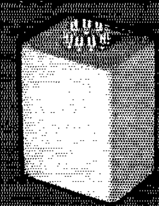
HA-106 Plate to Two Grids
15,000 ohms to 135,000 ohms in two sections . . . +12 db. level.



HA-113 Plate to Line
15,000 ohms to multiple line . . . +12 db. level . . . 0 DC in primary.

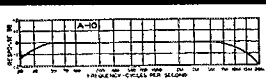


HA-133 Plate (DC) to Line
15,000 ohms to multiple line . . . +15 db. level . . . 8 Ma. DC in primary.

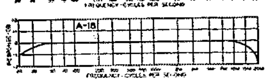


ULTRA COMPACT series

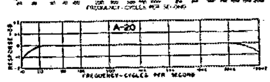
UTC Ultra Compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. The frequency response is within 2 db. from 30 to 20,000 cycles. Hum balanced coil structure plus high conductivity die cast case provides good inductive shielding. Maximum operating level is +7db. Top and bottom mounting as well as circular terminal layout are used in this series as well as the ones described above.



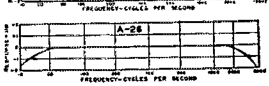
A-10 Line to Grid
Multiple line to 50,000 ohm grid.



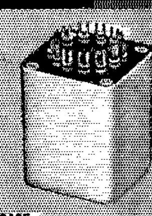
A-18 Plate to Two Grids
15,000 ohms to 80,000 ohms, primary and secondary both split.



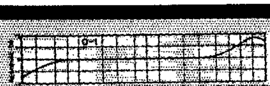
A-20 Mixing Transformer
Multiple line to multiple line for mixing mikes, lines, etc.



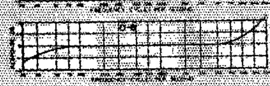
A-26 P.P. Plates to Line
30,000 ohms plate to plate, to multiple line.



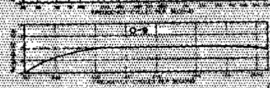
A CASE	
Length	1½"
Width	1½"
Height	2"
Unit Weight	½ lb.



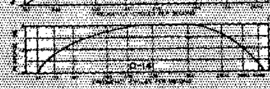
O-1 Line to Grid
Primary 50, 200/250, 500/600 ohms to 50,000 ohm grid.



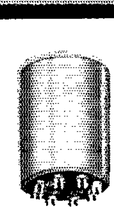
O-6 Plate to Two Grids
15,000 ohms to 95,000 ohms C.T.



O-9 Plate (DC) to Line
Primary 15,000 ohms, Secondary 50, 200/250, 500/600.



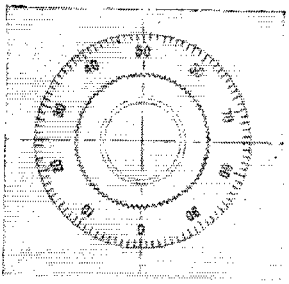
O-14 50: 1 Line to Grid
Primary 200 ohms, Secondary .5 megohm for mike or line to grid.



OUNCER CASE	
Diameter	⅞"
Height	1-3/16"
Unit Weight	1 oz.

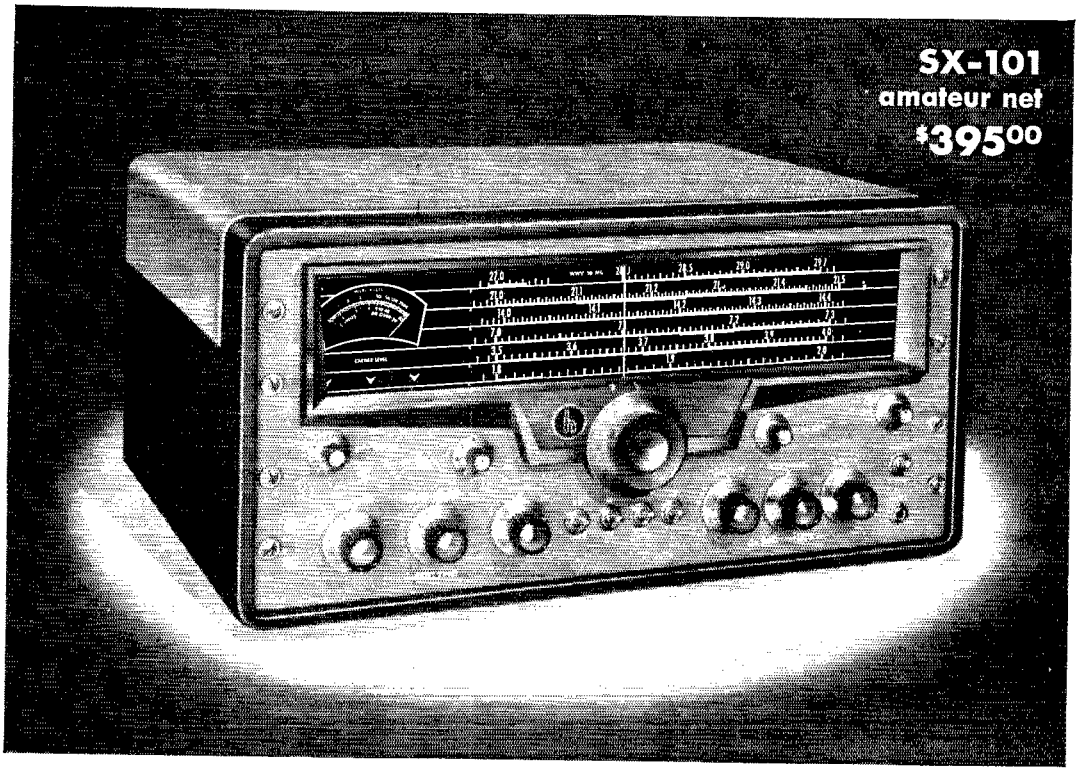
UNITED TRANSFORMER CORP.

150 VARICK STREET, NEW YORK 13, N. Y.
EXPORT DIVISION: 13 EAST 40th STREET, NEW YORK, 16, N. Y. CABLES "ARLAB"
PACIFIC MFG. DIVISION: 4008 W. JEFFERSON BLVD., LOS ANGELES 16, CALIF.



New heavyweight champion!

Hallicrafters new SX-101 receiver employs heaviest chassis in the industry . . . offers selectable sideband . . . has complete coverage of seven bands.



It's all amateur—and as rugged as they come! Hallicrafters presents the complete answer to ham reception, with every essential needed for today and for the future.

First—built like a battleship. Bigger. Heavier. Second—a marvel of stability—the result of 22 years of experience and development. Third—it brings you a long list of new features:

- **Complete coverage of 7 bands—160, 80, 40, 20, 15, 11-10 meters.**
- **Special 10 mc. pos. for WWV.**
- **Exclusive Hallicrafters upper/lower side band selection.**
- **S-meter functions with A.V.C. off.**
- **Tee-notch filter.**

PLUS: Band in use individually illuminated...built-in crystal calibrator...antenna trimmer...dual conversion...full gear drive from tuning knob to gang condensers...five steps of selectivity from 500-5000 cycles...sensitivity—less than 1 microvolt on all bands...direct coupled series noise limiter...50 to 1 tuning knob ratio...and many more.

NEW

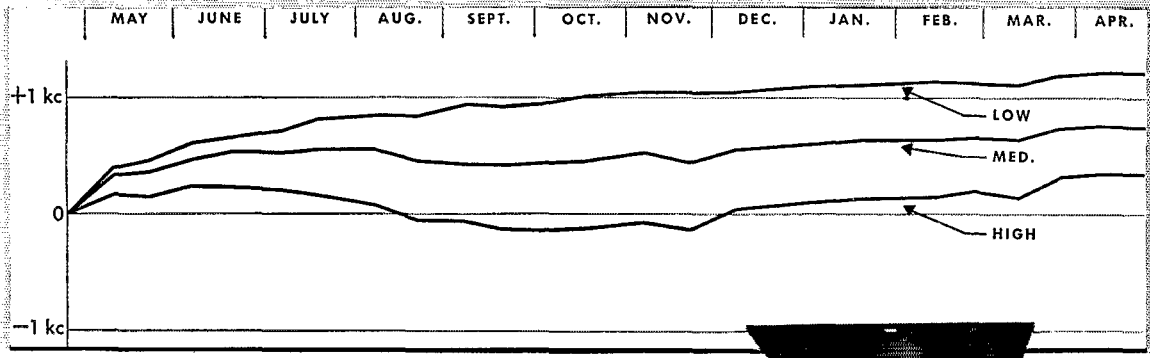
FROM

hallicrafters

CHICAGO 24, ILLINOIS

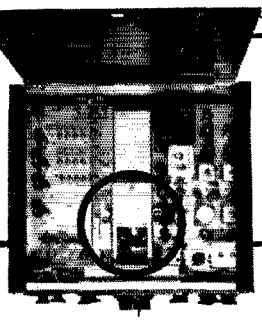
WHERE THE BEST IDEAS IN COMMUNICATIONS ARE BORN

Available with convenient terms from your Radio Parts Distributor.



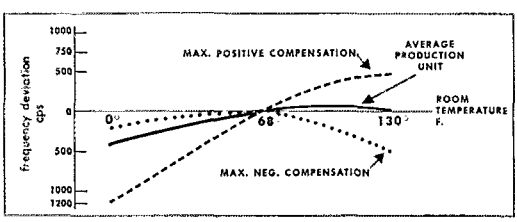
UNSURPASSED STABILITY

75A-4



Exceptional frequency stability is another reason why Collins amateur equipment sets performance standards. To develop oscillators capable of maintaining frequency stability over a long period of time, Collins constantly carries on oscillator aging tests. In these tests, groups of oscillators produced with different materials and techniques are operated over one and two year periods. The frequency drift of the high, middle and low frequencies is charted on an aging curve. The aging curve shown above charts the performance of a particular group of oscillators which showed superior long-range stability. Note the end point spread in the curve (1.955—2.955) is less than 1 kc. In other words, after continuous operation for one year, the frequency difference between the high and low ends was only 900 cycles. Oscillators with the changes indicated necessary by these tests were incorporated and are one reason why you get outstanding year-to-year frequency stability in Collins amateur equipment.

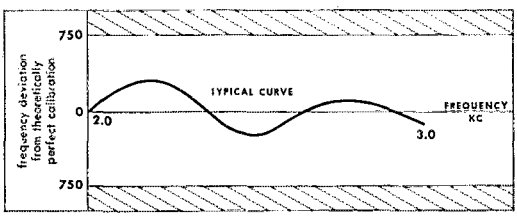
Temperature stability



To produce the minimum effect of temperature variation on frequency stability, each PTO on a Collins equipment is individually temperature compensated. In final testing, the PTO is placed in a temperature controlled chamber. The correct compensation is selected to bring it within the 750 cps (hot) and 1200 cps (cold) limits as shown on the curve.

Calibration accuracy

When the PTO dial in your Collins KWS-1, 75A-4, or KWM-1 indicates a frequency, you are closer than anyone else with a VFO. Production limits of 750 cycles, and actual figures much better (see curve), give you the best frequency calibration available, other than a crystal. Frequency deviation is also limited to 250 cycles per 50 kc of frequency change to eliminate any sudden variation within the band.



Vibration

An outstanding characteristic of Collins KWM-1 mobile transceiver is its amazing frequency stability despite vibration. (The oscillator in the KWM-1, though smaller and of different construction, has the frequency stability of the 75A-4 oscillator.) A vibration table oscillating at 60 cps in 2 g shocks varies the frequency less than 75 cycles. An automobile traveling over washboard roads produces considerably less than this.

The 75A-4 will take a shock of 5 g's — approximately the same as dropping it six inches onto a very solid surface — with less than 50 cycles of frequency shift.

The 75A-4 was not intended to be a frequency standard, but where else can you get the features of 1 uv sensitivity, Mechanical Filter selectivity, precise dial calibration, and rock-like stability?

See your Collins distributor for the finest in amateur equipment — the 75A-4, KWS-1, and KWM-1.

Collins CREATIVE LEADER IN COMMUNICATION COLLINS

QST

SEPTEMBER 1957

VOLUME XLI • NUMBER 9

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

OFFICES

38 La Salle Road
West Hartford 7, Connecticut
TEL.: ADams 6-2535 TWX: HF 88

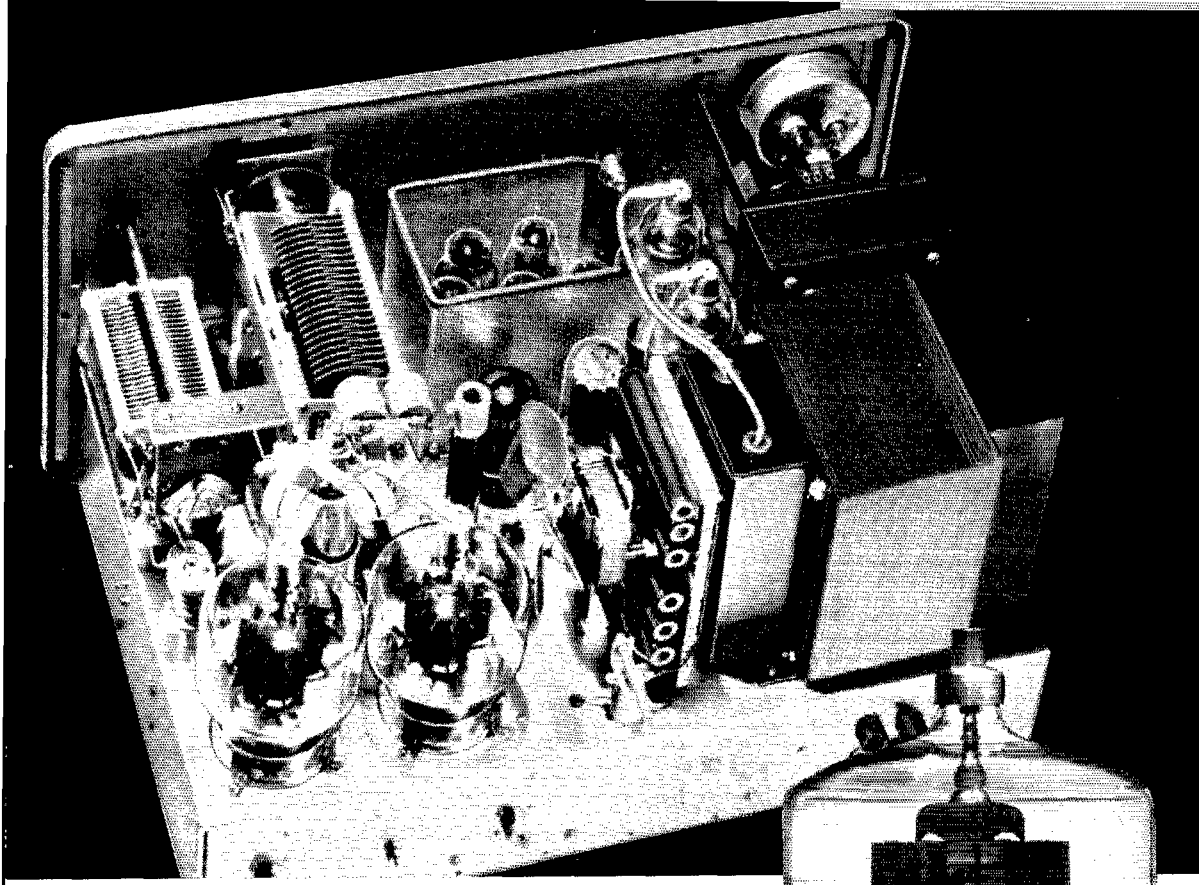
Subscription rate in United States and Possessions, $4.00 per year, postpaid; $4.25 in the Dominion of Canada, $5.00 in all other countries. Single copies, 50 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

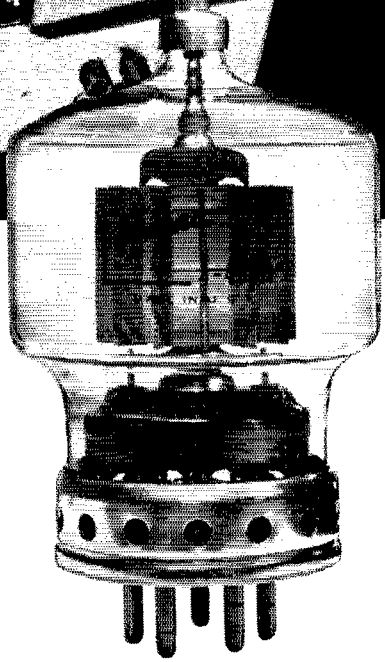
Entered as second-class matter May 29, 1919 at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1102 Act of October 3, 1917, authorized September 9 ,1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

INDEXED BY
INDUSTRIAL ARTS INDEX

Library of Congress Catalog
Card No.: 21-9421

—CONTENTS—





EIMAC 4-400A powers new Viking Thunderbolt

"Full communications power" is the slogan at E. F. Johnson Co., designers and manufacturers of the well-known Viking transmitters. To insure this full communications power in their new Thunderbolt table top linear amplifier, quality minded Johnson engineers specified a pair of Eimac 4-400A's. These tubes loaf along at 1 kw/cw, 750 watts AM linear, and 2 kw P. E. P. linear input.

Eimac offers the amateur a complete line of transmitting tubes — tubes extensively used by equipment manufacturers in amateur, commercial and military transmitters. For complete information on any Eimac tube, contact Eimac's Amateur Service Department or visit your Eimac distributor. Of particular interest is *Application Bulletin #9, a comprehensive* booklet titled "Single Sideband."

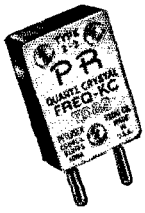
EITEL-McCULLOUGH, INC.
SAN BRUNO · CALIFORNIA
***Eimac First* for quality, dependability and performance**

MAXIMUM RATINGS EIMAC 4-400A CLASS AB, TO 110 MC

DC Plate Voltage	4000 volts	Plate Dissipation	400 watts
DC Screen Voltage	850 volts	Screen Dissipation	35 watts
DC Plate Current	350 ma.	Grid Dissipation	10 watts

There's a PR for every Service!

AMATEUR



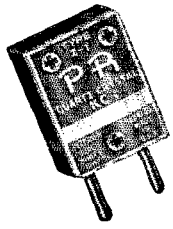
40, 80 and 160 Meters, PR Type Z-2

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed.....**$2.95 Net**

20 Meters, PR Type Z-3

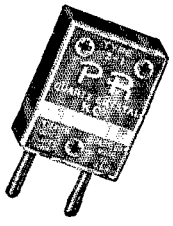
Harmonic oscillator. Low drift. High activity. Can be keyed in most circuits. Stable as fundamental oscillators. Fine for doubling to 10 and 11 meters or "straight through" 20 meter operation.....**$3.95 Net**

COMMERCIAL



COMMERCIAL, PR Type Z-1

Designed for rigors of all types of commercial service. Calibrated .005 per cent of specified frequency. Weight less than ¾ ounce. Sealed against moisture and contamination. Meets FCC requirements for all types of service.



SPECIAL TYPES

Type Z-1, AIRCRAFT

3023.5 Kc., .005%.....**$3.45 Net**

Type Z-1, MARS and CAP

Official assigned transmitter frequencies in the range.
Calibrated to .005%. 1500 to 10000 Kc. **$3.45 Net**

Type Z-6A FREQUENCY STANDARD

To determine band-edge. To keep the VFO and receiver properly calibrated.

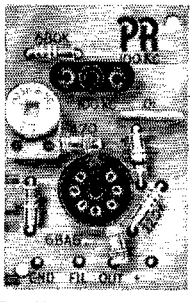
100 Kc. . . . . **$6.95 Net**

PR PRINTED OSCILLATOR KIT

Has many uses—

- As 100 Kc. Marker
- As 1000 Kc. Marker for Check Points up to 54 Mc.
- As Foundation Circuit for Low Frequency SSB Crystals

Assembled in minutes. Kit contains everything but 6BA6 oscillator tube and crystal.



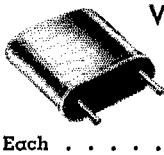
Each . . . . . **$4.50 Net**

Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

1600 to 12000 Kc. (Fund.) ±5 Kc. . . . **$3.45 Net**

12001 to 25000 Kc. (3d Mode) ±10 Kc. . . . **$4.45 Net**



VHF Type Z-9R

For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range.

Each . . . . . **$4.95 Net**

Type Z-9A RADIO CONTROLLED OBJECTS

27.255 Mc., .04% . . . **$3.95 Net**

Type Z-1 TV Marker Crystals

Channels 2 through 13 . . . . . **$6.45 Net**
3100 Kc. . **$2.95 Net**
4100 Kc. . **$2.95 Net**
4.5 Mc. Intercarrier, .01% . . . **2.95 Net**
5.0 Mc. Sig. Generator, .01% **2.95 Net**
10.7 Mc. FM. IF, .01% . . . **2.95 Net**

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

PETERSEN RADIO COMPANY, INC.

2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

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

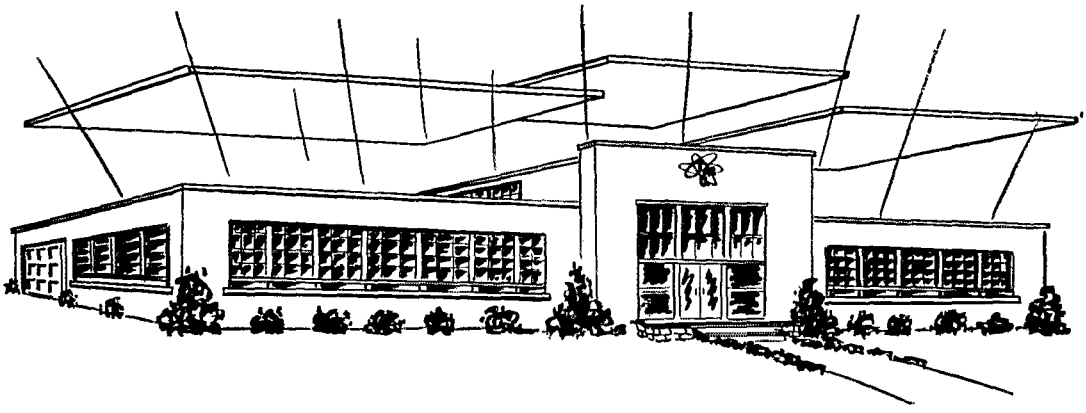
Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, RM and PAM where vacancies exist. *All amateurs* in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

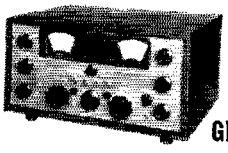
ATLANTIC DIVISION				
Eastern Pennsylvania	W3JNQ	Richard B. Mesirov	1372 W. Indian Creek Dr.,	Philadelphia 31
Maryland-Delaware-D. C.	W3UCR	Louis T. Cronelberger	9904 Gardiner Ave.	Silver Spring, Md.
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.	Palmyra
Western New York	K2HUK	Charles T. Hansen	211 Rosemont Drive	Buffalo 26
Western Pennsylvania	W3GJY	*John F. Wojtkiewicz*	*1017 Girard Road*	*Pittsburgh 27*
CENTRAL DIVISION				
Illinois	W9VIX	George Schreiber	239 S. Scoville Ave.	Oak Park
Indiana	W9NTA	Seth L. Baker	276 West Sumner Ave.	Martinsville
Wisconsin	W9KQB	George Woida	2103 South 9 St.	Manitowoc
DAKOTA DIVISION				
North Dakota	WØKTZ	Elmer J. Gabel		Hankinson
South Dakota	WØFLP	Les Price	Custer State Park	Hermosa
Minnesota	WØKLG	Robert Nelson	P. O. Box 425	Dassel
DELTA DIVISION				
Arkansas	W5ZZY	Ulmon M. Goings	P.O. Box 207	Osceola
Louisiana	W5FMO	Thomas J. Morgavi	3409 Beaulieu St.	Metairie
Mississippi	W5EHH	John Adrian Houston, sr.	114 North First Ave.	Cleveland
Tennessee	W4SCF	Harry C. Simpson	P.O. Box 10104	Memphis
GREAT LAKES DIVISION				
Kentucky	W4KKW	Albert M. Barnes	830 Third Ave.	Dayton
Michigan	W8RAE	Thomas G. Mitchell	409 Liberty	Buchanan
Ohio	W8AL	Wilson E. Weckel	2118 Tuscarawas St., W.	Canton 8
HUDSON DIVISION				
Eastern New York	W2EFU	George W. Tracy	1138 North Country Club Drive	Schenectady
N. Y. C. & Long Island	W2TUK	Harry J. Dannals	139 East Zoranne Drive	Farmingdale, L. I.
Northern New Jersey	W2VQR	Lloyd H. Manamon	709 Seventh Ave.	Asbury Park
MIDWEST DIVISION				
Iowa	WØBDR	Russell B. Marquis	807 North Fifth Ave.	Marshalltown
Kansas	WØIGV	Earl N. Johnston	1100 Crest Drive	Topeka
Missouri	WØGEP	James W. Hoover	15 Sandringham Lane	Ferguson 21
Nebraska	WØEXP	Charles E. McNeel	Route 3, RFD	North Platte
NEW ENGLAND DIVISION				
Connecticut	W1TYQ	Victor L. Crawford	RFD 5, Stadley Rough Rd.	Danbury
Maine	W1BPI/VYA	Allan D. Duntley		Casco
Eastern Massachusetts	W1ALP	Frank L. Baker, jr.	91 Atlantic St.	North Quincy 71
Western Massachusetts	W1HRV	Osborne R. McKeraghan	22 Mutter St.	Easthampton
New Hampshire	W1AIJ	John Arthur Knapp	15 North State St.	Concord
Rhode Island	W1VXC	Mrs. June R. Burkett	24 Roger Williams Ave.	Rumford 16
Vermont	W1OAK	Mrs. Ann L. Chandler	RFD 2	Barre
NORTHWESTERN DIVISION				
Alaska	KL7AGU	Dave A. Fulton	Box 103	Anchorage
Idaho	W7RKI	Rev. Francis A. Peterson	Box 66	Preston
Montana	W7NPV/WXI	Vernon L. Phillips	Box 971	Harlowton
Oregon	W7IDX	Hubert R. McNally	11908 S.E. Madison St.	Portland 16
Washington	W7FIX	Victor S. Gish	511 East 71st St.	Seattle 5
PACIFIC DIVISION				
Hawaii	KH6AED	Samuel H. Lewbel	P.O. Box 3564	Honolulu
Nevada	W7JLV	Albert R. Chin	P.O. Box 14	Reno
Santa Clara Valley	W6YHM	G. Donald Eberlein	P.O. Box 372	Los Gatos
East Bay	W6FDJ	Roger L. Wixson	3018 Berlin Way	Oakland 2
San Francisco	W6GGC	Walter A. Buckley	901 Grafton Ave.	San Francisco 12
Sacramento Valley	K6CFF	LeVaughn Shipley	3005 Maison Way	Sacramento 25
San Joaquin Valley	W6JPU	Ralph Sarovan	3639 Mono St.	Fresno
ROANOKE DIVISION				
North Carolina	W4RRH	B. Riley Fowler	Box 143	Morgantown
South Carolina	W4HMG	Bryson L. McGraw	*227 Kalmia Road*	Columbia
Virginia	W4KX	John Carl Morgan	c/o Radio Station WFVA, Box 269	Fredericksburg
West Virginia	W8PQQ	Albert H. Hix	1013 Belmont St.	Forest Hills, Charleston 4
ROCKY MOUNTAIN DIVISION				
Colorado	WØDML	B. Eugene Spoonemore	224 Carlile Ave.	Pueblo
Utah*	W7OCX	Col. John H. Sampson, jr.	3618 Mt. Ogden Drive	Ogden
New Mexico	W5OZ	Ray Birch	Route 1, Box 700	Albuquerque
Wyoming	W7PSO	James A. Masterson	851 Bon Ave.	Casper
SOUTHEASTERN DIVISION				
Alabama	W4MI	Joe A. Shannon		Cottondale
Eastern Florida	W4KGJ	John F. Porter	6890 S.W. 51st St.	Miami 55
Western Florida	W4MS	Edward J. Collins	1003 E. Blount St.	Pensacola
Georgia	W4CFJ	William F. Kennedy	459 Fairway Hill Drive, S.E.	Atlanta
West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman Rio Piedras, P. R.
Canal Zone	KZ5WA	P. A White	Box 82	Gamboa
SOUTHWESTERN DIVISION				
Los Angeles	W6JQB	Albert F. Hill Jr.	801 No. Millard Ave.	Rialto
Arizona	W7OIF	Cameron A. Allen	1020 East Maryland Ave.	Phoenix
San Diego	W6LRU	Don Stansifer	4427 Pescadero	San Diego 7
Santa Barbara	W6REF	Mrs. Dorothy E. Wilson	Route 1, Box 415	Oxnard
WEST GULF DIVISION				
Northern Texas	W5TFP	Ray A. Thacker	4700 West Hanover	Dallas
Oklahoma*	W5FEC	Richard L. Hawkins	1408 Bell Ave.	Lawton
Southern Texas	W5QEM	Roy K. Eggleston	1109 Vernon Drive	Corpus Christi
CANADIAN DIVISION				
Maritime	VE1WB	D. E. Weeks	R.R. 3	St. Stephen, N. B.
Ontario	VE3NG	Richard W. Roberts	170 Norton Ave.	Willowdale, Toronto, Ont.
Quebec	VE2GL	Gordon A. Lynn	R.R. No. 1	Ste. Genevieve de Pierrefonds, P. Q.
Alberta	VE6MJ	Sydney F. Jones	10707-57th Ave.	Edmonton, Alta.
British Columbia	VE7JT	Peter M. McIntyre	981 West 26th Ave.	Vancouver, B. C.
Yukon				
Manitoba	VE4HL	John Polmark	109-13th, N.W.	Portage la Prairie, Man.
Saskatchewan	VE5HR	Harold R. Horn	1044 King St	Saskatoon

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

WE'RE RAISING THE ROOF!

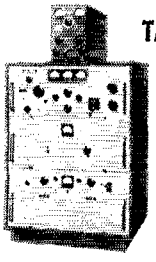


We've been pretty lucky and the demand for TMC Products has been better than we hoped for— so to give us more room we're RAISING THE ROOF and putting another floor on our main building.



GPR-90

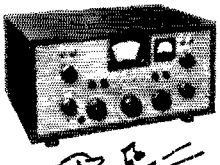
TAC



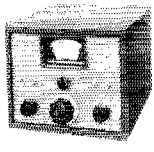
GPT-750

We think the increased demand is due to our policy of telling the customers exactly what our equipment will and will not do.

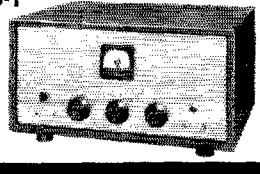
YOU CAN DEPEND ON IT — — — TMC MEETS IT'S PUBLISHED SPECIFICATIONS!!



SBE



GSB-1



RTC

The TECHNICAL MATERIEL CORPORATION

IN CANADA
TMC Canada Ltd., Ottawa, Ontario

Main Office:
MAMARONECK, NEW YORK.

THE AMERICAN RADIO RELAY LEAGUE, *INC.*,

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

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

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

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

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

Past Presidents

HIRAM PERCY MAXIM, W1AW, 1914–1936
EUGENE C. WOODRUFF, W8CMP, 1936–1940
GEORGE W. BAILEY, W2KH, 1940–1952

Officers

President . . . . . GOODWIN L. DOSLAND, WØTSN
Moorhead, Minnesota

First Vice-President . . . . . WAYLAND M. GROVES, W5NW
P.O. Box 586, Odessa, Texas

Vice-President . . . . . FRANCIS E. HANDY, W1BDI
38 La Salle Road, West Hartford, Connecticut

Vice-President . . . . . PERCY C. NOBLE, W1BVR
37 Broad St., Westfield, Massachusetts

Secretary . . . . . A. L. BUDLONG, W1BUD
38 La Salle Road, West Hartford, Connecticut

Treasurer . . . . . DAVID H. HOUGHTON
38 La Salle Road, West Hartford, Connecticut

• • • • •

General Manager . . . . . A. L. BUDLONG, W1BUD

Communications Manager . . . . FRANCIS E. HANDY, W1BDI

Technical Director . . . . . GEORGE GRAMMER, W1DF

Assistant General Manager . . . . JOHN HUNTOON, W1LVQ

Assistant Secretary . . . . . PERRY F. WILLIAMS, W1UED
38 La Salle Road, West Hartford, Connecticut

• • • • •

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

DIRECTORS

Canada

ALEX REID VE2BE
240 Logan Ave., St. Lambert, P. Q.
Vice-Director: William R. Savage VE6EO
833 10th St. N., Lethbridge, Alta.

Atlantic Division

GILBERT L. CROSSLEY W3YA
Dept. of E.E., Penna. State University
State College, Pa.
Vice-Director: Charles O. Badgett W3LVF
725 Garden Road, Glenside, Pa.

Central Division

JOHN G. DOYLE W9GPI
4331 N. Wildwood Ave., Milwaukee 11, Wis.
Vice-Director: George E. Keith W9QLZ
RFD 2, Box 22-A, Utica, Ill.

Dakota Division

ALFRED M. GOWAN . . . . . WØPHR
1012 South Willow Ave., Sioux Falls, S. D.
Vice-Director: Forrest Bryant . . . . . WØFDS
6840 Harriet Ave., Minneapolis, Minn.

Delta Division

VICTOR CANFIELD W5BSR
Box 965, Lake Charles, La.
Vice-Director: Milton W. Kirkpatrick W5KYC
4914 Floynell Dr., Baton Rouge, La.

Great Lakes Division

JOHN H. BRABB W8SPF
708 Ford Bldg., Detroit 26, Mich.
Vice-Director: Robert L. Davis W8EYE
247 Highland Ave., Salem, Ohio

Hudson Division

GEORGE V. COOKE, JR. W2OBU
3 Daisy Lane
Commack, L. I., N. Y.
Vice-Director: Lloyd H. Manamon W2VQR
709 Seventh Ave., Asbury Park, N. J.

Midwest Division

ROBERT W. DENNISTON . . . . . WØNWX
Box 631, Newton, Iowa
Vice-Director: Sumner H. Foster . . . . . WØGQ
2315 Linden Dr., S.E., Cedar Rapids, Iowa

New England Division

MILTON E. CHAFFEE W1EFW
53 Homesdale Ave., Southington, Conn.
Vice-Director: Frank L. Baker, jr. W1ALP
91 Atlantic St., N. Quincy 71, Mass.

Northwestern Division

R. REX ROBERTS W7CPY
837 Park Hill Drive, Billings, Mont.
Vice-Director: Howard S. Pyle W7OE
3434 74th Ave., S.E., Mercer Island, Wash.

Pacific Division

HARRY M. ENGWICHT W6HC
770 Chapman, San Jose 26, Calif.
Vice-Director: Harold L. Lucero W6JDN
1113 Elinore Ave., Dunsmuir, Calif.

Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.
Vice-Director: Thomas H. Wood W4ANK
1702 N. Rhett Ave., North Charleston, S. C.

Rocky Mountain Division

CLAUDE M. MAER, JR. . . . . WØIC
740 Lafayette St., Denver, Colo.
Vice-Director: Carl L. Smith . . . . . WØBWJ
1070 Locust St., Denver 20, Colo.

Southeastern Division

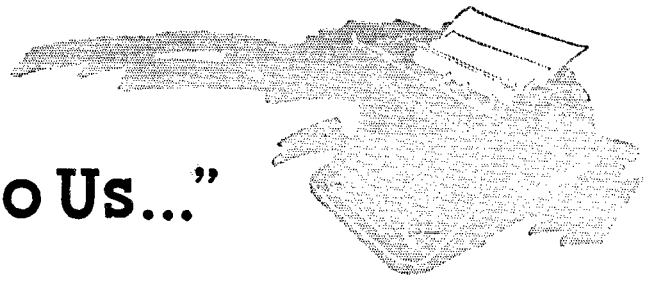
JAMES P. BORN, JR. W4ZD
25 First Ave., N.E., Atlanta, Ga.
Vice-Director: Thomas M. Moss W4HYW
P.O. Box 644, Municipal Airport Branch,
Atlanta, Ga.

Southwestern Division

WALTER R. JOOS W6EKM
1315 N. Overhill Drive, Inglewood 3, Calif.
Vice-Director: Virgil Talbott W6GTE
9226 Alexander Ave., South Gate, Calif.

West Gulf Division

GRADY A. PAYNE W5ETA
5103 Linden St., Bellaire, Texas
Vice-Director: Carl C. Drumeller W5EHC
5824 N.W. 58th St., Oklahoma City 12, Okla.



"It Seems to Us..."

SWITCH TO SAFETY

Two recent reports of death by electrocution have forcibly reminded us that amateur radio equipment must be treated with respect and caution. This is not to say that you must be afraid of your gear, nor should your family have to worry because of the nature of your hobby, but there should be an awareness of what is involved. Unfortunately, however, the old saw "familiarity breeds contempt" is all too true. Probably all of us at one time or another have been guilty of making a "temporary" hookup, in which there were a few exposed connections or terminals which carried more than a hundred volts or so. Likewise, the prevalence of 110-volt juice in every household has caused even that low voltage to be treated with far less caution than is wise.

So you think that low voltage is harmless? Well, bear in mind that it isn't the voltage that kills you, but the current. And Ohm's law applies to you just as much as it does to your radio equipment.

Some figures supplied through the courtesy of the National Safety Council and the Pacific Telephone and Telegraph Company tell the story very clearly. Dry skin has an average resistance of 100,000 to 600,000 ohms, while wet skin as a resistance of only 1000 ohms. Internal body resistance from hand to foot is roughly 400 to 600 ohms, while the ear-to-ear resistance is approximately 100 ohms. So, with 120 volts and a skin resistance plus internal resistance of some 1200 ohms, the result would be a current of 100 ma. That isn't much? Look at the table below for the effects of various currents passing through the human body.

Safe Current Values

1 ma.: causes no sensation — not felt.
1 to 8 ma.: Sensation of shock, but not painful. The individual can release his contact at will, as muscular control is not lost.

Unsafe Current Values

8 to 15 ma.: Painful shock; individual can let go at will. Control is not lost.
15 to 20 ma.: Painful shock. Muscular control of adjacent muscles is lost. The individual cannot let go.
20 to 75 ma.: Painful shock. Severe muscular contractions with breathing extremely difficult.
100 to 200 ma.: Painful shock, causing ventricular fibrillation of the heart. This is "irregular twitching of the wall of the ventrical of the heart." *It is a fatal heart condition, for which there is no known remedy or resuscitation. It means DEATH!*
200 ma. or over: Severe burns, severe muscular contractions, so severe that chest muscular reaction clamps the heart and stops it for the duration of shock. This reaction prevents ventricular fibrillation. Artificial respiration should be administered immediately and in most cases the victim can ve revived.

Thus, current is the killing factor in electrical shock, and the voltage is important only in that it determines how much current will flow through a given body resistance. What to do? Be careful, and "Switch to Safety."

Do you work on the rig only when all voltages are turned off? (even the 110 can kill) Does your family know where the main switch is, so that all power to the transmitter and receiver can be killed if you get into trouble? Does someone in the family know how to administer artificial respiration? (See *QST* for July, 1956, p. 65.) Are all racks and chassis grounded for protection against accidental shorts?

Ham radio is fun, but don't make fun of its dangers.

ALWAYS
BE
CAREFUL

★ ★ ★

(A) Kill all transmitter circuits completely before touching anything behind the panel.

(B) Never wear 'phones while working on the transmitter.

(C) Never pull test arcs from transmitter tank circuits.

(D) Don't shoot trouble in a transmitter when tired or sleepy.

(E) When working on the transmitter, avoid bodily contact with metal racks or frames, radiators, damp floors or other grounded objects.

(F) Keep one hand in your pocket.

(G) Develop your own safety technique. Take time to be careful.

★ ★ ★

Death Is Permanent!

Hamfest Calendar

Kentucky — The Blue Grass Amateur Radio Club will have its annual hamfest on Sunday, Sept. 29, at the Keeneland Racing Park in Lexington. Further details are available from W4PRT.

Manitoba — The Amateur Radio League of Manitoba, in cooperation with the Winnipeg Sports Car Club and the Model Aircraft League of Manitoba, will hold a hamfest over the Labor Day week end. Besides the usual hamfest activities, there will be demonstrations of sports cars and model aircraft. For further details, contact Al Jebb, VE4TJ, 1115 Sherburn St., Winnipeg.

Missouri — The Southwest Missouri Amateur Radio Club will sponsor a hamfest in Springfield beginning at 0900 on Sept. 8, at Fassnight Park. Registration fee will be 50¢, with free buffet. There will be a transmitter hunt, an s.s.b. demonstration, and a talk by the SCM.

New Jersey — The South Jersey Radio Association will hold its annual picnic on Sunday, Sept. 8, at Grenloch Park on Route 42 near Blackwood. Registration starts at 1100, with v.h.f. transmitter hunts starting at noon. Activities for the whole family, including swimming. Pre-registration $1.00, at the gate $1.50, for single ham or family. Contact Win Davis, W2LBX, Martin Ave., Merchantville, N. J. Talk-in transmitters will be on 75, 10, 6 and 2.

New York — The 13th annual Hamfest and Ladies Night of the Oneida area hams will be held on Saturday, Sept. 28, at the Masonic Temple Dining Room, 230 Main St., Oneida. Admission is $3.00 per person, by advance registration only, and is limited to the dining hall capacity of 150 persons. Registration begins at 5 P.M., with the banquet at 7 P.M. Make all reservations prior to Sept. 26 by contacting Walter L. Babcock, W2RXW, 405 Sayles St., Oneida.

North Carolina — The annual hamfest of the Shelby Radio Club will be held on Sunday, Sept. 1, at Brackett's Cedar Park, 14 miles north of Shelby on State Highway 10. Southern fried chicken, "hush puppies" with all the trimmings, all you can eat. Swap table and auction. Entertainment and contests. Talk-in on 3865 and 29,000. For map, further info, and dope on hotel/motel reservations, contact Malcolm E. Spangler, Box 481, 509 Suttle St., Shelby.

Ohio — 20th Annual Stag Hamfest on Sunday, Sept. 8, sponsored by the Greater Cincinnati Amateur Radio Assn. The location is two miles south of Greenhills, on Winton, Road, at Kolping Grove. Registration $2.50 at the gate, which provides you with hot dogs all day long, donuts and coffee until noon, beer and pop served all day, and full picnic dinner and supper (all you can eat). Rain or shine. Games, contests, radio-controlled model plane demonstration. For further information, contact Paul R. Wolf, W8IVE, 741 Delta Ave., Cincinnati 26.

Ohio — The Findlay Radio Club will hold its annual old-fashioned hamfest on Sunday, Sept. 8, at Riverside Park. Advance registration is $1.00; $1.50 at the gate. W8FT talk-in on 3812 kc. Swap shop, contests. Concessions will be operating. Bring your family and your picnic basket. For advance registration and further information, contact Dick Corbin, 855 Summit St., Findlay.

Quebec — On Sept. 21 the Montreal Amateur Radio Club will hold its annual hamfest in Victoria Hall, Westmount. There will be a Friday night tour of the Molson Brewery, for those who arrive early, and a banquet on Saturday night. Registration $5.00 each. For further information contact Mr. J. L. Miller, VE2TA, 535 Lansdowne Ave., Westmount 6.

Re the National Convention

Say, those of you attending the National Convention will be glad to hear that there is a city-owned parking lot near the Palmer House which will help keep your expenses down. If you drive, try the Monroe Street Municipal parking lot, east of Michigan Avenue, on Monroe St. It is only three blocks east of the Palmer House, and will also be the site of the Mobile judging contest.

A.R.R.L. SOUTH DAKOTA STATE CONVENTION

Huron, South Dakota — September 21–22

The Huron Amateur Radio Club is sponsoring the South Dakota State Amateur Radio Convention to be held September 21 and 22 in Huron. The two-day affair will be highlighted by talks and demonstrations in the fields of transistors, single side band and v.h.f. communications. Other strictly-ham activities will include a hidden transmitter hunt, mobile-judging and talks by League officials. For the XYL and YL not interested in amateur radio, special ladies' activities will be featured.

No matter what your interest, you'll find the program entertaining and instructive. The pre-registration fee of $6.00 and the at-the-door registration fee of $6.50 includes tickets for a "Chuck Wagon" feed on Saturday evening and the Sunday afternoon banquet. The club will be glad to handle hotel and motel reservations. For details, write Huron Amateur Radio Club, Box 1234, Huron, South Dakota.

ARRL MIDWEST DIVISION

Kansas City, Kansas — September 21–22

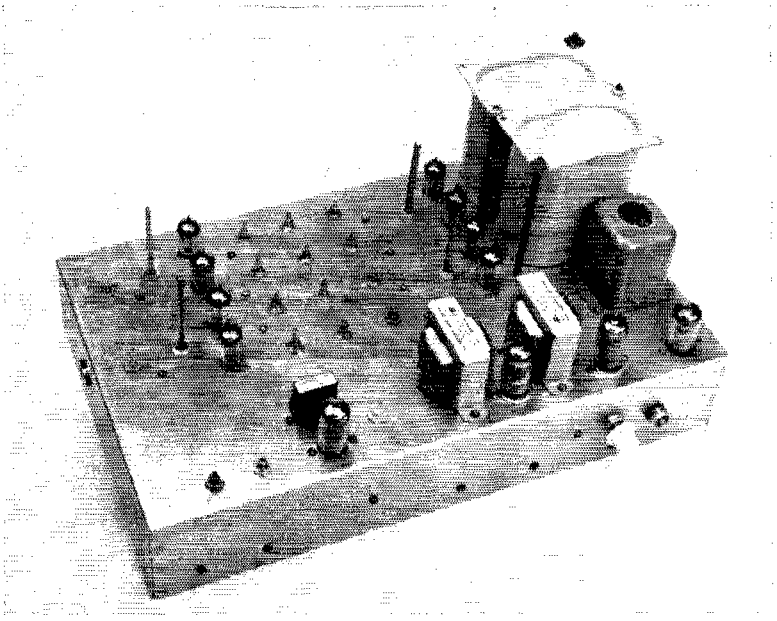
The 1957 ARRL Midwest Division Convention will be held under the sponsorship of the Johnson County Amateur Radio Club at the Town House Hotel, Kansas City, September 21 and 22. Headquarters Representatives will discuss current problems. Special sessions will be held for Novices and Technicians and for those interested in DX, traffic handling, ultra-high frequencies, the earth satellite, Operation Smoke-puff, and IGY. A special display of radioteletype in action will be presented by the Midwest Amateur Radio Teletype Society, featuring many different models. The drill team from Salina, Kansas, will conduct an initiation ceremony for the Royal Order of the Wouff Hong at Midnight Saturday, under the direction of WØMVG.

Advance registrations are $10.00 per person. Contact Jim McCoy, WØLQV, 4844 Booth St., Kansas City 3, Kansas. After September 7, registration will be $12.50. Make reservations for accommodations directly with the hotel.

COMING A.R.R.L. CONVENTIONS

August 30–31–Sept. 1 — ARRL National Convention, Chicago, Illinois
August 31–Sept. 1–2 — Maritime Provinces, Charlottetown, Prince Edward Island
September 21–22 — Midwest Division, Kansas City, Kansas
September 21–22 — South Dakota State, Huron, South Dakota
October 18–19 — Ontario Province, Toronto, Ontario
November 8–11 — Far East Pacific Division, Guam

SEE YOU AT THE A.R.R.L. NATIONAL CONVENTION IN CHICAGO, LABOR DAY WEEK END



The "third method" exciter built by W1PNB was laid out for easy circuit modification during experimental work, and is therefore considerably larger than would be necessary in a "final" design. The audio circuits are along the front and the balanced modulators occupy the rear section of the chassis.

The Third Method of S.S.B.

How It Works in Theory and Practice

BY HOWARD F. WRIGHT,* W1PNB

THE SINGLE side-band issue of the *Proceedings of the IRE* contains a thought-provoking article entitled, "A Third Method of Generating and Detecting Single Sideband Signals."[1] The circuit is interesting in that, although the balanced modulators, filtering, and phasing are individually commonplace in s.s.b. techniques, the way they are used here is unique. It is quite unlike present practice.

Fig. 1 is the diagram of the basic "third method" generator. A common source of audio is parallel fed to two ordinary balanced modulators. The carrier signal for these first modulators — and this is novel — is centered in the speech range at 1800 cycles. The carrier voltages are in quadrature.

Each modulator is followed by an identical low-pass filter designed to pass frequencies below the first carrier at 1800 cycles and reject those above that frequency.

The output of each filter feeds another balanced modulator. The quadrature carrier voltage for these second modulators is at the desired r.f. output frequency. The r.f. outputs of these modulators are combined by series connection of the links.

The circuit will be discussed further, but first let's take a look at the claims for this method:

1) It does not require sharp-cutoff filters.

2) No wide-band phase-shift networks are needed.

3) Faulty phasing and balancing doesn't cause unwanted energy to fall outside the channel; instead, inverted in-channel energy appears.

Through a method of side-band folding and a.f. filtering, the system discussed here generates a single-side-band signal having the unique feature that the suppressed side band is in the same channel as the transmitted side band. This "third method," devised by D. K. Weaver, produces the s.s.b. signal directly on the desired output frequency, but does not require wide-band audio phase-shift networks.

* 55 Sigourney St., Bristol, Conn.

[1] Weaver, "A Third Method of Generation and Detection of Single-Sideband Signals," *Proceedings of the IRE*, Dec., 1956.

4) Undesired signal components are at least 30 db. down.

5) The s.s.b. signal can be generated at any desired radio frequency.

6) Operation can be bilateral; that is, the method also can be used for s.s.b. reception.

7) Quality is good.

8) The unit can be small and rugged.

Fig. 2 shows the speech spectrum to be applied to the system. These frequencies heterodyne

Fig. 2 — Speech spectrum considered in the system described.

(modulate) with the 1800-cycle first carrier in each initial modulator. Except for the quadrature phase shift, the outputs of both modulators are identical. For the present we need consider only one.

First Modulator and Low-Pass Filter

Fig. 3 shows the output spectrum of either initial modulator. Notice that the upper side band of this modulation process (sum frequency)

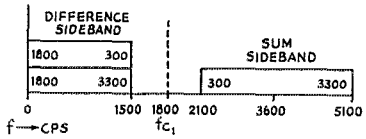


Fig. 3 — Output spectrum of first balanced modulator.

occupies a conventional relation to the 1800-cycle carrier, f_{c1}. The lower side band (difference frequency) is folded upon itself. This occurs because there can be no "minus frequencies" and because the carrier is within the speech range. For the latter reason there are two speech frequencies — one above, and one below 1800 cycles — which mix to produce identical frequencies in the modulator output range of 0 to 1500 cycles. This is shown graphically in Fig. 4. Here, each frequency in the difference side band may represent either of two original audio frequencies. The exception is 0 cycles (d.c.), which now represents

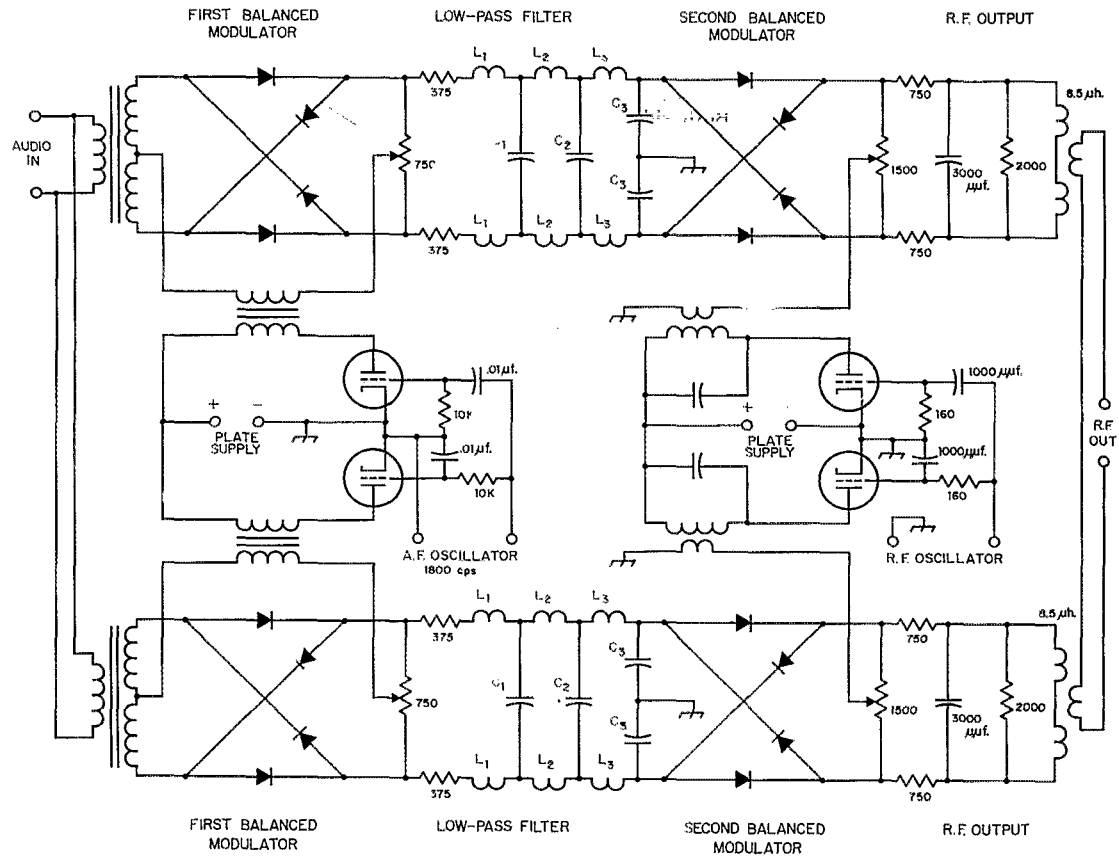


Fig. 1—Circuit of the "third method" single-side-band generator (Weaver, *Proc. IRE*, December, 1956). Constants of output circuits of second balanced modulators (3000 $\mu\mu$f. and 8.5 μh.) and the *RC* values in the r. f. oscillator phase-shift network (160 ohms and 1000 $\mu\mu$f.) are for an output frequency of 1 Mc. and should be modified appropriately for other output frequencies. Low-pass filter constants are as follows:

C_1 — 0.15 μf. C_2 — 0.20 μf. C_3 — 0.11 μf. L_1 — 27.5 mh. L_2 — 100 mh. L_3 — 75 mh.

original audio of 1800 cycles. Referring to Fig. 1, notice that d.c. coupling is used between first and second modulators so that audio information at and around 1800 cycles will not be destroyed.

Referring again to Fig. 3, we are interested only in the difference side band — below 1500 cycles. The sum side band — above 2100 cycles — must be effectively removed. If it is not removed this band of frequencies will appear in the final signal as a normal, readable, unfolded, "unwanted side band."

The dashed line in Fig. 5 represents the low-pass filter requirements necessary for an arbitrary 40-db. suppression of out-of-channel unwanted side band if the speech range starts at 300 cycles.

Second-Modulator Operation

The output spectrum passed by the filter is applied to the second modulator. In this case (the second modulator) the carrier is at approximately the desired output frequency. Quadrature phase is also maintained between the carrier voltages applied to both second modulators.

Fig. 6 is the individual output of either second modulator. The signal at this point is a double-side-band suppressed-carrier signal. Both side bands are 1500 cycles wide. However, all 3000 cycles of original audio information is contained in each of these side bands because of the folding effect of the first modulator. Both side bands contain two components. One represents the low half of the original speech and the other, the high.

Both modulators have this same output spectrum. The phase relationship of the individual outputs, due to the quadrature carrier supply to both modulators, is such that combining the outputs of the second modulators results in one component being phased out of each side band. Thus, in Fig. 6, the signal components contained in the shaded areas will be suppressed and those in the clear areas transmitted; or, if either the audio or r.f. phase is reversed, the opposite will be true. If the components in the unshaded areas are transmitted, an s.s.b. receiver tuned to a synthetic carrier frequency of $f_{c2} + 1800$ will reproduce a normal audio spectrum. If the components in the shaded areas are used, the receiver would switch side bands and tune to $f_{c2} - 1800$ for proper demodulation.

Fig. 7 demonstrates the first case and shows the presence and location of the folded-back, unwanted side band. This "unwanted" is due to imperfect phasing. It occupies the same channel as the "wanted."

Operating Characteristics

Fig. 8 is the complete output spectrum of the final signal. If the receiver is set at $f_{c2} - 1800$ or $f_{c2} + 1800$ (depending on the side band transmitted), proper reception of the original audio will result. Any unbalance in the second modulators resulting in leakage of the true suppressed carrier at f_{c2} will result in an audible 1800-cycle

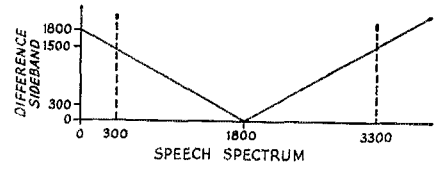


Fig. 4

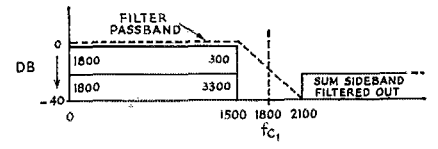


Fig. 5

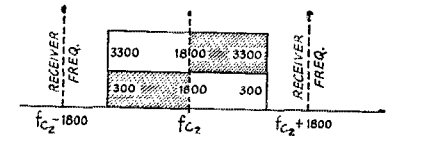


Fig. 6

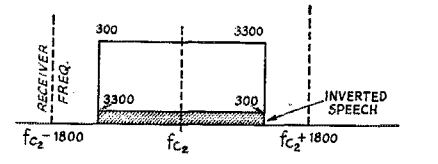


Fig. 7

Fig. 4 — Frequency components in the speech band that are spaced equally either side of 1800 cycles are converted to the same frequency in the difference side band. This occurs in the first balanced modulator.

Fig. 5 — Audio-frequency filter characteristic for 40-db. suppression of out-of-band components.

Fig. 6 — The signal channel contains two sets of components, corresponding to an upper side band (shaded) or lower side band (clear). One set can be eliminated by the r.f. and audio phasing. The receiver local oscillator frequency is set 1800 cycles to one side of the suppressed transmitter carrier frequency. The side to be used depends on the side band transmitted.

Fig. 7 — An error in phasing results in an inverted side band superimposed on the desired side-band signal.

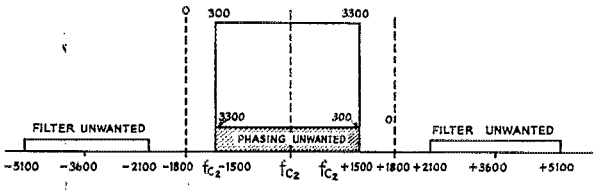


Fig. 8—Complete spectrum of the signal, showing the positions of out-of-band unwanted components not suppressed by the low-pass audio filters.

tone. Notice that the out-of-channel groups marked "filter unwanted" are a function of filter performance. The shaded area indicating in-channel inverted signal is a function of phasing adjustment.

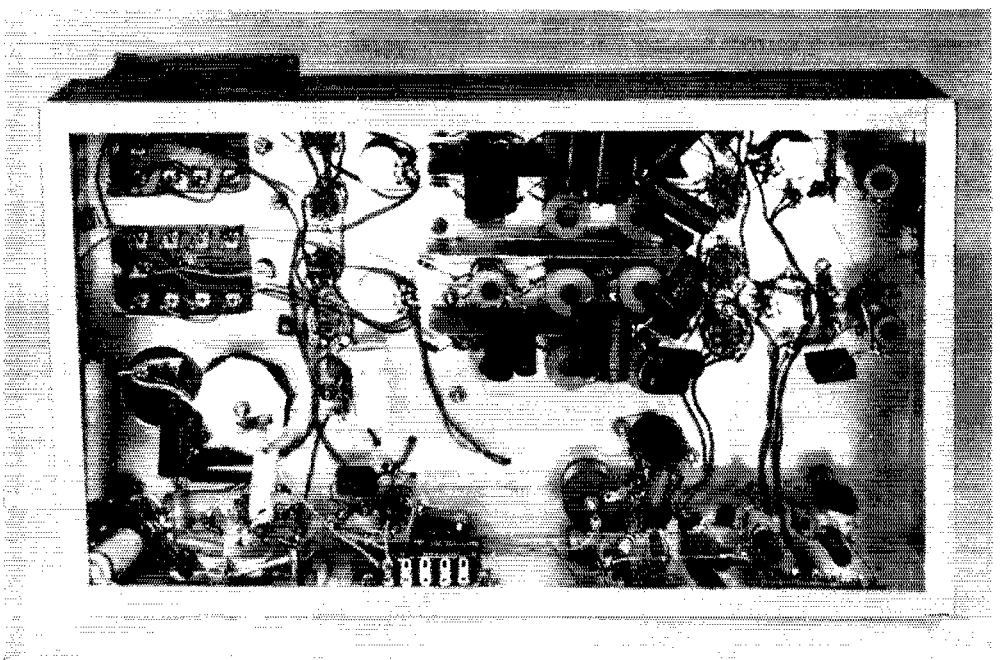
Single-frequency steady signals that tune like carriers will appear at $f_{c2} - 1800$ and $f_{c2} + 1800$ (the spots of proper receiver tuning) if the original audio frequency carrier at 1800 cycles is not perfectly nulled out in the first pair of balanced modulators.

The novel features of the "third method" aroused considerable interest among my s.s.b. friends. There was much speculation as to how the system would work and sound. Accordingly, having tried everything from n.f.m. to "supermodulation," I decided to give the "third method" a try. Because of uncertainty as to the outcome and a desire for cheap, speedy results, I didn't build a complete exciter but just a basic unit which could be connected to an existing exciter. The results are shown in the photograph. Since the parts were largely "scrounged" from interested bystanders and any part that would work, regardless of size or shape, was used, no conclusion as to the possibilities of the system in terms of bulk or complexity should be drawn from the picture.

The basic circuit was followed closely. Minor changes included changing the crystal diodes to tubes, moving the output frequency to 455 kc., and changing the phase splitter of the second oscillator to critically-coupled tuned circuits. A dual-triode audio stage is followed by a low-pass audio filter and circuitry to attenuate lows. The 1800-cycle oscillator uses a toroid-wound inductance. The transformers supplying audio are 500-ohm line-to-line, and plate-to-line transformers supply 1800-cycle carrier. The output tuned circuits were scaled down to 455 kc.

When complete, the unit was coupled into the i.f. stages of the existing 20-kc. filter rig. The resulting signal was examined and adjustments made using the highly selective station receiver, calibrated attenuator, and oscilloscope which have been used for several years to accurately measure band width and relative amplitudes of various signal components of the transmitted and incoming signals.

The "third method" experimental exciter performed as follows: Referring to Fig. 8, the suppressed carrier at f_{c2} is nulled out by balancing the two second modulators. No difficulty was experienced in obtaining a null of at least 40 db.,



The components clustered at top center are for the low-pass filters.

but any drift in this null results in an audible whistle of 1800 cycles in the received signal.

The carrier-like signals 1800 cycles above and below f_{el} are nulled out in the first balanced modulators. Again, there was no trouble in obtaining a null. This null holds better, but the null for both signals didn't occur at exactly the same adjustment — a difficulty that was not enough to prevent obtaining a good signal. It may have been due to some peculiarity of this particular unit.

At first, considerable readable signal in the region marked "filter unwanted" was encountered. Experimentation proved that the original simple constant *k* low-pass filters were inadequate for obtaining out-of-channel suppression comparable to that of conventional rigs. Adding a capacitor across the center coil of the filter, to give one *m*-derived section, gave vastly improved results, but a better filter designed for sharpest possible cutoff is desirable. Although it is fairly easy to get the desired selectivity at this frequency, the actual slope (in cycles) must be as good as for any conventional filter rig.

When the out-of-channel problem was licked, the phasing aspect was studied. It is extremely interesting to note the effect of differing levels of folded-back side band upon wanted signal intelligibility and distortion. With no suppression of one side band, either signal can be copied, but through fairly heavy interference from the other. Thanks to the inversion of the folded-back side band and the effects of product detection, surprisingly large amounts of unwanted signal can be tolerated without causing undue trouble. When the folded side band is suppressed 20 db. or more it seems to practically disappear as a factor in intelligibility. At 30 db. its effects on voice quality are negligible.

Conclusions

Many contacts were made using this exciter. The results were excellent. Although all desired adjustments and investigations are not complete some conclusions can be drawn from the work done.

The system is basically capable of producing excellent s.s.b. signals. Although these signals are actually double-side-band suppressed-carrier, the side-band components are so arranged that they tune like and are otherwise indistinguishable from regular single-side-band suppressed-carrier transmissions. Although the system benefits from the extremely low frequency of filter operation, and poor phasing is not ruinous, the actual attenuation *vs.* frequency of the two filters must be as good as in any filter rig.

The big obstacle, at the present state of design, is the complete dependence upon maintaining the null in the balanced modulators to remove the carrier and its resulting audible beat.

Although it can not be foretold what, if any, part the "third method" will play in future s.s.b. voice communication, this article is presented because this system should intrigue anyone interested in the various types of modulation.

I wish to thank those on the 75-meter band whose parts, interest, and encouragement made this an enjoyable project. The charts and graphs accompanying this article were largely prepared by Tony Sivo, W2FYT, as a result of early discussions concerning the "third method."

Silent Keys

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

W1AKU, Gordon S. Dayton, Winsted, Conn.
W1DDG, Hyman Yoffe, Revere, Mass.
WN1NYS, Ernest W. Sims, Bradford, R. I.
K2MFD, Leonard E. Park, Long Beach, N. Y.
W3BCL, Albert Wolni, Pittsburgh, Pa.
W3AZG, Frederic A. Leonard, Coraopolis, Pa.
WN3ERT, Warren J. Hunter, Allentown, Pa.
W4EAK, Walter R. Hinton, jr., Greensboro, N. C.
W4ABN, James E. Brightwell, Hendersonville, N. C.
ex-W4ATS, Harry W. Schiffman, Greensboro, N. C.
W5AFG, Elmer J. White, Beaumont, Texas
W6BLY, Ira J. Schab, Whittier, Calif.
K6DTO, Gilbert L. Beneze, Hawthorne, Calif.
W6FMT, Roland W. Davidson, Whittier, Calif.
W6LEC, Hubert Sherman, Whittier, Calif.
W7BDP, James H. Foster, Butte, Mont.
W8WET, John W. Adamson, Port Austin, Mich.
WØKDL, Leonard L. Schnirring, Sac City, Iowa
WØFMD, Arnold N. Svarte, Duluth, Minn.
WØTRE, Everett S. Stokes, Sidney, Nebr.
WØKTE, Alvis E. Hagans, Norton, Kan.
WØAFU, David F. Michael, Springfield, Mo.
ZL1MG, Ernie Parkin, Waigeke, N. Z.

September 1932

. . . "An Intermediate-Frequency and Audio Unit for the Single-Signal Superhet" was the lead-off article 25 years ago, to be used in conjunction with the unit described the previous month.

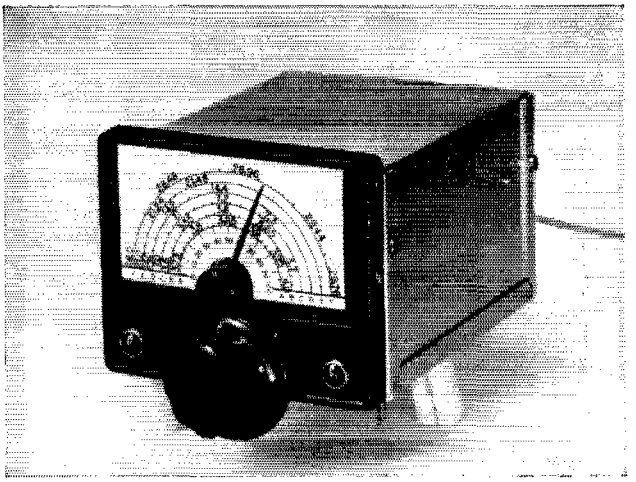
. . . The "Thirty-Three Watts per Dollar" rig was also featured in this issue, with W6CUH explaining how to get high output with efficiency and safety from a type '52.

. . . Another popular article in this issue was the symposium on "Sticks That Have Stuck", being a roundup of various types of masts and an attempt to determine which was best.

. . . An article about "Science Service Ursigrams" reminds us that cosmic data was being investigated long before the IGY came along.

. . . In IARU News are reported newly-adopted rules for the issuance of WAC certificates — rules which have continued unchanged to this date. Incidentally, for the first half of 1932 a total of 69 WACs had been issued. That is somewhat under the current rate!

. . . And there were more reports on the use of 56 Mc. at the National Glider Meet.



The remotely-tuned v.f.o. is enclosed in a Bud Mini-box (CU-3005) measuring 4 by 5 by 3 inches. Pilot-lamp jewels mounted at the lower corners of the Millen type 10039 dial indicate the tuning range for which the v.f.o. is adjusted. Calibration for the 11-meter band, added after the unit had been photographed, now appears at the right end of the 21-Mc. scale. The control shaft for the range switch, S_1, protrudes through the bottom of the box.

V.F.O. Control for the ARRL Model 6-60-90

High C in a Remote Tuning Head

BY C. VERNON CHAMBERS,* W1JEQ

Here is a remote v.f.o. tuning unit for the ARRL model 6-60-90 Mobile Transmitter. Although it was constructed especially for that particular rig, it may be used with almost any transmitter equipped with a grid-plate crystal oscillator. It's a compact unit designed for under-the-dash mounting and the remote frequency control of a trunk-mounted transmitter.

SPACE under the dash is at a premium in most low-slung cars of modern design. In fact, the installation of a completely "up front" mobile station may be nearly impossible in some cars unless one turns the front end of the vehicle into a "no-passengers-allowed" compartment. At least, that was the situation encountered in our '56 hard-top while attempting to dash-mount a Gonset G66B, remote-control heads for Master Mount and Radfred antenna gear, James power supply, control panel and the ARRL Model 6-60-90.[1] After looking over the pile of equipment, and the mounting space available, it was decided that the two larger units — the power supply and the transmitter — would be mounted in the trunk so as to make at least a little leg room available for the front-seat riders.

It was only natural that this decision should lead to thoughts of a remotely-tuned v.f.o. for the transmitter. Although we have no objection to a short trip to the rear whenever the transmitter is to be switched to another band, we did feel that a v.f.o. would be of little value unless it could be controlled from the driver's seat.

The compact unit to be described is the outcome of these considerations. It is small enough to be tucked out of the way under the dash, and it requires no power other than that used by a single pilot lamp. The crystal-oscillator tube of the main transmitter is used as the v.f.o. tube and all of the connections between the v.f.o. and the transmitter are supplied by a single length of Twinax cable. A simple switching arrangement adjusts the circuit for operating any one of three frequency ranges. The first of these tunes 3370 to 3405 kc. for transmitter output at 11 meters, and the second and third ranges cover 3500 to 3720 kc. and 3720 to 4000 kc., respectively. Splitting the 3500- to 4000-kc. band in this manner provides excellent band spread for the higher-frequency bands (7 through 28 Mc.) and spreads the 75-meter spectrum out over 70 per cent of the tuning dial. An indicator circuit ganged with the band switch keeps the operator aware of the v.f.o. range in use.

The Circuit

The circuit diagram of the v.f.o. is shown in Fig. 1. Actually, the circuit is nothing more than a high-C tank that may be used to convert a standard grid-plate crystal oscillator into a Colpitts v.f.o. Since the capacitance of the remote-control cable is across the tuned circuit,

* Technical Assistant, *QST*.

[1] Chambers, "The ARRL Model 6-60-90 Mobile Transmitter," *QST*, August, 1957.

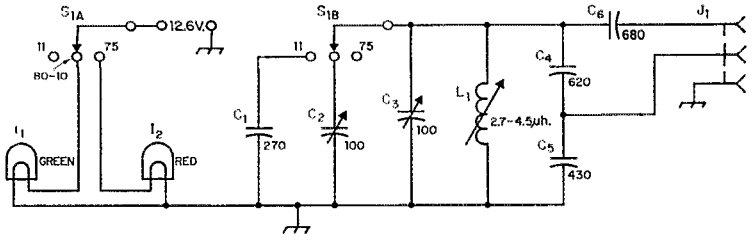


Fig. 1—Circuit diagram of the remotely-tuned v.f.o. Capacitances are in $\mu\mu$f. Fixed capacitors are silver mica.

C_1, C_4, C_5, C_6 — See text.
C_2 — 100-$\mu\mu$f. midget variable (Hammarlund MAPC-100).
C_3 — 100-$\mu\mu$f. variable (Hammarlund MC-100-S).
I_1, I_2 — 6- or 12-volt pilot lamp assembly; 1 red jewel, 1 green jewel (Johnson 147-503).
J_1—Twin cable receptacle (UG-103).
L_1 — Approx. 3 μh., slug-tuned (North Hills 1300-G).
S_1 — 2-pole, 3-position tone switch (Centralab 1473).

the v.f.o. frequency will depend upon the length of the cable as well as other values. The constants shown are based on a 15-ft. control cable of RG-22/U between J_1 of the tuned tank and the v.f.o. input receptacle, J_1, of the Model 6-60-90. This length of cable should easily span the distance between the dash and the trunk of almost any make of modern car.

The circuit uses the band-spread capacitor, C_3, in parallel with L_1 for operation at the highest of the three frequency ranges. A variable padder, C_2, is switched across the tuned circuit by means of S_{1B} to lower the tuning range to 3500 through 3720 kc. This padder is replaced by a 270-$\mu\mu$f. fixed capacitor, C_1, when S_{1B} is switched to the 11-meter position (3370 to 3405 kc.).

Feedback is controlled by C_4 and C_5, plus the cable capacitances shunting them. The capacitance between inner conductors of the fifteen-foot length of RG-22/U is several hundred $\mu\mu$f., and the capacitance between each conductor and the shield (ground) is better than 300 $\mu\mu$f. The manner in which these capacitances appear in the circuit is best illustrated in Fig. 2. Notice that C_6

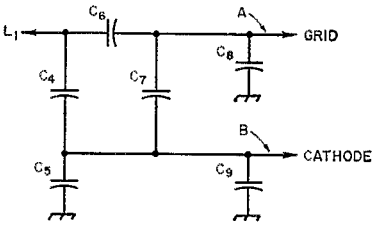


Fig. 2 — Circuit diagram showing how the capacitances of the Twinax coupling cable are effectively connected across the v.f.o. tuned circuit. C_4, C_5 and C_6 are the fixed capacitors shown in Fig. 1. C_7 is the capacitance between conductors of the cable, and C_8 and C_9 are the capacitances between conductors and shield (ground). *A* and *B* are the cable conductors which terminate at the grid and cathode terminals, respectively, of the oscillator tube.

and C_8 form a capacitive divider across the tuned tank and that the grid of the oscillator tube is tapped down on the tuned circuit as a result. When a long length of cable is used between units, the capacitance of C_6 becomes somewhat critical. If the value is too small the oscillator will not perform satisfactorily; if the capacitance is too large it shunts the tuned circuit with nearly the full capacitance of C_8, causing LC-ratio and band-spread problems.

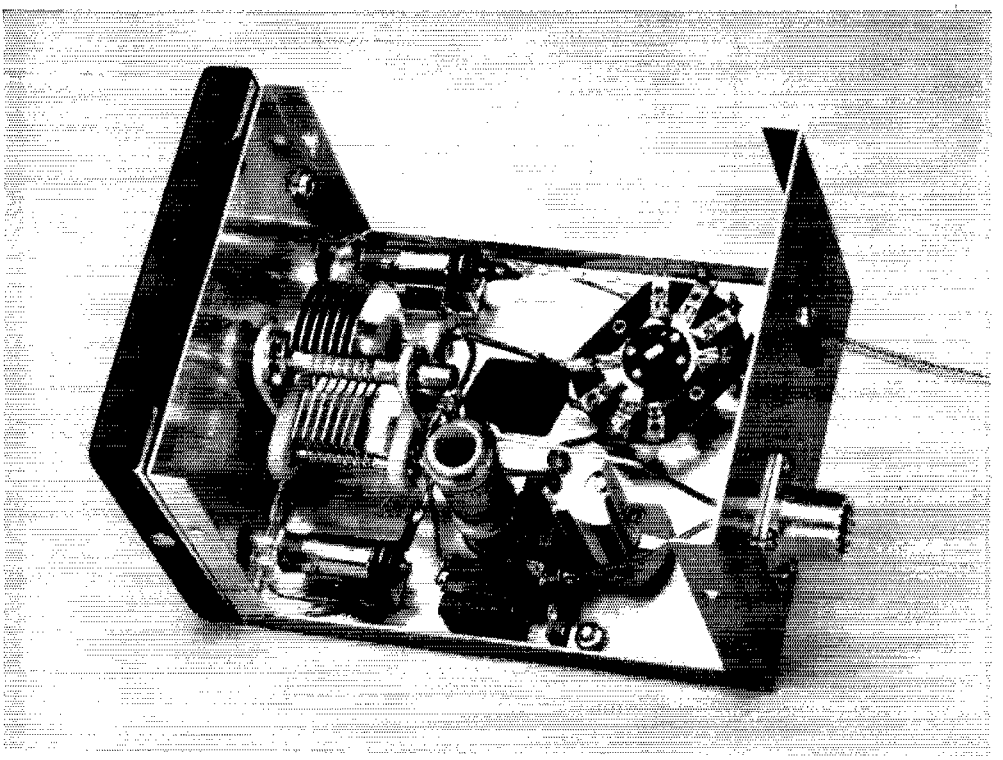
The indicator circuit consists of I_1, I_2 and S_{1A}, the latter being ganged with the band switch, S_{1B}. To balance the panel of the v.f.o., and to provide an "off" position so that I_1 and I_2 may be extinguished, only two lamps were used. The "lights out" position of S_{1A} indicates that the v.f.o. band switch is set at the 11-meter position. A green jewel is illuminated by I_1 when the circuit is switched to the 3500- to 3700-kc. range, and a red jewel indicates that the v.f.o. is tuned to 3720 kc. or above. The red light serves as a warning against tuning up the transmitter on the higher-frequency bands while the v.f.o. switch is in the high-frequency position. Voltage for the indicator lamps is obtained from any convenient spot under the dash that is connected to the car battery. Naturally, the lamps should match the voltage of the car's battery.

Construction

Photographs of the v.f.o. show how the components are arranged on the U-shaped chassis. Before disassembling the multiscale dial so that the rear plate may be used as a template for marking the mounting holes on the front wall of the chassis, scribe through the large holes in the lower corners of the rear plate onto the rear side of the dial cover. The holes so marked may then be drilled — after the cover has been removed — to accommodate the pilot-lamp jewels. A similar set of holes should be drilled in the front wall of the chassis to pass light from the lamps through to the jewels.

After the dial has been mounted, slip the control shaft of C_3 into the hub of the dial and then cut to length metal spacers that will fit snugly between the mounting feet of the capacitor and the bottom of the chassis. Machine screws may then be used to fasten the capacitor firmly in place. The remainder of the parts may now be mounted as illustrated in the interior view of the unit.

To avoid confusion, it should be pointed out that the capacitance values for C_4 and C_5 of the original unit were obtained by connecting smaller capacitances in parallel, and the photograph shows combinations of two and three capacitors adjacent to L_1. The parallel combinations may be replaced by the single units indicated in Fig. 1.



The main tuning capacitor, C_3, mounted on metal pillars, is seen at the left in this interior view of the v.f.o. Variable padder C_2 and fixed capacitor C_5 are to the right of L_1. C_6 and C_4 are above and below L_1, respectively, and the range switch is in the upper right-hand corner. The output receptacle is mounted on the wall at the right along with the rubber grommet for the battery cable connected to S_{1A}.

All of the wiring except that for the hot leads to the pilot lamps is done with No. 14 tinned wire. Connections should be point-to-point with the shortest possible length. A tie-point strip to the lower right of L_1 (interior view) supports the junction of C_4, C_5 and the lead to J_1.

Testing

The v.f.o. unit should be connected to the transmitter via the fifteen-foot length of Twinax cable. (Incidentally, remember to remove the crystal from the rig.) An a.c. filament transformer may be used to power I_1 and I_2 if you want to check out the indicator circuit while bench testing. Warm up a receiver of known calibration. A high-resistance voltmeter connected across the 68K grid resistor of V_2 in the transmitter will facilitate alignment.

Only the oscillator and buffer-doubler tubes of the transmitter need be activated at this time if a high-resistance voltmeter is available for checking d.c. voltage across the buffer-doubler grid leak. In this case, the driver-multiplier tube, V_3, may be temporarily put out of action by either turning the excitation control to minimum or by turning the mode switch to the v.f.o set position. If a voltmeter is not available, the transmitter can be lined up by observing final grid current. However, receiver blocking will be less of a problem if V_3 can be disabled. V_5, V_7 and V_8 should be removed from their sockets to prevent excessive screen dissipation (these tubes are without plate voltage when the amplifier plate supply is turned off).

Tune the receiver to 4 Mc., turn the b.f.o on, switch the v.f.o. to the highest range and apply power to the exciter. Adjust the bandspread capacitor of the v.f.o. tank to nearly minimum capacitance — about 98 on the Millen dial — and then adjust L_1 until a beat note is heard. Tune the receiver a few kc. off to either side of 4 Mc. and listen for any additional signals that may be caused by oscillator squegging. This occurred in the original circuit, but it was quickly cured by lowering the grid-leak resistance of the oscillator tube (V_1) to 39K.

Next, rotate C_3 to nearly full capacitance — about 3 on the dial — and then retune the receiver to the v.f.o. signal. The new frequency should be 3720 kc. or slightly lower. Now, switch the tank to the next lower range, tune the receiver to 3500 kc. and adjust the variable padder C_2 until the v.f.o. signal is heard. This should occur with C_2 set at approximately 90 per cent of its total capacitance. With C_3 rotated to nearly minimum capacitance, the oscillator signal should show up at 3720 kc. or a bit higher when the re-

(*Continued on page 142*)

Transistors in Speech Equipment

Design Notes and An All-Transistor Speech Amplifier

BY HANS J. ALBRECHT,* VK3AHH

• Low-level audio amplification is one spot where transistors ought to find considerable application in ham gear. Compactness and low power consumption are easily achieved. And the all-battery power supply offers an easy answer to the hum problem!

ALTHOUGH TRANSISTORS have been on the market for some time, amateurs generally seem to be reluctant to make proper use of these extremely economical devices. This may be due to the lack of detailed circuit descriptions in amateur radio journals, and it is for this reason that this article has been written. The author will attempt to explain the design of transistorized amplifiers, and circuit details of a three-stage audio amplifier and a tone oscillator will be given.

By way of introduction, it must be emphasized that transistors can only be used within their limitations. At the present state of the art, transistors are suitable only for low-level operation. Thus in the case of modulation equipment for ham radio transmitters the speech amplifier is the first part that can be simplified, without loss of performance, by using transistors. In fact, the amplifier to be described has been used as the speech amplifier for a clamp-tube modulator, and performed satisfactorily in every respect.

Design Considerations

Engineering textbooks describe the design of transistor amplifiers in detail and readers interested in a more theoretical approach may consult them.[1, 2] Although it is not intended to rehash in this article the fundamentals of transistor circuitry,[3] some introductory comments may not be amiss, with particular reference to the needs of the amateur. The design considerations of transistorized gear may briefly be listed as follows:

1) Care must be taken to ensure linear operation by selecting the position of the quiescent operating point.

2) The circuitry has to be designed for minimum effects of ambient temperature.

3) It is not advisable to operate transistors at potentials higher than the maximum data published.

The first point is well known from vacuum-tube technique, and characteristics published by manufacturers allow suitable operating points to be determined. Single-battery operation being preferable for convenience, the calculation of resistances for an appropriate bias network is outlined later.

The second point calls for some effective temperature compensation to be provided in the electronic circuitry. In other words, the bias of each stage has to be stabilized with respect to temperature variations. The effect of temperature upon transistor characteristics is considerable, particularly so far as the collector current at zero

* Permanent address: 10 Belgravia Ave., Box Hill North E 12, Melbourne, Australia. Temporary: % Schnitzler, Hebelstr. 3, Schramberg, Württemberg, West Germany.

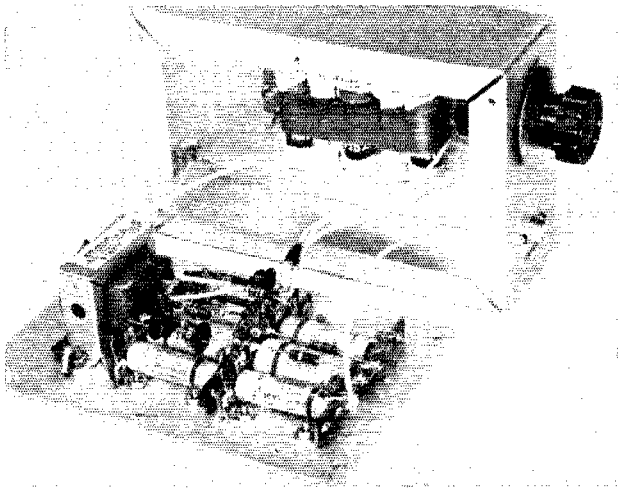
[1] Shea, *Principles of Transistor Circuits*, Wiley, New York.

[2] Terman, *Electronic and Radio Engineering*, McGraw-Hill, New York.

[3] Basic principles were discussed by Priebe, "Transistor Operating Characteristics," *QST*, Feb., 1957. — *Ed.*

This amplifier, built in the *QST* laboratory, uses the circuit of Fig. 2 but incorporates transistors of U. S. manufacture. The input switching circuit shown in Fig. 2 was omitted, the input coupling capacitor being connected to the microphone input terminals (a phono connector) through a 0.5 megohm resistor to provide a load for a crystal or ceramic microphone. Using G.E. type 2N107 transistors, the gain is sufficient to overdrive the last stage even though no preamplifier is used. The peak audio voltage across the secondary of the output transformer is 10 volts, with negligible distortion, using a 7.5-volt penlite-cell supply. The transformer is 3-to-1 ratio interstage type with 10,000-ohm primary. It was necessary to load the secondary with a 100,000-ohm resistor to provide the proper primary load for the transistor and to minimize distortion in the last stage.

Other inexpensive transistors — General Transistor type GT-222 and Raytheon CK-722 — were used in the same circuit with similar results.



emitter current is concerned. Stabilizing circuits will be discussed below.

With reference to the third point, excessive operating voltages do not necessarily result in a complete failure of the transistor. The general performance, however, is likely to deteriorate if the transistor is exposed to such treatment. The temperature rise at the junction is a function of the dissipated power, a typical value being 0.4 degree Centigrade per milliwatt collector dissipation. The maximum junction temperature is usually given as 45 degrees Centigrade, or 113 degrees Fahrenheit. The author recalls one experiment in which the base-emitter section of a transistor was unintentionally subjected to a current far in excess of the specified limit. Subsequently, the transistor assumed a temperature of approximately 200 degrees Centigrade for a period of about three minutes. This particular transistor still performs well in a low-level oscillator, although its output is somewhat lower than before.

As is undoubtedly known to readers, there are three possible circuit connections of transistors, similar to vacuum-tube practice: common-emitter, common-base, and common-collector, resembling common-cathode, common-grid, and cathode-follower operation, respectively. Theoretical design considerations indicate that the common-base connection features lower input impedance (about 50 to 500 ohms), than the common-emitter connection (around 1000 ohms). On the other hand, the common-collector circuit provides a higher input impedance (about 60,000 ohms). So far as the corresponding optimum load impedances are concerned, typical values are 200,000 ohms, 70,000 ohms, and 2000 ohms for common-base, common-emitter, and common-collector circuits, respectively. It can be proved mathematically that, for cascade operation, the common-emitter configuration is a good compromise.

The question whether a cascade amplifier for the audio frequency range should use transformers or *RC*-coupling between stages is largely one of preference and availability of components. Too many transformers may cause the amplifier to become a somewhat inefficient oscillator, just as in orthodox vacuum-tube technique. Another disadvantage of interstage transformers, particularly midget transformers, may be their cost. On the other hand, straight *RC*-coupling results in some loss of gain, if compared with a properly matched transformer. To achieve the same gain, the mismatch between *RC*-coupled stages necessitates an increase in the number of stages by about 30 per cent. Also, it would seem reasonable to use additional transistors as common-collector matching stages between common-emitter amplifying stages. In practice, however, a cascade of three *RC*-coupled common-emitter stages provides more gain than two *RC*-coupled common-emitter stages with a common-collector matching stage.

Nevertheless, the common-collector configuration is a very useful connection if an input source of high impedance is to be coupled to a common-emitter transistor, as shown later in this article.

Stabilization

Fig. 1 illustrates typical bias stabilizing circuits for low-level common-emitter operation.

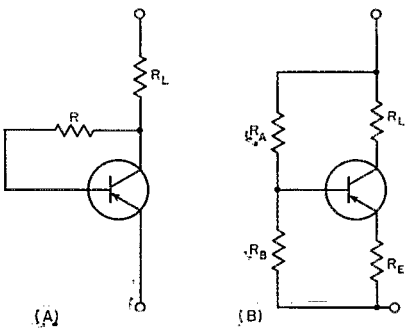


Fig. 1 — Bias and stabilizing circuits for transistors.

In the first circuit, Fig. 1A, stabilization is achieved by resistance feedback between collector and base, the base current being given by the ratio of collector voltage to the resistance connecting the collector and base. In some cases, an emitter resistance may be added.

In Fig. 1B the base bias is produced by a voltage divider $R_A R_B$. The emitter resistor R_E is used for automatic stabilization. This circuit provides optimum stabilization at the expense of higher over-all power consumption. It is ideally suited for low-level amplification, and has been used by the author in the amplifier to be described. Some comments on the theoretical relations of these resistors seem to be worthwhile.

A "stability factor," S, which should have a low value, is defined by [1]

$$S = \frac{1 + \frac{R_E}{R_B} + \frac{R_E}{R_A}}{1 - \alpha + \frac{R_E}{R_B} + \frac{R_E}{R_A}} \qquad (1)$$

where α = current amplification factor. The following formulas are used for calculating R_E, R_A, and R_B:

$$R_E = \frac{\alpha(E - V_c - R_L I_c)}{I_c - I_{co}} \qquad (2)$$

$$R_A = \frac{E(S-1)}{I_c - SI_{co}} \qquad (3)$$

$$R_B = \frac{S-1}{\frac{(1 - S + \alpha S)(I_c - I_{co})}{\alpha(E - V_c - R_L I_c)} - \frac{I_c - SI_{co}}{E}} \qquad (4)$$

where R_L = load resistance
E = supply voltage
V_c = collector voltage } at operating point
I_c = collector current }
I_{co} = collector current at zero emitter current.

The emitter resistor, R_E, has to be bypassed

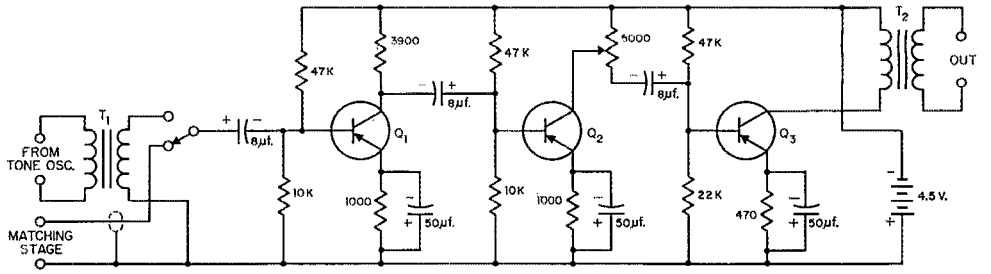


Fig. 2 — Circuit of the all-transistor speech amplifier. Capacitors are electrolitic, 25-volt or lower rating sufficient. Fixed resistors are ½ watt.

Q_1 — Philips OC-71.
Q_2, Q_3 — Philips OC-72.
T_1 — Interstage audio, 2 or 3 to 1 ratio, larger winding connected to tone-oscillator terminals.
T_2 — Interstage audio, about 3 to 1 ratio, larger winding connected to output terminals.

so that the impedance of the *RC* combination is negligible for all frequencies used. Omission of this bypass capacitor or the use of too low a value would result in feed-back effects similiar to those associated with the cathode-resistor bypass in tube circuits.

For completeness' sake, two other possible stabilizing circuits should be mentioned briefly. To maintain a reasonable over-all efficiency in power applications, a temperature-sensitive non-linear device — *e.g.*, a thermistor — is often connected into the bias network. Its characteristic enables some automatic stabilization to take place. Another possibility is the so-called tandem arrangement. This uses a resistance-stabilized transistor which supplies a constant emitter current to a second transistor. However, these circuits are not at all necessary for low-level operation, and since the amplifier under discussion is concerned with low-level audio amplification the resistance stabilization described above is quite satisfactory.

The Audio Amplifier

The amplifier consists of three cascaded common-emitter stages, and its circuit diagram is given in Fig. 2. The stabilizing circuits are basically identical with the one shown in Fig. 1B, with an average stability factor of $S \approx 8$ for $\alpha \approx 0.98$. The stabilization obtained is sufficient for the purpose of this amplifier. A lower factor — *e.g.*, $S = 2$ — would give better stabilization at the expense of higher over-all power consumption. *RC* coupling is used for the input and intermediate stages and the output load is represented by the primary winding of an ordinary interstage transformer. Its secondary is connected to the modulator stage, or any other load.

The transistors utilized are Philips junction triodes OC-71 and OC-72, all operated in Class A. As is general practice with transistor amplifiers, appreciable coupling capacitance must be used to suit the generally low input impedances of transistor stages. Each stage has been carefully designed to provide optimum amplification at the general supply voltage of 4.5 volts, which is taken from a flashlight battery. At the current consumption of 3 to 5 ma. for the entire three-stage amplifier, the life of the battery should be nearly equal to the shelf life.

The last two stages of the amplifier are equipped with OC-72s. These are classified as medium-power transistors, with a permissible dissipation power of 45 milliwatts. In Australia they are commercially available in matched pairs for Class B power operation. However, their characteristics are such that they are also very suitable for single Class A operation, as used in the amplifier under discussion. Of course, OC-71s could be substituted which would result in somewhat less amplification.

Using the primary of an ordinary audio interstage transformer as the output load, the input impedance at the base of the first stage is of the order of 1000 ohms.

A volume control has also been included. As is evident from the circuit diagram, the load resistor of the second stage has been made variable for this purpose.

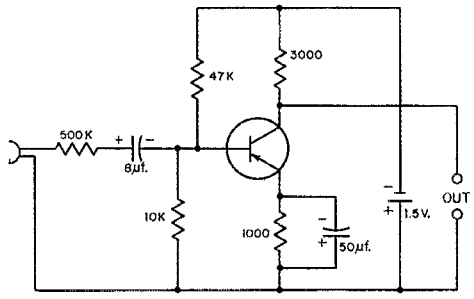


Fig. 3 — Preamplifier circuit for coupling a crystal or other high-impedance microphone to the speech amplifier.

Input Matching

The relatively low input impedance of the amplifier requires a matching network of some kind. Dynamic microphones can be matched easily by a suitable transformer. In the case of crystal microphones a special matching stage appears to be the best solution.

As mentioned earlier, a transistor in the common-collector configuration is suitable for matching a high to a low impedance, in analogy to the cathode follower in tube technique. However, with a load impedance of about 1000 ohms the input impedance of this circuit is of the order of 60,000 ohms. This is still a bit too low for

adequately matching a crystal microphone, although the position is definitely improved. The remainder of the load has to be provided by a resistor, resulting in a loss.

Another solution is the use of a common-emitter stage with appreciable resistance in series with the input, in order to match a high-impedance source. The loss in the resistive element is compensated for by the amplification of this stage so that an adequate signal appears at the output of the matching stage. Fig. 3 is the complete circuit diagram of such a matching stage, as used to match a crystal microphone to the input of the three-stage amplifier.

Tone Oscillator

A detailed description of this part is not necessary, as circuits of transistorized tone oscillators or code-practice oscillators have been published in ham radio journals from time to time. Fig. 4

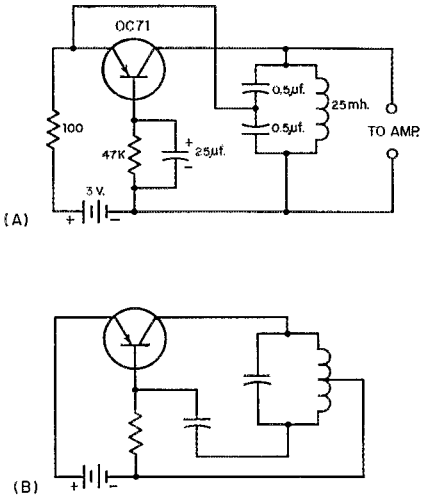


Fig. 4 — Audio oscillator circuits. The upper, a "Colpitts," will generate a tone of about 1000 cycles per second. The "Hartley" arrangement is shown below for comparison.

shows two popular *LC* feedback oscillators. In vacuum-tube practice these oscillators are known as the Colpitts (A) and Hartley (B), respectively.

For m.c.w. and test purposes, an oscillator of the type depicted in Fig. 4A has been included in the amplifier under discussion. An old Siemens r.f. iron-core coil of 1940 vintage was found to be extremely useful. A maximum number of turns was wound on the three sections of the core (total dimensions: diameter 0.88, height 0.72 inch), resulting in an inductance of approximately 25 millihenrys. The smallest capacitor that could be detected anywhere was also found in the junk-box. It is a center-tapped Bosch metallized-paper capacitor of 1 microfarad, another German disposals components (the author is ex-DL3EC). Of course, both parts can easily be replaced by modern components. Two penlight cells make an appropriate power supply and last for a considerable period at a maximum consumption of 2 milliamperes. The frequency of oscillation is of the order of 1000 cycles per second.

An interstage transformer (about 2.5 to 1, the higher impedance side toward the oscillator) is used to couple the oscillator to the input of the amplifier (see Fig. 2). A double-pole switch at the amplifier input selects the secondary of the transformer or the microphone matching stage.

Constructional Details

A small chassis was used as a the container for the amplifier and its 4.5 volt battery, the oscillator being mounted on top of the chassis. The crystal-microphone matching stage was housed in a small box which also contained its supply, a 1.5-volt dry cell.

The entire setup must be well shielded, particularly if used in connection with a transmitter, in order to counteract any possible r.f. feedback. Likewise, the output cable and the cable from the matching stage must be shielded.

Performance

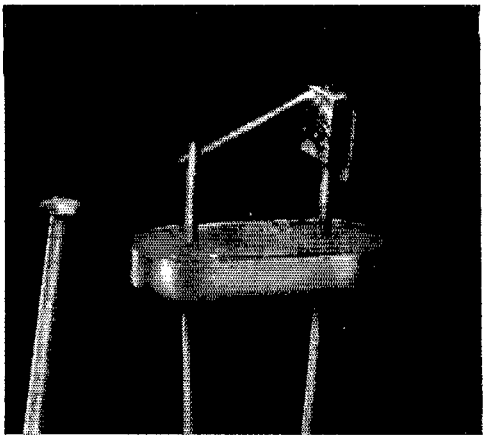
In the several months during which the equipment described in this article has been used its performance has been satisfactory in every respect. In the case of the author's ham station, the unit has been employed as a speech amplifier, its output being connected to the grid of a controlled-carrier modulator, a 12A6, which is used to modulate the p.a. (90 watts input, home-built, pair of 807s). The modulation level obtainable allows a fair amount of volume reserve. The output signals of the microphone matching stage and of the oscillator are of the same order of magnitude, permitting a convenient change-over from m.c.w. to telephony.

Strays

Hams who are also amateur cinematographers may be interested in participating in an amateur film festival created by K6RWR. Amateur films will be selected for presentation on TV, with panel discussion by professionals from the film industry. For further details, write K6RWR at 210 N. Larchmont, Los Angeles.

During one school year, both W8BWL and KN8BWL were members of the Amateur Radio Club of Shaker Junior High. — *W8SLR*

KN8EFH tells us that because of his weight (350 lbs.) he announces his call as KN8 Extra Fat Ham.



The "Spacistor"— a New Semiconductor Amplifier

A spacistor assembly on a transistor-size mount. The base and collector connections correspond to the bar-type connections shown in Fig. 1, while the "whiskers" on top of the semiconductor slab are in the same relative positions as the injector and modulator contacts in Fig. 1. The ordinary pin at the left is for size comparison.

A NEW PRINCIPLE in semiconductor amplifiers has been demonstrated successfully in an experimental device developed in the Raytheon research laboratory. The "spacistor," as it is called, is still in the research stage, but would appear to have a number of basic advantages over transistors for high-frequency applications. Its operation and characteristics are more nearly like those of conventional vacuum tubes than is the case with the transistor, although the spacistor is definitely a semiconductor-type amplifier.

Fig. 1 is a schematic of the spacistor. The usual materials such as germanium or silicon can be used for the body of the assembly, and a small pellet of indium is fused into the body to form a junction similar to that in a junction-type transistor. The collector terminal makes contact with the semiconductor body. A relatively large reverse bias, about 200 volts, is applied between the base and collector so there is a strong electric field but substantially no current in the base-collector circuit. Because of the strong field a small space-charge region forms around the junction, and electrons are introduced into this region through the "injector" contact, by means of a bias voltage applied between the base and injector. These electrons travel to the collector contact (at high speed) so current flows in the injector-collector circuit.

A fourth contact, called the "modulator," is introduced in the space-charge region, and suitably biased with respect to the base and injector. A signal voltage applied in the modulator circuit varies the electron emission from the injector, which compares with the way in which the grid controls the space charge and with it the plate current in a vacuum tube. In further analogy to the vacuum tube, the modulator or input circuit consumes negligible power, but causes an appreciable variation in the electron current, so that an amplified signal can be taken from the collector.

In spacistors that have been constructed so far, the input (modulator) and output (collector) impedances are both of the order of 30 megohms. The input impedance is high enough to be neglected in most applications, just as in the case of negative-grid vacuum tubes. The output impedance is of the order of 10 or more times that of a pentode tube, making the spacistor a truly constant-current device. Values of modulator-collector transconductance (g_m) of 100 to 150 micromhos have been obtained in experimental units — small compared with a.c. type tubes but not unfavorable as compared with small filament-type receiving tubes. The interelectrode capacitance is about 0.5 $\mu\mu$f.

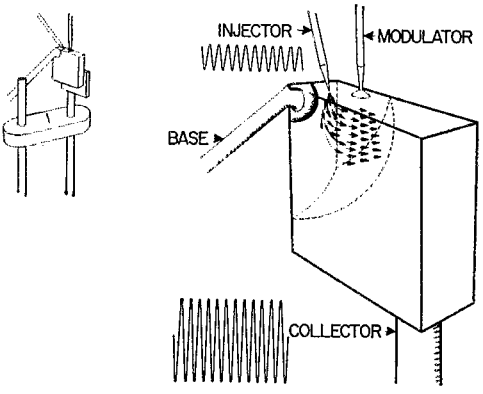


Fig. 1—How the spacistor operates.

It is expected that spacistors will be capable of operating at temperatures several hundred degrees higher than are practical with transistors.

The spacistor is purely a laboratory device at the present time, and there is no indication as to how long it might take to make it a commercial item. It needn't interfere with any of your current plans for using tubes or transistors, therefore — although there's no telling how it may alter the thinking of equipment designers some years from now.

— *G. G.*

Greater Selectivity with the C.W. Clipper-Filter

A Two-Stage Amplifier with Variable Band Width

BY L. I. ALBERT,* W1PLM

• By adding a second stage to the c.w. clipper-filter described in an earlier issue of *QST*, W1PLM obtains a band width of 200 to 600 cycles at 40 db. down. A simple method of varying the selectivity is included.

THE MODERNIZED VERSION of the c.w. clipper-filter described by W1CUT in *QST*[1] is an improvement over that originally described by Grammer.[2] However, for c.w. work on today's crowded bands its selectivity is still inadequate. A band width of 100 cycles at 6 db. down does not sufficiently attenuate adjacent signals if the band width at 40 db. down is one to two kc. What is required is a band width of the order of 300 to 500 cycles at 40 db. down.

This band width is easily achieved by means of the audio filter described by W1CUT; it only requires the addition of one more stage of filtering, exactly similar to the first stage, and tuned closely to the same frequency.

Inductors

Fig. 1 shows the circuit with the added filter stage. The W1CUT technique of using small power-supply chokes was followed quite successfully except that the bar of "I" laminations lying across the top of the "E" laminations was not removed entirely. Instead, 3 to 5 layers of paper were put between the "E" laminations and the bar of "I" laminations and a nonmetallic clamping arrangement, such as shown in Fig. 2, was used to hold the assembly. The inductances, and hence the resonant frequencies, can now be adjusted by tightening or loosening the clamping screws. The *Q* of the chokes seems to be about

* 41 Cotter Road, Waban, Mass.

[1] Campbell, "Modernizing the C.W. Clipper-Filter," *QST*, December, 1956, p. 36.

[2] Grammer, "An Accessory for C.W. Reception," *QST*, July, 1950, p. 11.

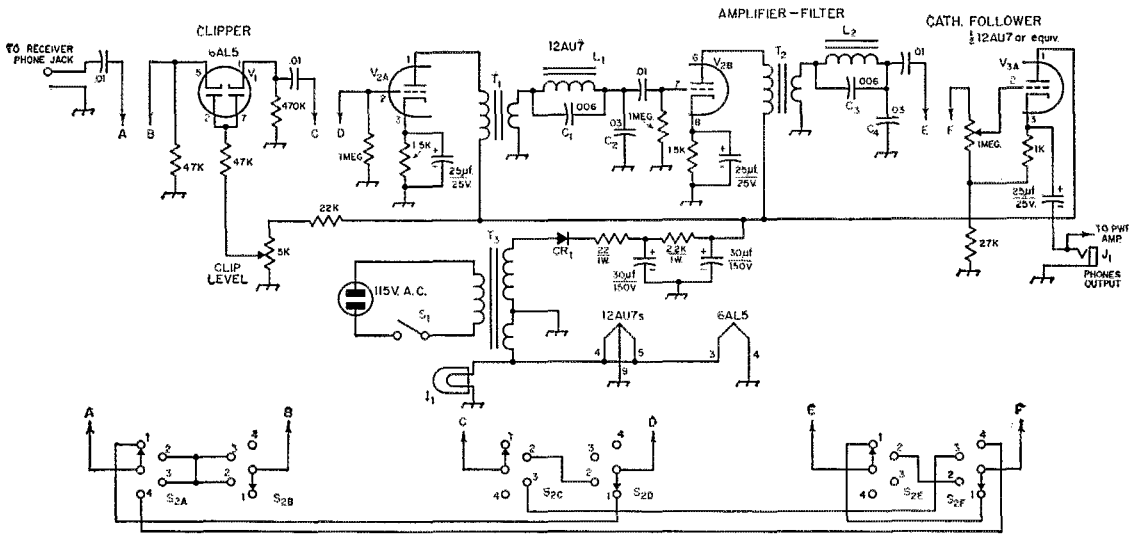


Fig. 1 — Circuit of the two-stage clipper-filter. All capacitances are in μf. All 0.01 μf. capacitors may be ceramic; capacitors marked with polarity are electrolytic. Others should be tubular plastic or mica. Resistors are ½ watt unless otherwise specified. Switch functions are as follows: Position 1, dual filter alone; Position 2, clipper and dual filter; Position 3, clipper alone; Position 4, straight through with cathode-follower output.

CR_1 — 50-ma. selenium rectifier.
I_1 — 6.3-volt pilot lamp.
J_1 — Open-circuit phone jack.
L_1, L_2 — 5-h. 65-ma. filter choke; frame removed and choke remounted as described in the text.
S_1 — S.p.s.t. toggle switch.
S_2 — 3-section 6-pole 4-position rotary switch, shorting type preferable. (Centralab PA-1020).
T_1, T_2 — Output transformer: 7000–10,000-ohm primary to 3.2-ohm voice coil (Thordarson 21S52).
T_3 — Power transformer: Half-wave: 125 volts, 50 ma.; 6.3 volts, 2 amps. (Stancor PA-8121).

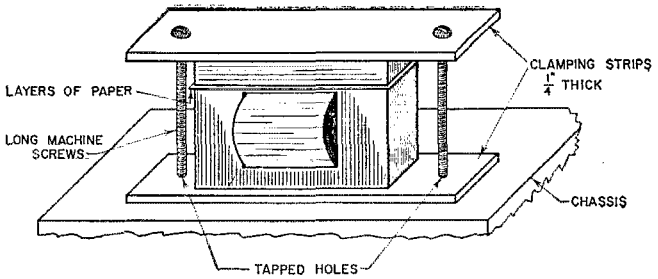


Fig. 2 — Sketch showing the method of clamping and tuning the filter inductors. Clamping strips must be of bakelite, phenol, plastic or other suitable *insulating* material. Metal should not be used.

the same with the air gap increased in this manner as with the "I" laminations removed altogether. Two similar chokes should be used so that their series-resonant frequencies will be close to one another when altered as described.

Circuit

Two changes were made in the switching circuits described by W1CUT. The first position of the switch was changed from filter-clipper to dual filter alone. This seems to offer a characteristic much more useful to this writer than did the filter-clipper characteristic. The receiver output in the straight-through position is connected to the output through the cathode follower. The writer also incorporated in his unit a simple beam power-output stage to drive a speaker.

Characteristics

The selectivity curves obtained from the unit are shown in Fig. 3. The two series-tuned circuits, L_1C_2 and L_2C_4, cannot be tuned to exactly the same frequency because excessive ringing results. The two circuits may be tuned about 10 cycles apart, resulting in a very sharp characteristic as shown by Curve 1. A more easily-used characteristic is shown by Curve 2 in which the tuned circuits are tuned about 30 cycles apart. Curve 3 results with the two circuits tuned about 60 to 70 cycles apart and is almost flat-topped, but it still has fairly steep skirts. The notch frequencies, governed by L_1C_1 and L_2C_3, were set higher than those used by W1CUT, while the peak frequencies were set to about 700 cycles, an audio frequency more pleasing to the writer than 900 cycles.

It should be mentioned that the 0-db. reference is not the same for the three curves. If the peak of the sharpest curve is taken as 0 db., the peaks of the progressively less-selective curves fall short of 0 db., by increasing numbers of db. In other words, the signal loudness increases with increasing selectivity until limited by ringing. It should also be noted that the response characteristic is effectively broadened by overloading signals. The receiver r.f. gain control thus should be backed off considerably when the desired signal is tuned in; the tremendous gain of the filter at the peaked frequency will allow the desired signal to be easily copied while, in most cases, all other signals will be inaudible.[3]

It is immediately evident that variable selectivity is easily obtained by altering the capacitances of C_2 and C_4 by means of a two-gang multicontact switch. Capacitance is progressively added at C_2 and subtracted at C_4, thereby broadening the selectivity curve while maintaining the center frequency. Fig. 4 shows one simple method of achieving this.

Adjustment

The filter can be aligned with the help of an audio signal generator and a scope. If C_2 and C_4 are to be fixed, the procedure is to set the two tuned circuits individually to within 10 to 15 cycles of the chosen peak frequency, but on opposite sides of that frequency. This adjustment can be made by tightening or loosening the clamping screws on each choke until each

[3] This is indicative of regeneration which undoubtedly contributes to the selectivity. — *Ed.*

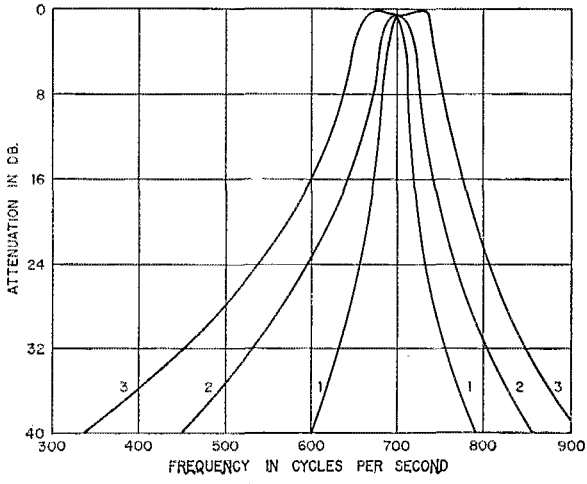


Fig. 3 — Selectivity curves of the two-stage filter of Fig. 1. Curve 1 is with the circuits tuned about 10 cycles apart; Curve 2, 30 cycles apart; Curve 3, 60 to 70 cycles apart.

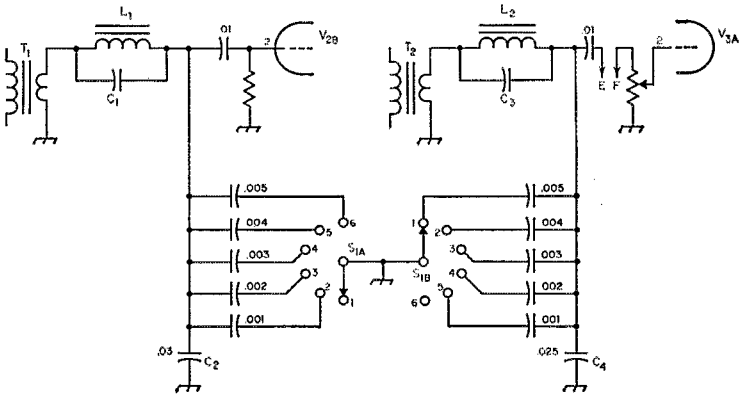


Fig. 4—One method of achieving variable filter selectivity. Greatest selectivity is obtained with S_1 in Position 1. All capacitances are in μf., and capacitors should be plastic tubular or mica. C_1, C_2, C_3, C_4, L_1, L_2, T_1, and T_2 refer to Fig. 1.

»

circuit is tuned to the desired frequency. Altering the number of layers of paper placed between the "I" and "E" laminations of either or both chokes will allow any two similar chokes which, due to manufacturing tolerances, may be of slightly different inductances, to be tuned to the same frequency. The filter is then ready to go. If the response is too sharp, slightly greater separation of the two frequencies can be achieved by a readjustment of the clamping screws on one of the chokes.

If the switch is to be used to obtain variable selectivity, the procedure is equally simple. With the switch in Position 1, the chokes are adjusted so that the respective series-resonant frequencies are 10 to 20 cycles apart, depending on the desired sharpness in the sharpest position. Then for switch Positions 2, 3, 4, etc., one switch section successively substitutes capacitors smaller by 0.001 μf. in parallel with C_4, while the other section successively increases the capacitance in parallel with C_2 in increments of 0.001 μf. The resonant frequencies of the two circuits thus move about 10 to 15 cycles farther apart for each succeeding position until the minimum desired selectivity is reached. At about 70 cycles separation, a dip appears in the center of the flat-topped portion of the curve, and at separations beyond 100 cycles this dip in the characteristic is severe enough to limit the usefulness of less-selective curves.

If no equipment is at hand, the circuits can be tuned by listening tests only. One's own c.w. signal can be used as a substitute for the audio signal generator. There will be no doubt when the two series-tuned circuits become resonant at close to the same frequency.

As mentioned in the original article [1], symmetrical output wave form depends upon proper choice of resistances in the diode circuit. The values shown were used after checking on an oscilloscope.

The operating difference between a clipper-filter using one tuned stage and one using two tuned stages is like the difference between night and day. The signals pop in and out and are best tuned by means of the beat-oscillator pitch control. Most such controls cover 2 to 3 kc. and are ideal for tuning over a narrow region around your own operating frequency.

Strays

Some of the old timers around the Atlanta, Georgia, area, at a recent meeting. W4AD was elected president and W4KL secretary-treasurer of this Old Timers Club.

The Effect of Capacitance on Power-Supply Filter Bounce

A Discussion of Power-Supply Dynamic Regulation

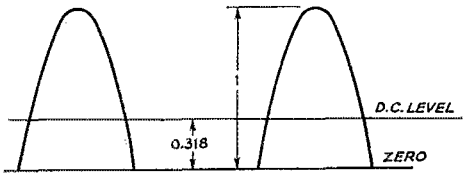
BY DAVID T. GEISER,* W1ZEO

• The fact that the output voltage of a power supply decreases with an increase in load current is universally appreciated, but relatively few amateurs are aware of the rather drastic changes in output voltage that can occur when the load is rapidly varied, as in c.w. keying or in s.s.b. work. This article shows graphically how the output voltage is affected by the resonant frequency of a choke-input filter, and how the situation is improved by going to a large output capacitance. The effect of the filter constants on the surge currents that occur when the supply is turned on also is shown.

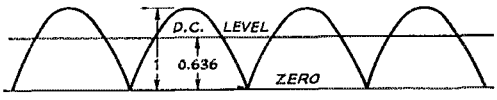
LOAD CHANGES affect power-supply output voltages, regardless of the quality of design and components used. Some of the drop in output voltage with an increase in load is caused by rectifiers or resistance, and some of these factors are discussed here; but the most annoying and alarming current or voltage change — and the least well-known — is "bounce" or "resonant response." Resonant response in a power-supply filter is a simple process, and it is hoped this discussion will show how simple it is.

Why Filter a Rectifier?

A rectifier changes alternating current to "one-way" current (*not* direct current) by choosing



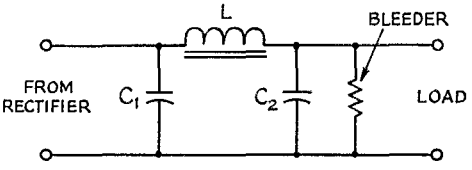
HALF WAVE RECTIFICATION



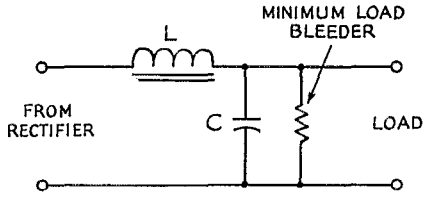
FULL-WAVE RECTIFICATION

Fig. 1 — Comparison of half-wave and full-wave rectification. The value of the average (d.c.) output is shown referred to the peak value of the rectified wave, neglecting any tube and resistance drops.

paths through the rectifying circuit that only let the output current flow in one direction. The output current may be large or small; it may even be zero if there is no possible path for current to



(A) CAPACITOR INPUT FILTER



DESIGN: L IN HENRYS $= \frac{\text{MAX. TOTAL LOAD, OHMS}}{1000}$

NOTE: *1130 INSTEAD OF 1000 GIVES MINIMUM 120-CPS INDUCTANCE ALLOWABLE; USING 1000 GIVES SOME SAFETY FACTOR.*

(B) CHOKE — INPUT FILTER

Fig. 2 — Capacitor and choke-input filters. "Minimum" load corresponds to maximum resistance (bleeder only); "maximum" load to minimum total resistance across the supply.

flow in that one favored direction. Half-wave, full-wave center-tap and full-wave bridge (single-phase) rectifiers without filtering all produce zero voltage many times each second. The half-wave voltage peak is more than three times the "d.c." (average) voltage, while full-wave peaks are more than one and a half times the "d.c." voltage, as shown in Fig. 1.

These unfiltered current or voltage waves from the rectifier actually (and mathematically, too, but not here) can be considered to be made up of a constant, smooth "one-way" (direct) current plus several alternating-current waves. If constant, smooth direct current or voltage is wanted, the alternating current waves must be greatly reduced. The best filter reduces the a.c. without affecting the d.c.

Alternating current waves produced by half-wave rectifiers have frequencies equal to whole

*Sprague Electric Co., North Adams, Mass.

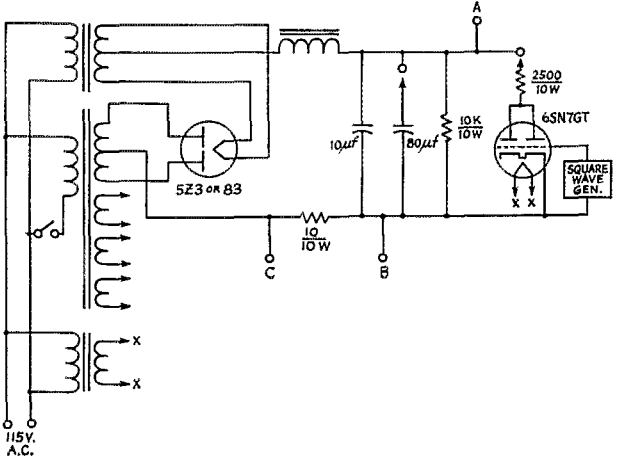


Fig. 3 — Test setup for checking filter "bounce" with changes in load. The 6SN7GT acts as a switch for alternately connecting and disconnecting the load, when its grids are driven by a square-wave generator. For observing voltage changes the vertical plates of the oscilloscope are connected to *A* and *B*. The rectifier input current can be inspected by connecting the oscilloscope to *C* and *B*. The setup uses a receiving-type power transformer and filter components.

numbers (1, 2, 3, etc.) times the supply frequency; such as, 60, 120, 180 cycles per second for a 60 c.p.s. supply. The lowest frequency has the largest wave and is hardest to filter.

Perfect full-wave rectifiers produce alternating currents whose waves have frequencies *even* whole numbers (2, 4, 6, etc.) times the supply frequency. A full-wave or bridge rectifier powered from a 60-cycle power line will produce smaller amounts of the more easily filtered 120-, 240-, 360-cycle and higher frequency waves. (But one should not forget unbalanced tubes or transformers will produce a 60-cycle wave, in addition, in the output.)

What's a Filter?

A filter is a circuit that passes electrical waves

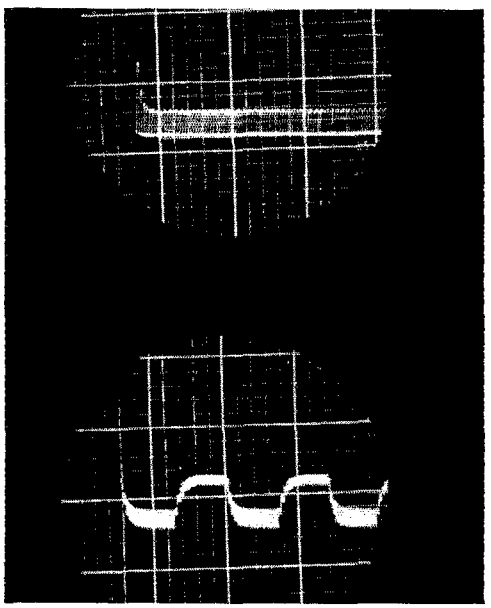


Fig. 4 — Top: Inrush current through rectifier tubes to capacitor-input filter. Left-hand end of trace represents instant of closing power-line switch. The trace consists of a series of pulses at the rectified-output frequency (120 cycles per second) each of which is a pulse of current into the first filter capacitor, the peak current being represented by the height of the pulse. (Note that alternate pulses are not quite the same height, indicating that the outputs of both sides of the rectifier are not quite equal.) The inrush surge current has a peak about three times as high as the steady-state pulses, and takes several cycles to die away.

Bottom: Change in d.c. output voltage with change in load: load switching at a uniform rate. Ripple voltage in the output is indicated by thickening of the trace; the ripple increases with heavier loading, as shown by the fact that the lower sections of this trace, representing lower d.c. output voltage, are thicker.

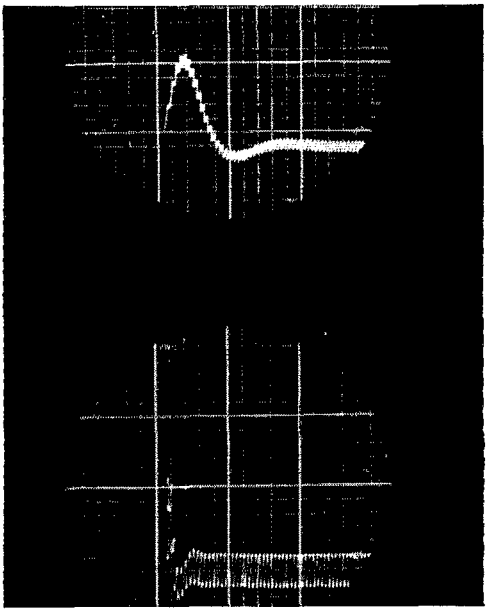


Fig. 5 — Inrush current through rectifier tubes to choke-input filter. Top: 40-henry input choke followed by 40-μf. capacitor; bottom: 10-henry input choke followed by 10-μf. capacitor. Note that the maximum surge current is the same in both cases (somewhat more than twice the steady-state current) since the *L/C ratio* is the same, but that its duration is dependent on the *amounts* of *L* and *C* in the filter. The a.c. ripple in the rectifier output current is considerably smaller in the filter with the larger *LC* product.

With the choke-input filter the rectifier output current does not go to zero between pulses of rectified current. Compare these photos with the top picture in Fig. 4, where the rectifier output current consists of a series of discrete pulses separated by periods of zero current. (The latter is represented by the bright base line in the upper photo of Fig. 4.)

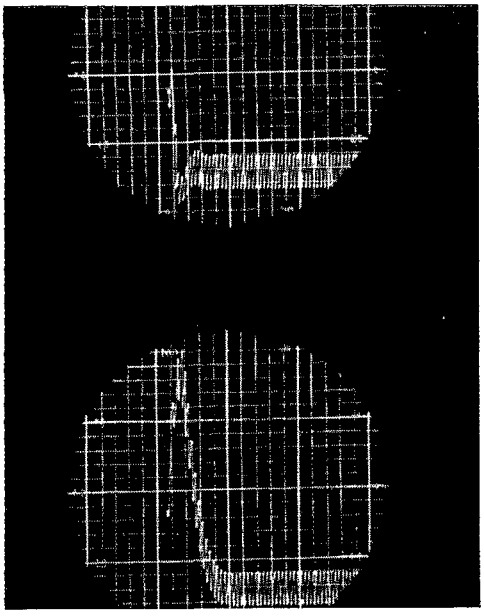


Fig. 6 — Effect of changing L/C ratio on inrush current to rectifier tubes through choke-input filter. Top: 10-henry input choke followed by 10-μf. capacitor; bottom: 10-henry input choke followed by 90-μf. capacitor. The scale in these photographs is the same as in Fig. 5. The peak inrush current is considerably larger with the larger capacitance (smaller L/C ratio) and has a greater duration because of the larger LC product. Note also that the small oscillation or overshoot at the terminal end of the transient is practically eliminated with the larger capacitor.

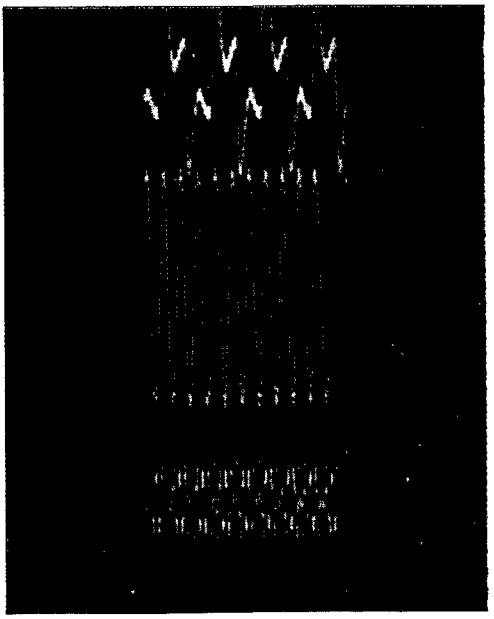


Fig. 7 — Filter resonance effects in output voltage as a load is alternately switched on and off; choke-input filter with 10-henry choke and 10-μf. capacitor. Top: load switched at rate of 5 times per second; center: switching rate 15 per second; lower: switching rate 45 per second. The large swing in output voltage in the middle photo is caused by the resonance in the filter, its natural resonant frequency being approximately the same as the switching rate.

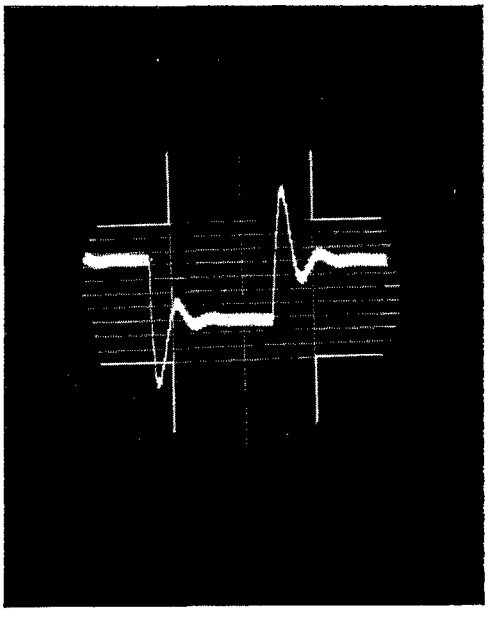


Fig. 8 — Load switching at 5 cycles per second with expanded sweep in the oscilloscope, same conditions as Fig. 7. The output voltage tends to oscillate at the resonant frequency of the filter, 15 c.p.s.

in desired proportions. A steady one-way current does not change and can be said to have *no* cycles per second, so wherever "frequency" is used in the arithmetic, the number zero can be used as the frequency of the steady current.

A filter prevents or reduces passage of electrical waves either by changing the electrical energy to heat in a resistance or by providing a path that will not accept energy from waves of certain frequencies. A wave of any frequency (even zero) loses energy in passing through a resistance, so in a power-supply filter it is usually best to use parts and circuits having as little resistance as practicable. This means that circuits using chokes and capacitors are most efficient in selecting the desired direct current while reducing the accompanying a.c. waves to acceptable levels. Since more than twice as much inductance-times-capacitance ($L \times C$) is required to filter half-wave rectifiers as full-wave rectifiers, only full-wave rectifier filtering will be discussed.

Capacitor or Choke Input?

The most commonly used filter is the capacitor-input type, Fig. 2A, sometimes also called the "brute-force" or pi (π) filter. Good quality input capacitors (the *only* kind that will work and last in this filter) permit extremely high pulse currents to flow through the rectifier. These currents are limited only by tube drop and power transformer impedance. It is costly to design good life into this circuit.

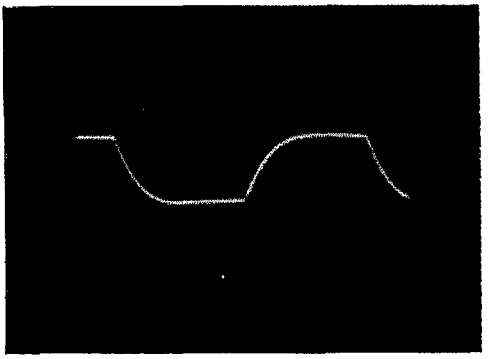


Fig. 9 — Output voltage switched at 5-cycle rate, choke-input filter using 10-henry choke and 90-μf. capacitor. The overshoot visible in Fig. 8 is practically entirely gone. (The improved ripple smoothing resulting from the use of the larger value of capacitance is also evident on comparison of this photo with Fig. 8.)

Changing the drain on the supply changes the output voltage. Fig. 4 shows both the inrush current (when the power is turned on) and the output voltage change with load for a typical capacitor-input filter. This filter used 10-μf. input and output capacitors and a 10-henry, 45-ohm choke. Much less voltage drop with load can be obtained with a choke-input filter, Fig. 2B.

Other advantages of choke-input filters include low "runing peak currents" to prevent damage to rectifier tubes and filter capacitors. The most common (and *wrong*) objection to choke input is that "capacitor input gives more power out of the power transformer." [1] One manufacturer [2] puts out two power transformer lines, one for choke input, one for capacitor input. For equal d.c. output voltages and currents, cost, size, and weight are nearly identical. In no known case are high-voltage, high-power transformers made for capacitor-input filters.

How Much Capacitance?

Inrush or surge currents with choke-input filters may be quite high.[3] RCA recommends certain choke *and* capacitor values, specifying that if the capacitance is increased, the inductance must be increased the same proportion. The effect on surge current is shown in Fig. 5. The lower oscillogram is the surge in a 10-henry choke-input filter with 10 μf. capacitance. The upper oscillogram shows the effect of 40 henrys and 40 μf. (This second photo is not to the same scale as the capacitor-input photo, Fig. 4.) If the capacitance is increased without increasing the inductance, the situation shown in Fig. 6 results. The upper picture shows the surge with 10 henrys and 10 μf.; the lower shows the effect of increasing the capacitance to 90 μf.

No surge problem exists, of course, if the plate power transformer voltage is turned on gradually and left on. (This assumes that the energy stored in the filter much exceeds the variable demand.)

Load change does affect the output voltage of choke-input filters. Fig. 7 shows the effect on the output voltage of switching a resistive load (Fig. 3) on and off the filter output at 5, 15, and 45 times per second. There is obviously resonance at 15 times per second, in very close agreement with the resonant frequency of the 10-henry inductance and 10-μf. capacitor used. Fig. 8 shows an enlarged picture of the 5-times-per-second switching rate.

Increasing the capacitance to 90 μf. almost completely removes the overshoot. This is shown in Fig. 9 (5-times-per-second switching) and the Fig. 10 (twice-a-second switching). It is felt that the lower Q at the "predicted" 5-cycle resonance frequency is responsible. High capacitance does remove load bounce from the voltage output.

Recommendations

No detailed recommendations can be given — there are too many possible situations — but the following suggestions should be helpful:

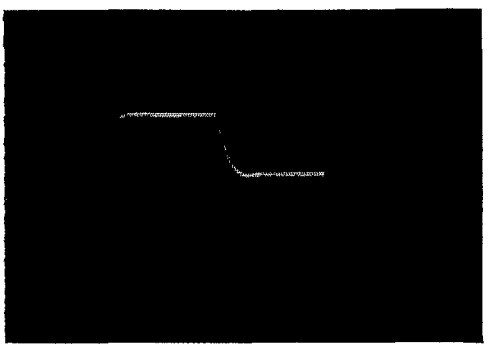


Fig. 10 — Same filter as in Fig. 9, but with load switched at a 2-cycle rate.

Reduce surge currents by turning on rectifier plate voltage gradually and leaving it on. Do not try to find chokes of extreme inductance (at $15 to $30 per watt-second).

Use choke-input filters for medium- and high-power supplies. Use of high capacitance will minimize filter voltage bounce and produce sufficient hum filtering.

Remember that all supplies not electronically regulated will show some voltage change with load. If very stable voltage is required, an automatic voltage control system must be used.

Acknowledgments

Thanks are due Harold Churchill of the Signal Corps Engineering Laboratory for asking the question that initiated this investigation. Prior writers in this field shortened the labor by clear reporting and deserve credit. The permission, assistance, experience, and advice of the Sprague Electric Company team has also been essential.

[1] Probably because the d.c. output voltage from the same transformer-rectifier system will be higher when a capacitor is added in front of a choke-input filter. This neglects transformer heating, which is higher for the same d.c. *power* output with capacitor input than it is with choke input, even though the output voltage is lower with choke input. — *Ed.*

[2] Chicago Standard Transformer Corp.

[3] *RCA Tube Handbook HB3*, Vol. 9-10, p. 866-A/866, 6/30/44.

•Technical Topics—

Satellite Tracking

With the publication in this issue of constructional data on antenna systems, the equipment picture for satellite tracking is almost complete. Earlier *QST*'s have covered the requirements in general (July 1956), low-noise converters and preamplifiers (November and December 1956), and a method of antenna calibration (April 1957). There remains the question of recording the signals in a form that will be useful for subsequent processing. This, at first, had the appearance of being a rather sticky problem since the recorders used in the primary Minitrack system are rather expensive items. However, the NRL people have come up with a scheme that eliminates the need for a high-speed ink recorder at the tracking installation, and it now looks as though the recording difficulty can be resolved quite simply.

In essence, the method consists of using beat-note reception of the satellite signal as in ordinary c.w. practice, and then recording the receiver's audio output with a conventional magnetic-tape recorder. Simultaneously, time ticks from WWV are recorded on the tape for precise timing of the variations in received signal strength as the signal goes through the successive nulls in the antenna pattern. The plan is that stations making such tapes will forward them to NRL where they will be played into an ink recorder of the type used in the primary Minitrack setups so that the final record will be similar to those made by the primary recording stations.

The system has been tested under conditions simulating those to be expected — *i.e.*, a signal of the same strength as is anticipated to be available from the actual satellite — with excellent results. Final records obtained in this way compare very closely in all essential details with records made simultaneously on the same signal by a primary-type recorder. Making the tape recordings offers no technical difficulties, and any of the commercially-available tape recorders should be satisfactory.

Getting back to the antennas, the installations described by Messrs. Easton and Firor are electrically similar but differ a good deal constructionally. A principal consideration in the NRL design was mechanical ruggedness as a contributing factor to electrical stability and thus to high accuracy in taking bearings. This leads to somewhat more costly construction but should represent a good investment where wind and weather are likely to be adverse. In locations where the weather is more favorable less expensive construction may be quite adequate. Dr. Firor's antenna, incidentally, was designed originally for tracking of radio stars and the essentials of the complete receiving system for that purpose are covered in his article. Star tracking could be a fascinating activity for amateurs who have the necessary ground space and the inclination to get off the beaten track. There isn't any greater DX to be had!

Minitrack Calibration by Moon-Bounce Signals

The antenna system for a satellite tracking installation has to be calibrated on an actual signal if the highest possible accuracy is to be achieved. Various calibration methods have been proposed and used from time to time, ranging from airplanes and balloons carrying 108-Mc. transmitters on special flights to using radio "stars" (*QST*, April, 1957) as the calibration-signal source. Now, in a joint announcement from the Naval Research Laboratory and the U. S. Army Signal Engineering Laboratories, it is stated that signals reflected from the moon have been used successfully for Minitrack calibration.

Far from being just a stunt, moon-reflected signals offer a practical way of covering a large portion of the Earth's surface, and plans are under way for making "moon-bounce" a primary source of calibration for Minitrack stations. To this end a high-power 108-Mc. transmitter is being constructed and should be undergoing testing by the time this appears in print. The NRL-SEL experiments were carried out with SEL's "Diana" transmitter, which would not be usable for calibration of a regular Minitrack installation because Diana's frequency is 151 Mc. Special receiving equipment designed for the latter frequency was used in the NRL-SEL tests, but the output and recording circuits were of the regular Minitrack type.

It is expected that when the 108-Mc. transmitter is in operation — the target date is October — its transmitting schedules will be made available to operators of Mark II Minitrack installations. If practicable, they will be published in *QST*. Whether or not you can participate in the satellite-tracking program, a good 108-Mc. converter will give you a start toward hearing signals both from the Earth's most prominent natural satellite and from the man-made "moons" to be launched during the coming year.

Preliminary Satellites

Plans are afoot for launching a number of "practice" satellites in advance of the first attempt to launch the regular satellite already scheduled for IGY, according to articles in the newspapers as we go to press. More on this next month.

—*G. G.*

For the Sun, the Radio Stars, and the Earth's Artificial Satellite

A Radio Telescope

BY JOHN FIROR*

The antenna system described here is a type suitable for tracking the Earth Satellite, provided there is sufficient spacing (500 to 1000 feet) between elements. The receiving method discussed has been developed to separate star noise from ordinary background noise and, while it could be simplified a bit for the c.w. signal to be transmitted by the satellite, is well suited for calibrating a satellite-tracking antenna as described in April *QST*.

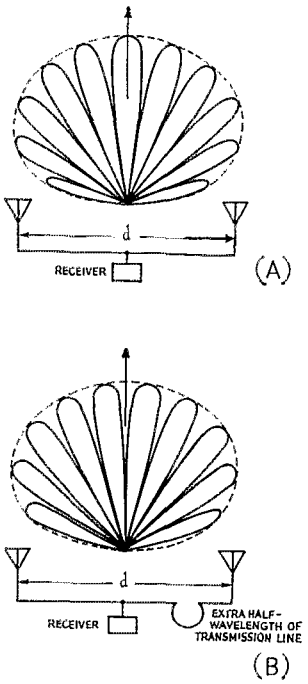


Fig. 1—Reception patterns of radio interferometers. In A the two antenna elements are connected together with equal lengths of transmission line. The resulting pattern has a maximum in the plane of symmetry of the two elements. In B the two elements are connected together out of phase, resulting in minimum sensitivity in the plane of symmetry.

ONE OF THE SIMPLEST METHODS of detecting radio sources in the sky, whether astronomical or artificial, is by use of a radio interferometer. The system to be described in this article is similar to systems used by radio astronomers in various parts of the world during the last ten years for detecting radio stars and measuring their positions, as well as for studying the radio emission from the sun.

An antenna consisting of two elements (where each "element" may be a dipole, Yagi, or other array) separated by several wavelengths will have a pattern which is broken up into many lobes. For example, the antenna shown in Fig. 1A will have a pattern somewhat like that shown above it. The envelope of the pattern (dotted line) is determined by the elements at each end of the system, while the angular spacing of the lobes is determined by the spacing of the elements (length d in Fig. 1A). The angle between the centers of two adjacent lobes is about $60\ \lambda/d$ degrees, where λ is the wavelength measured in the same units as d.

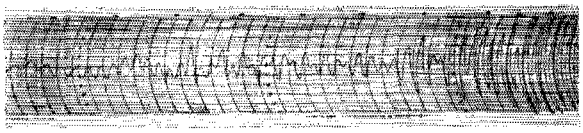
If we add an extra half wavelength of transmission line to one side of the antenna system, as indicated in Fig. 1B, the pattern will be similar to Fig. 1A, but the lobes will all be shifted in angle by half of their width. The envelope will be unchanged. This new pattern is also pictured in Fig. 1B. If further we arrange to put in and take out this extra half-wave length of line, we can switch between the two patterns of Fig. 1. A radio star, satellite, or other source which is at a maximum of the pattern when the half-wave-length section is out will be at a minimum when the extra piece is in. If we then switch the half-wave-length section in and out at a rate of, say, 1000 times a second, the output of the receiver will contain a 1000-cycle component caused by the presence of the radio star or source. The 1000-cycle modulation on the signal easily can be amplified and detected and used to indicate the presence and position of the radio star. The position is obtained from the phase of the 1000-cycle modulation relative to the switching cycle.

Antenna Considerations

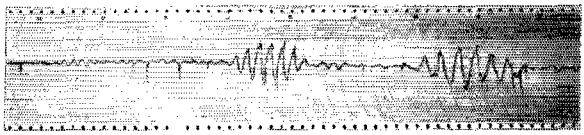
Now the question arises as to what sort of antenna-receiver combination we can build to do all this. First we will take a look at the antenna. It is possible to detect the sun and several radio stars with an antenna consisting of just two half-wave-length dipoles at any frequency from about 15 Mc. up to well above 108 Mc., the satellite frequency. In Fig. 2 is an actual record from a pair of dipoles and a receiver such as we will describe, operated at 108 Mc.[1] The record shows the up-and-down variations of the receiver output as the rotation of the earth carries the sources through the lobes of the

* Carnegie Institution of Washington, Department of Terrestrial Magnetism, Washington 15, D. C.

[1] Record kindly supplied by Mr. H. W. Wells of the Carnegie Institution.



(A) A record of two radio stars and the sun made with an interferometer consisting of two half-wave dipoles and a 108-Mc. receiver. At the left the up-and-down variations are due to the strong radio star in Cygnus passing through the lobes of the antenna pattern. Near the center of the record the even stronger source in Cassiopeia has entered the antenna pattern and is adding its influence to that of the Cygnus source. At the right the sun takes over.



(B) A record of the same two radio stars as in A but with higher-gain antennas. In this case the two stars are completely separated and can be studied individually. The source pattern near the center is Cygnus A and the one to the right is Cass A. Several weaker sources can also be seen. The antenna elements in this case were four-in line dipoles in a corner reflector.

Fig. 2

antenna pattern. At the left end of the record are variations caused by the strong radio source in the constellation of Cygnus. Near the center of the record the Cygnus wiggles become confused with wiggles caused by the even stronger source in Cassiopeia. At the right the sun takes over and dominates the record. One can see from this record the disadvantage of using a single dipole for the antenna element or, in fact, using any type of element which gives a broad envelope to the antenna pattern. Several radio stars can be in the over-all antenna pattern at one time, resulting in a somewhat confused record. The second record in Fig. 2 indicates the improvement achieved by using higher-gain antennas (sharper pattern). Here the two strong radio sources are completely separated and can be studied individually.

An antenna which will provide enough gain for picking up the rather weak signals from the satellite can be made of two 8-dipole broadside arrays spaced as far apart as the available ground will permit. Fig. 3 shows the arrangement as seen from above. Each dipole is supported by two posts driven or set in the ground and backed up by a simple ground screen. The dipoles themselves are folded half-wave dipoles constructed of ordinary TV Twin-Lead. Fig. 4 gives the details of the construction, and Fig. 5 diagrams a feeder system to get all eight dipoles connected in parallel. It is important that all the dipoles be phased correctly — that is, the leads to the north ends of all the dipoles are connected together and the leads to the south ends are all connected together.

For the long transmission line connecting the two arrays to the receiver, 450-ohm open-wire line is convenient and sufficiently low loss. If the commercial variety is used, remove most of the separators, leaving only one every four or five feet. This procedure seems to make the line less sensitive to moisture. For a nicer line, No. 14 wire stretched tight and supported only every thirty or forty feet works well. For 450 ohms, the No. 14 wire should be spaced about 1.4 inches. This type of line has been used on arrays up to 2000 feet long at 300 Mc. and has proved satisfactory except when rain is actually falling.

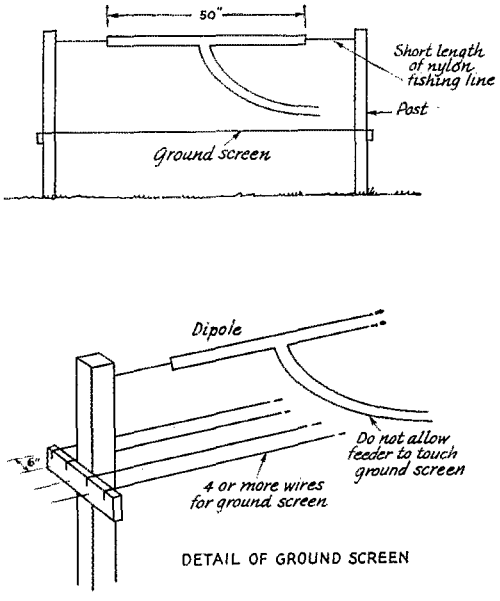


Fig. 4 — Construction details of antenna.

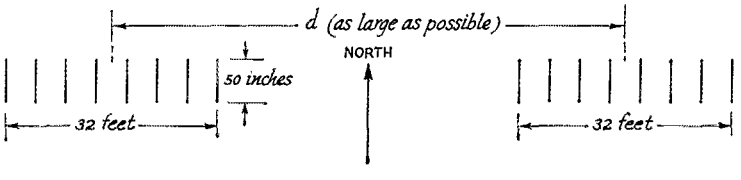


Fig. 3—Arrangement of possible interferometer as seen from above.

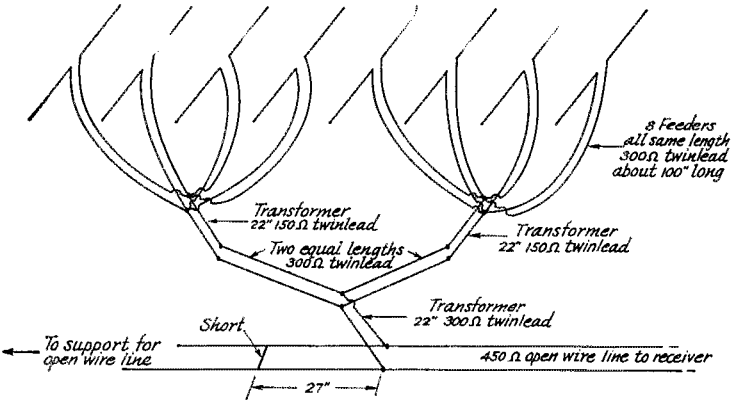


Fig. 5 — Feed system for antenna.

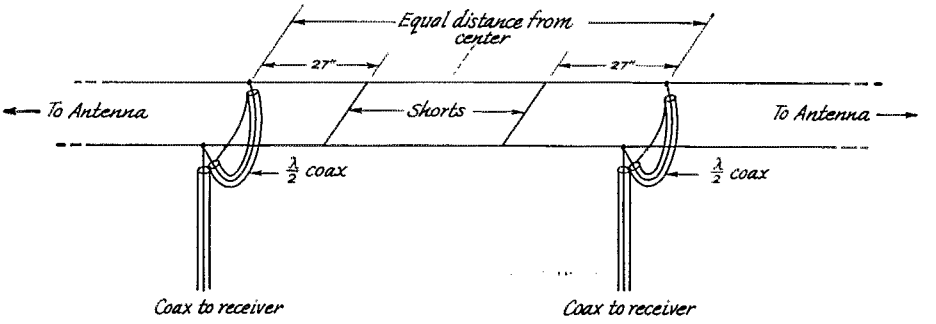


Fig. 6 — Detail near the center of the transmission line.

At the center of the line two baluns must be used to put the signal into coax for entering the house, shed, shack, or what have you. The arrangement near the center is shown in Fig. 6. The arrangement as shown is slightly mismatched at the balun. If better matching is desired, the spacing of the open-wire line could be gradually decreased during the last 30 or 40 feet so that it is about ½ inch at the balun.

The two arrays should be placed on as accurate an east-west line as can be determined with the available equipment. Furthermore, all the dipoles should be at the same level. Although interferometers not built on east-west lines or not level can be used, it is much harder to analyze the final measurements and determine the position of the satellite.

In the simplest case, when the interferometer is both level and on an east-west line, the central lobe of the antenna pattern lies on the meridian. That is, the maximum response of the pattern coincides with a line in the sky passing through the north pole, the point directly overhead, and the point directly to the south. From the output record one can measure the time at which the

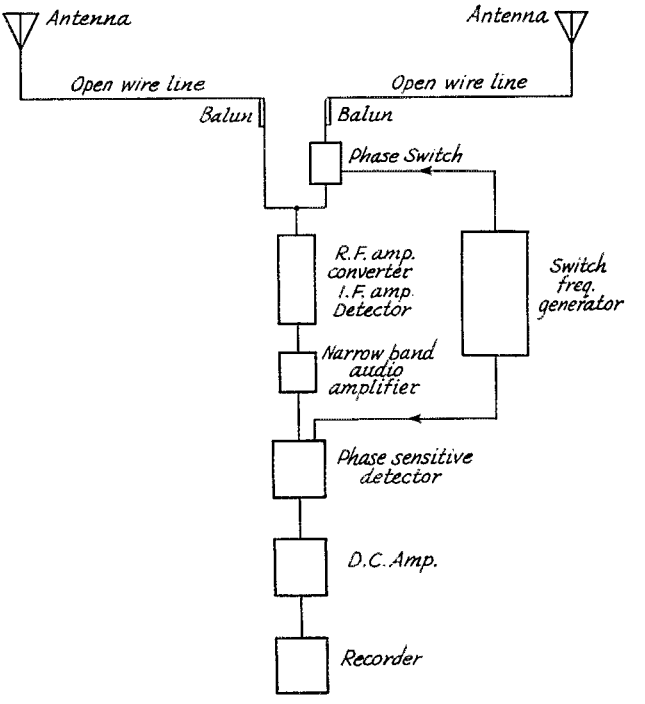


Fig. 7—Block diagram of a phase-switching radio interferometer.

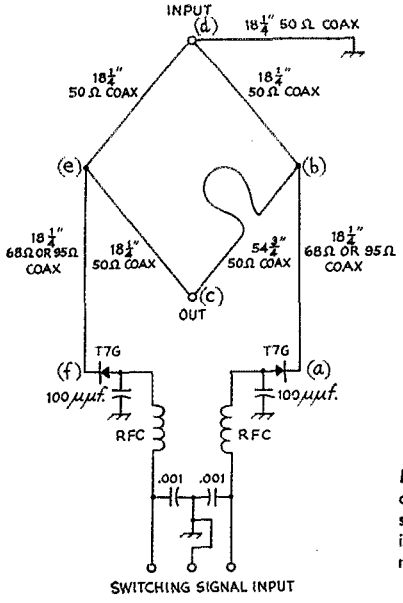


Fig. 8—Diode phase switch. RFC is self-resonant at 108 Mc.

satellite or other signal source was on this line. The position of the object is thus not completely specified, but if a number of different observers can give lines on which the source lay at various times then the true position and orbit can be calculated.

Receiving Equipment

A block diagram of the receiver to be used with this antenna is shown in Fig. 7. Most of the items are well known and need little description. The r.f. amplifier can be any of the low-noise preamplifiers which have been written up in *QST*. Our preference is a 6AN4-6AN4 grounded-grid model similar to that described by Simas.[3] But do not work too hard for that last db. of noise figure. The sky contributes about 10 db. of noise, so any preamp with a 4-db. noise figure is good enough. The oscillator for the mixer must be crystal controlled.

The i.f. amplifier and detector are standard items and could be a good communications receiver. The gain needed is about 120 db. for r.f. plus i.f. when observing the satellite. About 10 db. less will do for the radio stars. The i.f. band width should be 10 kc. for the satellite and as wide as possible for the stars. Probably one will be limited by interfering stations to a 100-kc. band pass.

The narrow-band audio amplifier is just an audio stage with a voltage gain of 100 or so and a simple *L-C* filter to limit the band pass to the neighborhood of the switching frequency. This could be part of a communications receiver.

The switch-frequency generator is an audio oscillator with two push-pull outputs, one of which can be shifted in phase relative to the other. One of the outputs needs to be pretty husky and will be mentioned again.

Phase Switching

The phase switch, or the unit that puts in and takes out the extra half-wave length of line, is an item which will be new to most hams. However, it can be made simply, and in Fig. 8 a form of phase switch is shown which is mostly pieces of coaxial cable either ¼ or ¾ wavelengths long. The actual switching is done by two high-conduction crystal diodes. The switch is built on a sheet of copper or aluminum, and the braid at each end of each length of coax is strapped or soldered to the sheet. The photograph (Fig. 9) shows the type of construction used. To provide the rather large switching current required by the diodes (50 ma.), a circuit such as that shown in Fig. 10 will be needed to amplify the output of the audio oscillator.

[3] Simas, "A Low-Noise Preamplifier for Satellite Tracking," *QST*, Dec., 1956, p. 42.

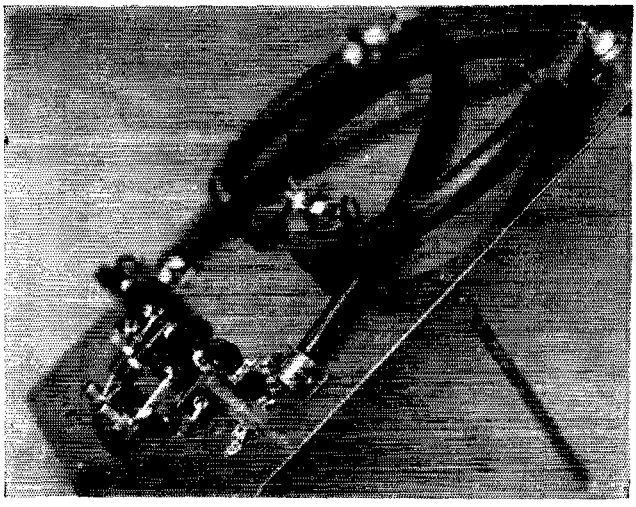


Fig. 9—Photograph of a phase switch similar to that shown in Fig. 8, but for higher frequency. Picture shows method of clamping coax to copper sheet near connector (upper right) and near diode (center). The plastic trimmer capacitor in the photo serves the same purpose as the 100-μμf. capacitor in Fig. 8.

The operation of the switch can be understood if it is remembered that a short looks like an open when seen through a quarter-wave-length piece of transmission line. So when one of the diodes is conducting (for example, the diode at *a* in Fig. 8), it appears open as seen from *b*. Hence, the signal can pass from input to output along path *dbc*. The other diode is open and so appears as a short at *e*. This short in turn appears as an open at the input and output and does not interfere with the signal on the other side. When the switching signal changes over, the r.f. signal changes to path *dec*, which is a half wave length shorter.

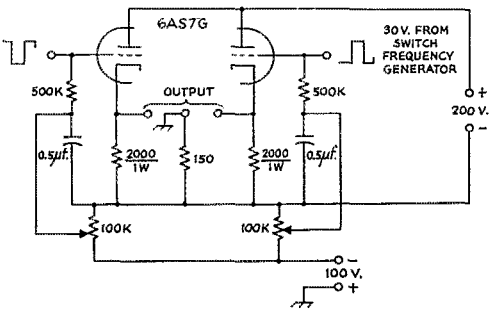


Fig. 10—Driver for diode phase switch. The bias on the 6AS7G triode sections is adjusted to cutoff by means of the 100K potentiometers, with no input from the switch-frequency generator. A push-pull square wave having a peak-to-peak amplitude of about 30 volts is needed for excitation of this circuit. D.c. coupling to the source is not required.

must be adjusted to have the correct phase. The narrow-band audio amplifier will have some phase shift and must be compensated for.

If an ordinary 0-1 ma. recording meter is used, the d.c. amplifier in Fig. 11 is adequate.

A Few Hints

It can be seen from the above description that building an interferometer, although not requiring any unusual techniques or parts, is still a fairly large job. Probably the hardest part will not be finding or building the components, but in securing satisfactory operation from all of the components connected together. A few comments are then perhaps in order to try to smooth the path as much as possible.

Things work much better if they have stable supplies of plate voltage and filament voltage. Get out *The Radio Amateur's Handbook* and build a few regulated plate supplies. Invest in a Sola or other regulating transformer for the filaments. If at all possible, keep the receiver in a room in which the temperature does not vary widely.

When looking at radio stars the exact frequency does not matter, but for the satellite the receiver should be tuned to 108 Mc. within a kilocycle or so. This means that if you build the converter or mixer to go with the receiver, the oscillator must be crystal controlled. In order to be sure the receiver is tuned correctly, a 100-kc. frequency standard could be used to calibrate a stable v.f.o. at 27 Mc. The fourth harmonic of this oscillator can then be used to line up the receiver to 108 Mc.

Keep a speaker attached to the detected output

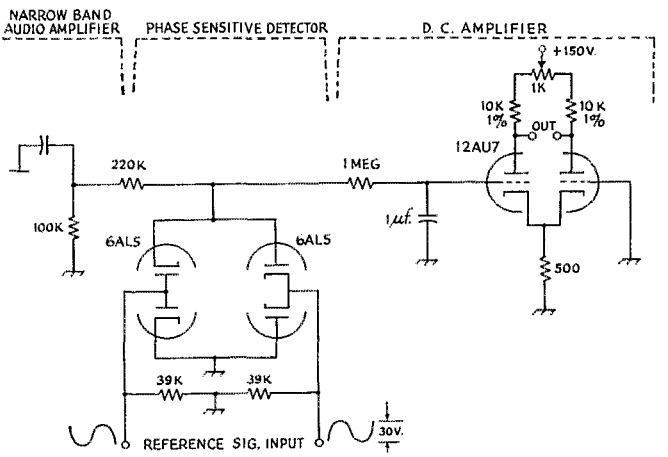


Fig. 11—Phase-sensitive detector and meter driver. Resistors are ½ watt. The reference signal (push-pull) should have a peak-to-peak amplitude of about 30 volts, and is taken from the switch-frequency generator. Its phase should be adjustable in order to compensate for phase shift in the receiver amplifier.

The other unusual item is the phase-sensitive detector, or the device that tells us whether the source is near a maximum of the antenna pattern in Fig. 1A or of the pattern in 1B. This circuit, Fig. 11, can be seen to be a switch which turns the output of the receiver on and off in time with the phase switch. The reference signal to the phase detector, although derived from the same source as the switching signal, of the i.f. amplifier. This is the easiest way to tell when you have interference problems, an oscillating preamp, or other troubles. When the receiver is working properly, the steady swish of noise should be heard. Dig out your July, 1953, copy of *QST* and build yourself a simple noise generator and use it frequently to check the noise figure of your preamp and the over-all behavior of your receiver.

Mark II Minitrack Base-Line Components

Constructional Details of Antenna System for Satellite Tracking

BY ROGER L. EASTON *

THE COMPONENTS required for a Mark II Minitrack interferometer base line are the antennas, transmission line and the hybrid junction. Since the main cost of a satellite tracking system may be in these components and since the better stations will have at least two base lines, much work has gone into making components having the desired quality yet which are reasonably inexpensive.

The most expensive single component is the antenna. The problem is that the antenna must fulfill a large number of requirements. It must be unaffected by wind and weather. It must provide high gain yet have a broad beam in one direction so a large number of satellite transits can be recorded. To provide a gain of about 50 an eight-element broadside array has been designed. It can be extended to any larger number of dipoles as desired. Extending the length of the antennas reduces the beam width only in the direction of the extension, so the gain can be increased as desired without changing the width of the broad antenna beam.

The Antenna

Another antenna requirement is that the gain of side lobes, back lobes and at the horizon be so low that ground-reflected signals from the satellite will not interfere appreciably with the direct signal. This requirement is the most limiting from an antenna design point of view. It can be analyzed approximately in the following manner:

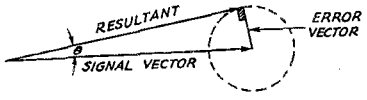


Fig. 1 — **Ground-reflected signal response combines with the desired response to introduce a phase error in the resultant signal as shown in this vector diagram.**

First, the system error that can be tolerated must be determined. The error in the antenna system is given by the following equation:

$$\text{Sine of error angle} = \frac{\text{Antenna phase error}}{\text{Base line in electrical degrees}}$$

A 100-wavelength base line contains 36,000 electrical degrees. To have an error of less than 20 seconds of arc (approximately equal to 0.0001 radian) the tolerable antenna phase error is 3.6°. If this is considered to be an r.m.s. error — that is, half of the time it will be less and half the time more than 3.6° — the maximum phase error will be $3.6° \times \pi/2$ or 5.6°. In each of the two antennas comprising the system the error can be as great as $5.6°/\sqrt{2} = 4°$.

Fig. 1 shows the geometry of the problem. The error vector can have any phase with respect to the signal so that angle θ can have any value less than the maximum angle shown.

$$\theta = \text{arc sin } \frac{\text{error vector}}{\text{signal vector}} \approx \frac{\text{error voltage}}{\text{signal voltage}}$$

$\frac{\text{error}}{\text{signal}} = \frac{4}{57.3} = 0.07$ in voltage. The power ratio is 0.005 or 23 db.

Since the interfering signal that is responsible for the error must be a reflected component, the reflection coefficient of the ground is important. This coefficient may be as low as 0.35 for dry soil, but is about 0.5 for ordinary soil and is 0.96 for salt water. If the value of 0.5 is taken the error signal is reduced to half. The maximum desired-response to side-lobe ratio can be as low as 17 db. under these conditions.

Two types of arrays have been investigated — collinear and broadside dipole arrays, both over ground screens. The difficulty with the collinear array above the ground screen is that the theoretical pattern perpendicular to the array axis is realized only for an infinite ground screen, because the dipoles comprising the array have no directivity in this plane. The broadside array has the advantage that the dipole elements have directivity in the plane perpendicular to the array. A true null then always appears at the ground screen, even when the ground screen is so small that ground effects are present.

The Dipole Element

The dipole element should be rigid, easily

This article gives the construction details of the antenna system for the Mark II Minitrack, the general principles of which were discussed by Mr. Easton in his article in July, 1956, *QST*. That article should also be consulted for over-all site and installation requirements.

* U. S. Naval Research Laboratory, Washington 25, D. C.

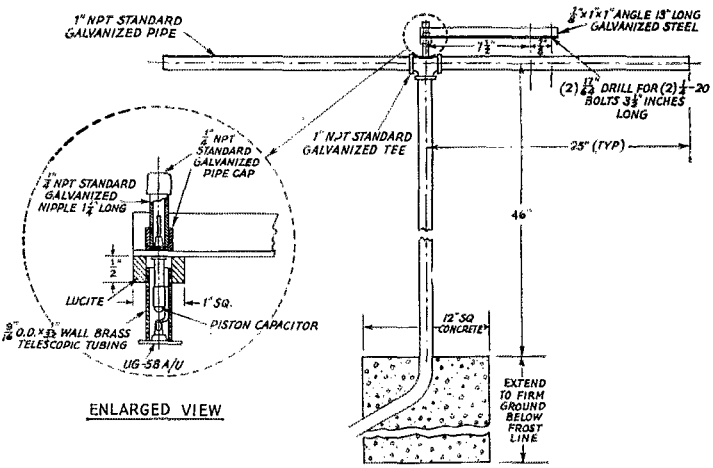


Fig. 2—Construction details of the dipole element. Eight of these are used in each of the two antennas in the Mark II Minitrack system. The angle iron is insulated from the dipole at the feed point by the Lucite block. This block is fastened to the angle iron by four screws (not shown) threaded into the iron, but is not fastened to the brass tubing; the support at the other end of the angle iron is sufficiently rigid to make such fastening unnecessary. The piston capacitor is made by JFD, type VC-13G.

tuned, and simple to manufacture. After several types of matching devices had been investigated the gamma-matched dipole was selected for further study because of its inherent simplicity and rigidity.

The simplest type of gamma-matched dipole, shown in Figs. 2 and 3, is inherently unbalanced. The unbalanced dipole would be expected to have a "squint" or "lean" to its pattern in the plane of the dipole, the direction of the squint being on the same side as the feed loop. However, the measured response in the plane of the dipoles at the ground screen, although unsymmetrical, is at least 19 db. below the maximum response, so it is satisfactory from an interference standpoint.

More important than squint would be currents on the vertical support rod. Negative results were obtained on pattern measurements run to determine if radiation existed due to support-rod currents.

Construction of the dipole is quite simple. It consists of three pieces of standard galvanized pipe and a standard tee modified as shown in Fig. 2. The only machine operation needed, outside of drilling holes, is the flat on the tee where the UG-58A/U socket is mounted. This can be made conveniently in a lathe or by a mill, but can also be made with a file. The capacitor is soldered to the cable socket terminal before the external brass tube is soldered to the socket frame. Either an insulating tube or several turns of insulating tape can be placed around the capacitor to prevent its shorting to ground. If it is felt to be necessary, the entire metal tube can be filled with silicone grease. The solid block of Lucite insulation effectively centers the brass tubing. The top of the capacitor is sealed by means of the pipe cap threaded to the capacitor base and by the pipe cap at the top of the nipple. The parts for this dipole element should cost less than $7.00.

Probably the most rigid and simple means of

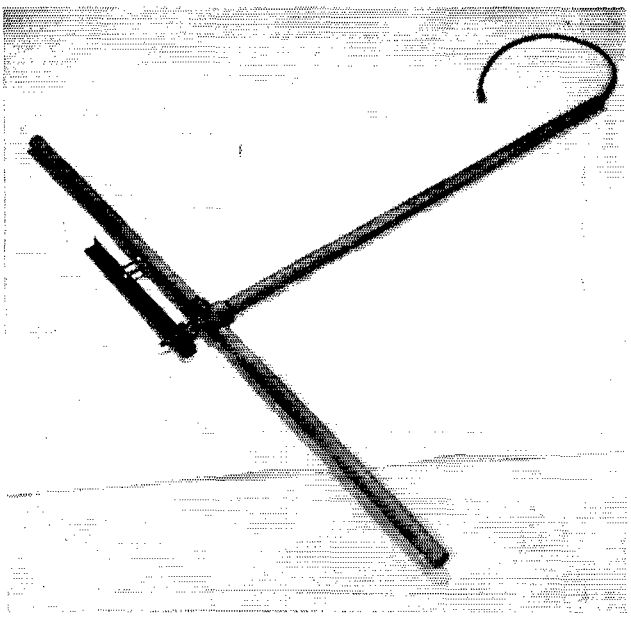


Fig. 3—Photograph of completed dipole element.

supporting the dipole is by embedding it in a concrete pier as shown in Fig. 2. To permit threading the coaxial cable through the vertical tubing an opening to the outside of the pier must be provided. This opening can be made in a number of ways. A greased block which can be removed when the concrete has set is one means. Another is a curved or angled tube which extends to or through the form boards. These form boards should be extended as shown in Fig. 4 to hold the

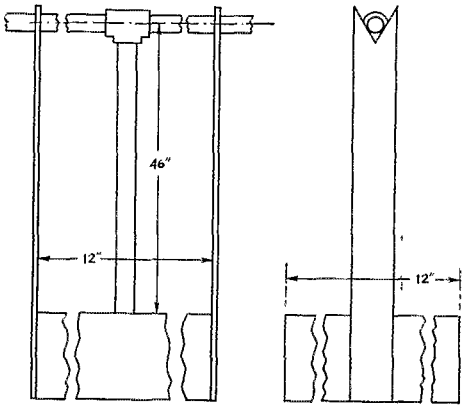


Fig. 4 — Temporary supports, notched at the top to hold the two arms of the dipole, should be made part of the form for the concrete. This will insure that the dipole elements are level and at the proper height.

radiating element. In this manner all the radiating elements can be made level and parallel.

After the form boards are removed the ground screen can be built as shown in Fig. 5. The ground screen must fulfill one principal requirement — it must be large enough so that the antenna will be unaffected by the conditions of the surrounding terrain.

Pattern measurements have indicated that the minimum screen width required is about fifteen feet. A width of sixteen feet has been selected because it is the nearest larger length that is a standard lumber size. The chicken-wire strips can be laid either parallel to the dipoles or perpendicular to them. If the strips are perpendicular to the radiators the separate pieces of netting should be bonded by twisting and soldering, or wiring together and soldering, every few inches.

To eliminate the soldering problem the radiators can be placed a standard chicken-wire roll width apart so that the screening strips can be easily placed parallel to the dipoles. Such a configuration can be built conveniently by placing the dipoles an even six feet apart. The screen should be supported and stretched so the sag is less than ½ inch.

Junction Box

Before the screen is built the transmission lines to all radiators should be installed. There are several ways that the feed structure can be built. One is the common "corporate structure" in which lines to two elements are joined and matched impedancewise, then a line from a similar junction is joined to a line from the first junction and so on until all elements are fed from a single source.

A method that appears simpler is proposed for this antenna. Here the feed lines to all elements diverge from a single junction box. For this system all lines must be electrically equal but may vary in length by multiples of full wave lengths. If the total line lengths from the junction box to the antenna feed points are made an odd number of quarter wave lengths then all the antenna currents will be equal, irrespective of mutual coupling effects.

The transmission line used to join the radiators to the junction box can be RG-8/U, RG-9/U or metal-covered solid-dielectric line (e.g., Amphenol 21-606). The aluminum-covered line is preferable for this use but RG-8/U is probably adequate.

Fig. 6 shows the construction of a junction box for an eight element array. For arrays having more elements more feed points must be provided and the impedance of the quarter-wave matching transformer must be reduced.

Antenna Matching

Because of their mutual coupling, all elements except the one being matched should be connected to the junction box while matching the elements, and each element should be adjusted individually. A convenient bridge for finding the best impedance match is shown in Fig. 7. Details

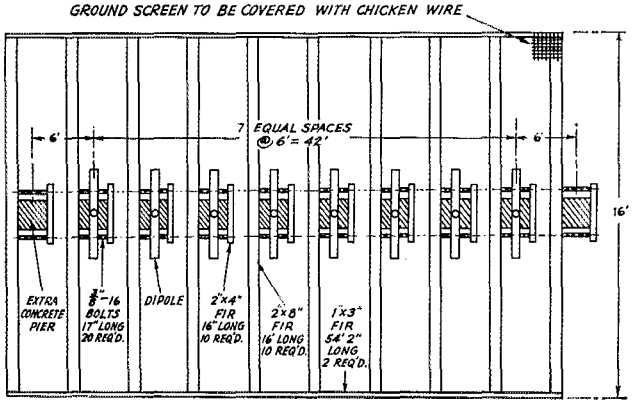


Fig. 5—Plan view of dipole and ground screen assembly. The 2 X 8s are laid horizontally on edge and extend two inches above the tops of the concrete blocks so the ground screen is spaced 44 inches from the dipole centers. The chicken-wire strips are supported by these members.

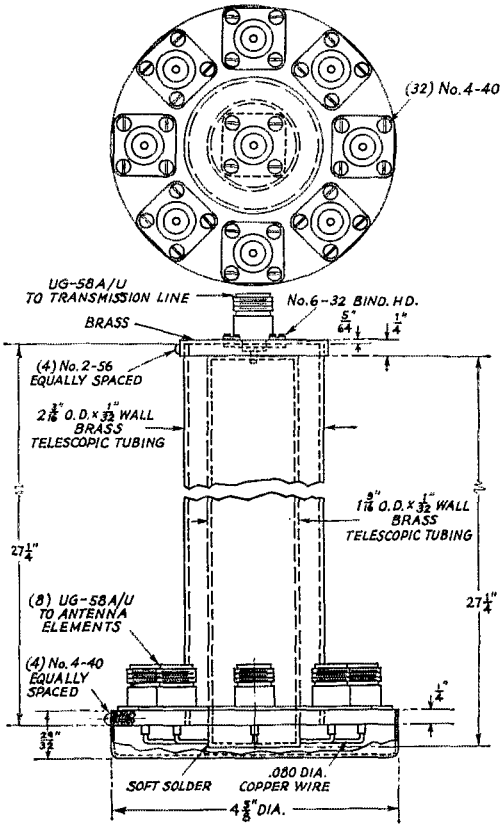


Fig. 6 — Detail of junction box. The inner length of tubing in the matching transformer is closed at the ends. The top is centered by the inner socket contact and the bottom is supported by the wires from the eight sockets as shown, so that no insulating support is required. The base on which the eight sockets are mounted is quarter-inch brass, drilled and tapped for the sockets as well as for the bottom cover.

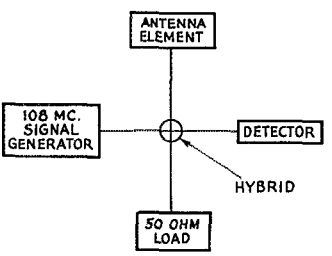


Fig. 7 — Setup for adjusting the match for an antenna element.

of making the hybrid will be given later in this article. With the hybrid bridge the antenna capacitor is adjusted until a null reading is obtained on the detector. Then the standing-wave ratio can be read using a standing-wave indicator, if available.

When all the dipoles are matched they should all be connected to the junction and the impedance looking into the junction measured. The v.s.w.r. at this point should be held to less than 1.1 to 1 if the antenna calibration is to be by surveying alone. Even if other calibrating means are available the v.s.w.r. should be kept as low as practicable. To achieve this v.s.w.r. it may be necessary to make small changes in the characteristic impedance of the matching transformer in the junction box.

Transmission Line and Hybrid

The transmission line joining the antennas to the hybrid junction must be independent of noticeable phase variation due to weather and must have low attenuation and negligible radiation. Since long lengths of it are required its cost should be nominal. The open-wire line shown in Fig. 8 appears to fulfill these requirements adequately.

This line is made of No. 8 wires. For extra strength, machine-straightened copper-covered steel wire was chosen. This wire costs about two cents per foot. The unstraightened wire costs about 10 per cent less but requires considerable stretching to eliminate kinks. The stretching process is troublesome and dangerous.

The selection of characteristic impedance for the line involves a compromise. A low-impedance line will give less line pickup but will also have higher attenuation. The impedance of a high-impedance line will be less affected by motion in the wind.

With No. 8 wires a line spacing of 1.8 inches gives an impedance of 400 ohms. The pickup on this line is independent of line length and was measured as being 26 db. below that from a dipole. Since the antenna gain is perhaps 14 db. above a dipole the satellite signal picked up by the line will be negligible (−40 db.) compared with the signal.

Although balanced transmission lines having balanced line hybrids have been built for phase

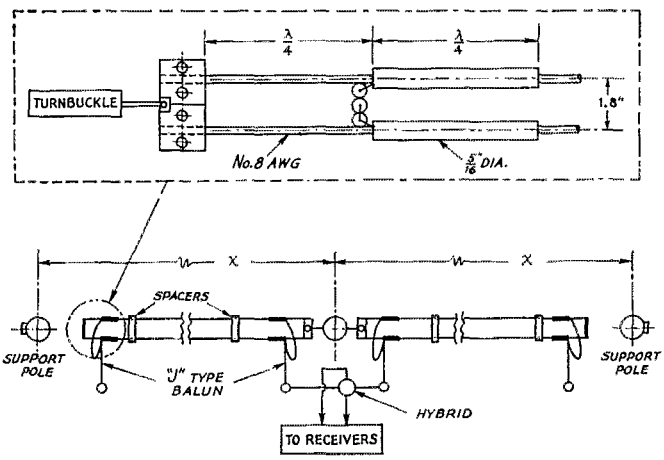


Fig. 8—Details of transmission line connecting the antennas to the hybrid junction. The distance x should be of the order of 500 feet for a high-accuracy system. The clamp at the end of the line consists of a single bottom piece into which the turnbuckle is anchored, with two top pieces (cut out for the turnbuckle as shown) to allow individual adjustment of wire tension. The pieces should be drilled to form a tight fit for No. 8 wire. Figs. 9 and 10 show details of the baluns and line spacers.

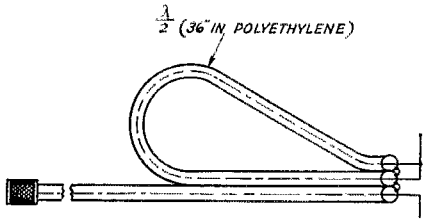


Fig. 9 — J-type balun. This should be made with solid-tube-type coaxial line.

comparison purposes, it is preferable to build the hybrid from coaxial line. The transmission line is matched to 50 ohms at both ends. A quarter-wave matching section made up of two $\frac{5}{16}$-inch quarter-wave capped tubes slipped over the wire as shown in Fig. 8 matches the line to 200 ohms. The J-type balun shown in Fig. 9 matches the 200-ohm balanced impedance to 50 ohms unbalanced. For best weatherproofing the balun should be supported so its loop extends above the transmission line.

The steel-covered copper wire will support itself for at least 500 feet. If a 1000-foot base line is used the two lengths of line should be made equal before installation. The spacing of

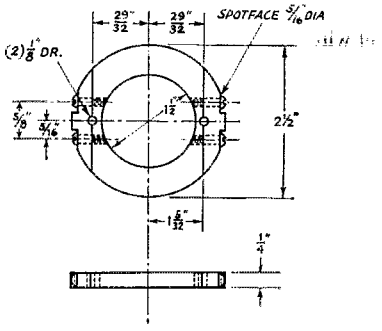


Fig. 10 — Transmission-line spacers. The side pieces clamp the line conductors to the remainder of the ring. The material is acrylic thermoplastic such as Plexiglas.

the wires can be kept uniform by using spacers built as shown in Fig. 10. Spacers placed every 30 feet or so appear to keep the line spacing satisfactorily uniform.

It appears advantageous to terminate the transmission lines at the center of the base line and to transform to unbalanced line before adding the signals in the hybrid. A termination pole at the center will in addition permit the use of several base lines all having the same centers.

The Hybrid

Fig. 11 shows a hybrid that has proven to be satisfactory. The ring is made of 70-ohm cable

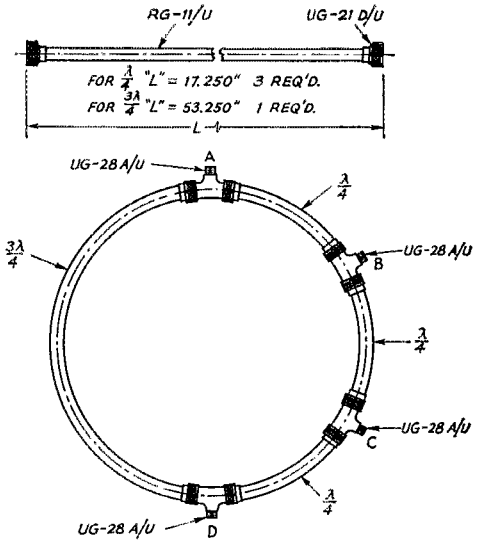


Fig. 11 — Construction of the hybrid junction.

(preferably double shielded) and the antennas are connected to A and C B then has a null output when the signals at the antennas are out of phase and D has a null output when the antenna signals are in phase. Fig. 12 shows the measured isolation between arms B and D with matched loads on A and C as a function of frequency.

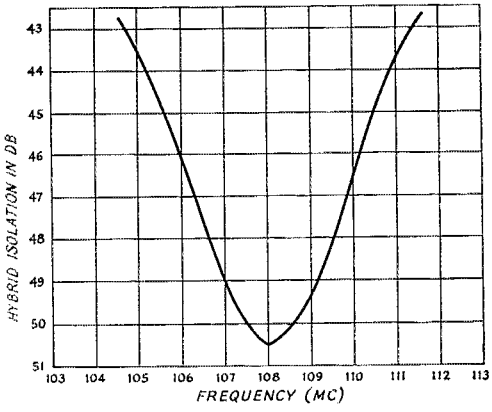


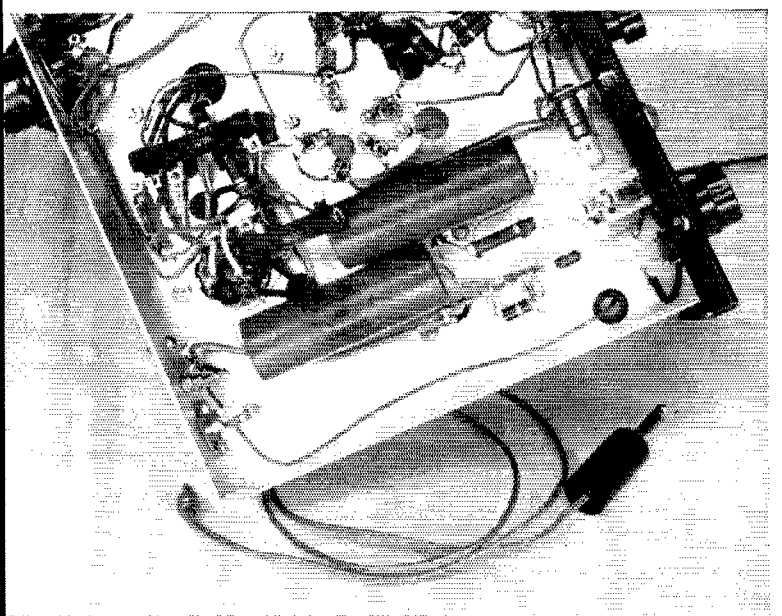
Fig. 12 — Measured isolation in a hybrid junction of the type shown in Fig. 11.

Acknowledgments

A large number of personnel have helped in the design of these components. Among them are Dr. Robert J. Adams, Louis D. Breetz, M. G. Dennis, Lawrence L. Gasch, J. A. Kaiser, Paul A. Lantz, Robert M. Porter, Dr. Alan J. Simmons, and Martin J. Votaw.

Strays

W2FW found a new source of surplus radio gear — his local junk yard has all sorts of bargains.



A $1.69 Keying Monitor

For Cathode-Keyed Transmitters

BY
LEWIS G. McCOY,* W1ICP

The monitoring oscillator installed in a Viking Adventurer. The NE-2 neon bulb and R_3 are mounted on a tie-point strip to the right of the lower filler capacitor and the two capacitors in the monitor circuit are supported by the strip and the key jack. The voltage divider resistors, R_1 and R_2, are mounted in the power-supply section on existing terminals.

WHILE THERE ARE some exceptions, most c.w. operators find it difficult to send their best code without monitoring the keying. Commonly the listening is done on one's own receiver, which when working someone on the same frequency presents no problem except proper juggling of the gain control. The crystal-controlled Novice doesn't want to limit his operations to those few frequencies for which he owns crystals, but in jumping back and forth with his receiver he runs the risk, in the crowded bands, of losing the other station. What the Novice, or anyone else, can use is a device that will permit the user to hear his sending regardless of the setting of the receiver. The keying monitor circuit shown in Fig. 1 is such a gadget.

This unit is designed to work with any cathode-keyed transmitter. If the reader doesn't know how his transmitter is keyed, a look at the diagram of his rig will bring the answer. It should be mentioned right now that the tone output of this device duplicates your fist, but is not a replica of the signal on the air.

Operation

The monitor is a neon bulb, audio-frequency oscillator connected to the keying circuit in the transmitter. Voltage for it is taken from the transmitter power supply through a voltage divider R_1R_2. The headphones are permanently connected both to the oscillator and to the receiver. When the key is closed, the oscillator generates a tone that is heard in the phones. The receiver can be switched to stand-by or left on, depending on the station controls. However, if the receiver is left on and the station being worked is on or very close to the operating frequency, then the monitor tone is likely to be drowned out by the receiver output. When the key is open, the neon bulb extinguishes and the audio oscillation stops, so received signals are heard as usual. High-impedance headphones must be used.

Construction

The monitor can be mounted as a separate unit with interconnecting leads to the receiver and transmitter. We preferred to mount it in the transmitter because then the only external leads needed were those to the receiver headphone jack. Practically any transmitter will have adequate space for mounting the few components.

The accompanying photograph shows the installation in a Viking Adventurer. Similar techniques can be followed with other transmitters. An open circuit-jack, J_1, was mounted on the panel between the dial light and the power switch. A tie-point strip was used for mounting C_1, R_3, and the NE-2 neon bulb. A length of

"Simplest" is an often overworked word in QST *titles, but its use seems to be justified in this article. Here W1ICP shows how to add a "sidetone generator" (as they say in the ads) to any cathode-keyed transmitter, at a cash outlay that is guaranteed not to break you.*

*Technical Assistant, *QST*.

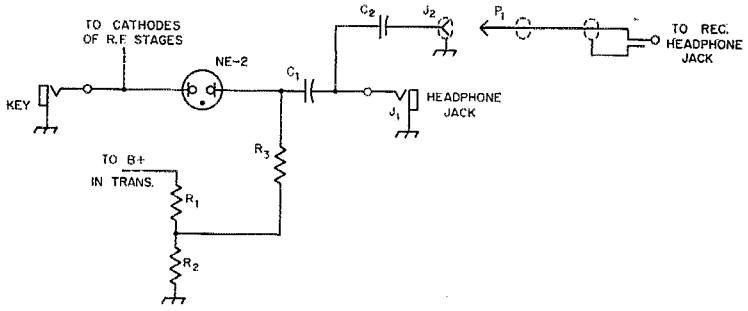


Fig. 1—Circuit diagram of the neon-oscillator monitor.
C_1—500-$\mu\mu$f. ceramic, paper, or mica, 500 V.
C_2—.01-μf. ceramic or paper, 500 V.
J_1—Open-circuit jack.
J_2—Phono jack.
P_1—Phono plug.
P_2—Phone plug.
R_1, R_2—See text and Table I.
R_3—6.8 megohms, ½ watt.

shielded wire was used to connect from C_2 to an RCA type phono jack mounted on the back of the chassis. The phono jack J_2 is used for the connecting lead from the headphone output of the receiver. A length of shielded wire with a phono plug at one end and a standard headphone plug at the other makes up the connection between the transmitter and receiver.

The voltage needed to operate the monitor is obtained from a voltage divider, R_1R_2. The values for R_1 and R_2 for some of the transmitters in current use are given in Table I. In cathode-keyed rigs other than those listed the values of R_1 and R_2 must be found by experiment. A simple method for doing this is to use a two-watt, one-megohm potentiometer (rated to carry two watts or more) as a voltage divider. One side of the potentiometer is connected to the B+ line and the other side to ground. The voltage for the monitor is taken from the arm (center terminal) of the potentiometer.

The adjustment of the potentiometer is simple. Turn on the rig but leave the key open. If a signal from the monitor is heard with the key open, adjust the potentiometer to the point where the monitor shuts off. Close the key and the monitor should be heard. If desired, the potentiometer can be mounted in the transmitter and used as the voltage divider. Otherwise, the resistance values each side of the potentiometer arm can be measured with an ohmmeter and one-watt resistors substituted for the potentiometer.

There are a few things we have pointed out in the past that bear repeating here. Always be careful in working around "live" circuits. When making connections or mounting components in the transmitter be *sure* the rig is turned off. As mentioned previously, the monitor will only work with high-impedance headphones. The receiver can be left on or switched to stand-by when transmitting, depending on how the user likes to operate.

Table I

Resistor Values for Voltage Divider

Transmitter	R_1	R_2
Adventurer	330,000	100,000
AT-1	330,000	680,000
Ameco AC-1	330,000	680,000
DX-35	1,000,000	330,000

Strays

I've Been Hamstrung

Holy smokes and Goodness sake,
I just received a card that made me shake.
You say my subscription to *QST*,
Has just run out. Oh woe is me

Rectifiers are red, and condensers are blue,
QST how I would miss you
Your pages are crammed with the latest dope,
Could I do without you, the answer is NOPE

I've got standing waves all over the place,
And my VFO is starting to race
Things are in rough shape as you can see,
And the only thing that helps is *QST*

Please find enclosed four hard earned bucks,
Flying to you with the speed of ducks,
I'm a lousy poet as you can see,
But renew my subscription to *QST!*

— *W0SXU*

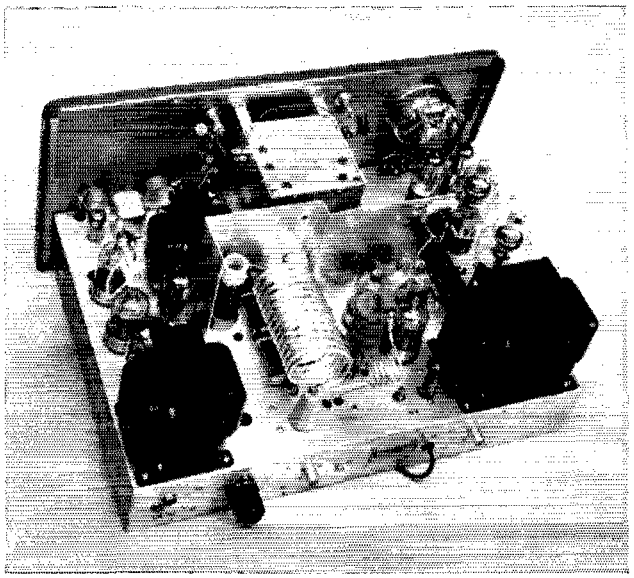
W3PGB recently participated in an all-continent roundtable in which the roll was called and acknowledgements received in just one minute and 25 seconds. Stations in on the feat included F7AC, HZ1AB, ZS6KD, KH6RU, YV5FL and W7DSO.

—•••—

A few months ago we published a brief Stray about a W6 who worked a couple of successive call signs on successive QSOs. Since then we've been swamped with letters and cards reporting similar coincidences. Okay, fellows, we surrender — it ain't as rare as we thought it was!

—•••—

Mr. Ohms of the General Electric Co. is secretary of the Detroit chapter of the IRE Professional Group on Vehicular Communications.



Rear view of the Viking "Valiant." Final-amplifier components are grouped at the center behind the baffle shield. The three 6146s are clustered around the plate-feed r.f. choke. The coil on the ceramic form to the left is for 160 meters. The neutralizing capacitor is in the upper right-hand corner of the shield. The box above the shield encloses the v.f.o. components, including its tube and screen-voltage regulator. To the left are the low-voltage power supply and modulator. At the right are the high-voltage transformer and 866 rectifiers. The baffle strips that seal the seam between the panel and cabinet can be seen inside the rim of the panel.

The Viking "Valiant"

WITH POWER-INPUT ratings of 275 watts on c.w. and s.s.b. (p.e.p. with auxiliary exciter), and 200 watts on a.m., the Viking "Valiant" fits into the gap between the "Ranger" and the "Five Hundred." Both mechanical and electrical designs follow closely those established in other "table-top" units of the Johnson line, with modifications to suit the power level.

The "Valiant" covers all bands, 160 through 10-meters, including the 11-meter band on a separate band-switch position. The pi-network output circuit is designed to handle antenna loads of approximately 25 to 2000 ohms at frequencies above 7 Mc., and 50 to 500 ohms on the lower frequencies, with enough additional latitude to compensate for several thousand ohms of antenna series reactance. A time-sequence system provides chirp-free break-in keying with adequate envelope shaping to minimize clicks. The a.m. modulator includes an adjustable clipper-filter, and provision for push-to-talk operation with control for an external antenna relay. Provision is also made for s.s.b. exciter input (3 to 4 watts p.e.p. across 50 ohms at the output operating frequency). An outlet at the rear of the transmitter affords access to the high- and low-voltage supplies, filament supply and modulator output for the operation of other gear, such as a v.h.f. transmitter.

R.F. Section

The tube arrangement is shown in block form in Fig. 1. A 6AU6 series-tuned v.f.o. with a broad-banded output circuit drives a 6CL6 buffer-doubler whose plate circuit is also broad-banded. This stage can be switched to serve as a grid-plate crystal oscillator. The 6CL6 drives a capacitive-bridge-neutralized 5763 buffer-multiplier having a conventional tank circuit with a separate panel tuning control. The screen of this stage is on a potentiometer so that the excitation to the final may be adjusted from the panel. The final has three 6146s in parallel and a pi-network output circuit. This stage is also neutralized by the capacitive-bridge method. Interstage coupling is capacitive.

Bandswitching System

A single panel control performs all band-switching functions. A three-position switch, cam-operated from the band-switch shaft at appropriate intervals, selects one of two basic v.f.o. frequency ranges — 1.75 to 2 Mc. for the 160- and 80-meter bands, or 7 to 7.42 Mc. for all higher-frequency bands. The third switch position adds a small padder that lowers the high-frequency range of the v.f.o. to cover 6.725 to 6.84 Mc. for 11-meter output. The basic frequency ranges are provided by two entirely separate temperature-compensated *LC* circuits with the tuning capacitors ganged. The illuminated v.f.o. dial has a calibration mark every 10 kc. on all bands.

The broad-banded output circuits of the v.f.o.

and 6CL6 are made up of combinations of fixed inductances loaded with resistance, selected by the band switch. The v.f.o. output plate circuit is on 160 for 160- and 80-meter operation and the 6CL6 operates as a straight amplifier on all bands except 10 and 11 meters where it doubles frequency.

The 5763 has a two-section tank coil tapped at appropriate intervals. It works as a straight amplifier on 160 and 40 meters, as a tripler to 21 Mc. and as a doubler on the remaining bands. All unused portions of the tank coil are shorted out.

In the pi-network output tank, the coil is in three sections with taps for the various bands. All unused portions are shorted. The variable tank capacitor is a 120-$\mu\mu$f.-per-section split-stator unit. On 160 and 80 meters, the two sections are in parallel and are padded with a series-parallel combination of four 600-volt silver-mica fixed capacitors totaling 330 $\mu\mu$f. On 40, one section of the variable is used in shunt with a second series-parallel combination of fixed capacitors totaling 150 $\mu\mu$f. On all higher frequencies the tank capacitor is one section of the split-stator variable with no padding.

On the output side of the network, a 360-$\mu\mu$f. variable is connected permanently in the circuit. A switch with a separate panel control adds fixed mica units as required.

Crystal-V.F.O. Switch

This switch has four positions — two for crystal operation, one for v.f.o. operation and one for setting the v.f.o. to frequency. For the first two positions, select one of two crystals (or a multiple-crystal plug-in unit) that may be plugged in through an opening in the panel. This opening is normally covered with a snap-in dummy knob to preserve shielding and panel symmetry. In either of the two crystal positions, the v.f.o. cathode circuit is opened and the v.f.o. output disconnected from the 6CL6 grid. There is an r.f. choke and feed-back capacitor permanently connected from the 6CL6 cathode to ground and the switch adds the other feed-back capacitor from grid to cathode to complete the grid-plate crystal-oscillator circuit. Crystals in the 160- or 80-meter bands may be used for 80-meter output, 80- or 40-meter crystals for output on 40, and 40-meter crystals are required for the remaining bands.

In the v.f.o. operating position, the switch establishes the v.f.o. connections, removes the 6CL6 grid feed-back capacitor and shorts the cathode choke and capacitor. The circuit is essentially the same when the switch is turned to the position for setting the v.f.o. to frequency,

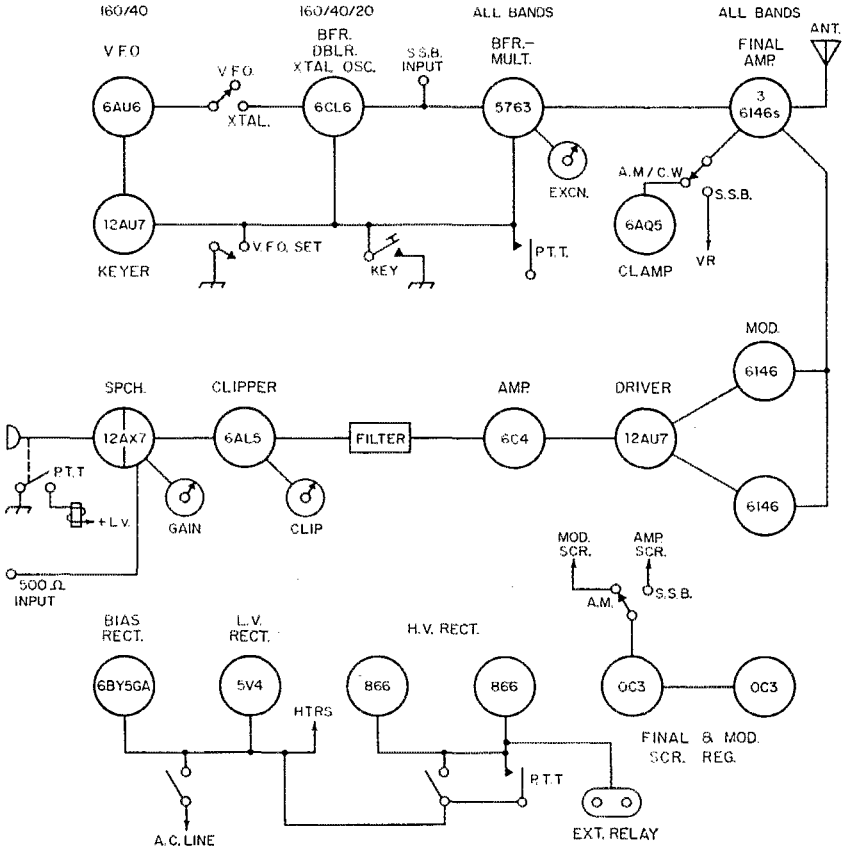
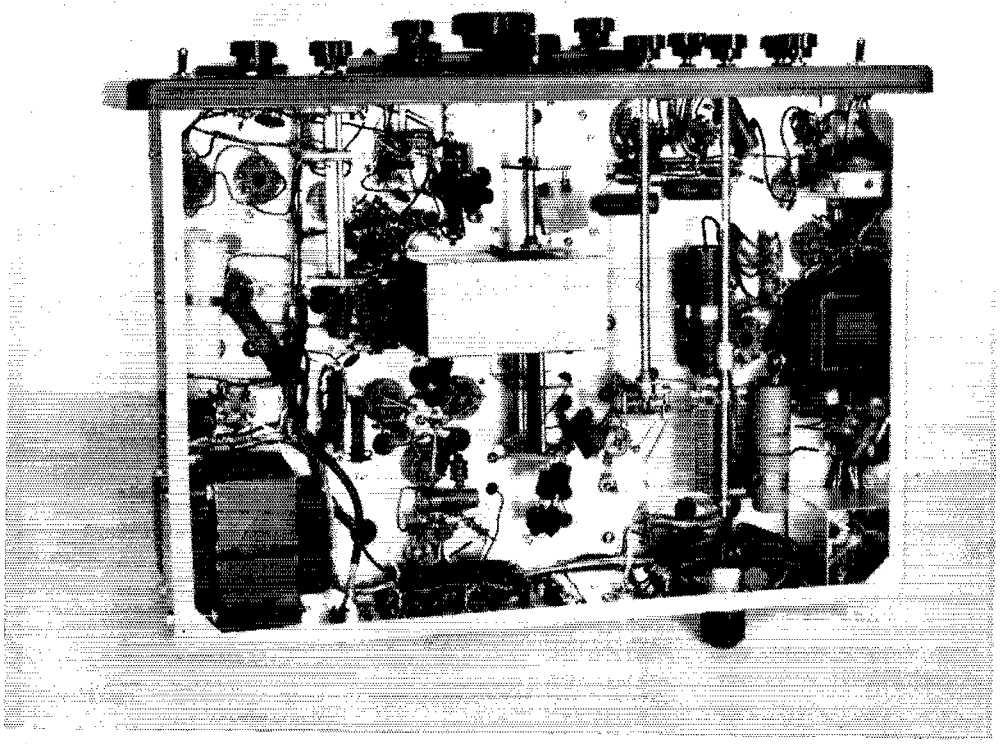


Fig. 1 — Block diagram of the Viking "Valiant."



Bottom view of the Viking "Valiant." The band switch is at the center. The shield encloses the switch section for the 6CL6 and the 5763, and the highest-frequency coils for these two stages. The mica capacitors connected to the bottom switch section are the pi-network input padders. The cam operating the v.f.o. crystal switch is immediately above the shield box.

The switch gang at the upper left is the mode switch. The pi-network output padder switch is to the right of the shield. Still farther to the right is the pi-network output variable. The high-voltage filter choke is in the lower left-hand corner, below the p.t.t. relay. The one in the low-voltage supply is at the right, below the driver transformer. The small coils at the bottom to the left are in the TVI filters in the a.c. input line and in the leads to the jack for an external antenna relay. Those to the right are in the TVI filters for the auxiliary power outlet. The small shield partition in the lower right-hand corner encloses the microphone and key jacks. Controls visible on the panel, from left to right, are for the low-voltage power switch, oscillator switch, mode switch, exciter tuning, v.f.o. tuning, band switch, final tuning, output padders, excitation control, output variable, clipping level, audio gain, and high-voltage power switch.

except that the key is shorted making it unnecessary to hold the key closed while setting frequency.

Keying System

The time-sequence keying system employs a 12AU7 to control blocking bias voltages to the v.f.o., 6CL6 and 5763 grids. The blocking voltage acts to turn the oscillator on an instant before amplifiers are keyed and to turn it off an instant after the key has been opened. The interval can be adjusted to the point where a breaking station can be heard between dots. The final, which is not keyed, is protected by a combination of fixed bias and a 6AQ5 triode-connected clamper which holds the plate current down to 10 ma. when the key is opened or the excitation otherwise removed.

Audio Section

A two-stage preamplifier using a single 12AX7 provides adequate gain for a crystal or high-impedance dynamic microphone. Provision is also made for 500-ohm line input to the cathode of the second stage. The gain control is at the grid of this stage. The microphone input jack carries connections for a push-to-talk switch which operates a relay that closes the key circuit, turning on the exciter, and also closes the primary circuit of the high-voltage transformer.

The preamplifier is followed by a clipper-filter using a 6AL5 dual diode. The clipping level — up to 20 db. — can be adjusted from the panel. The filter restricts the audio-frequency range principally to a band between 250 and 3000 cycles. The filter is followed by a third audio stage using a 6C4 which feeds the 12AU7 driver with its triodes in parallel. The driver is transformer-coupled to the 6146 Class AB_2 modulator.

Power Supply

The power supply is in two sections. One, using 866s and a single-section choke-input filter, supplies 620 volts for the plates of the final and

modulator tubes and, through dropping resistors, voltage for the screens of the final and modulator. The primary of the plate transformer of this supply is shunted by a connector at the rear for control of external 115-volt a.c. relays. Both are controlled either from a panel switch or the p.t.t. switch.

The other supply, which furnishes all heater power (6.3 volts), has a dual rectifier. One rectifier, using a 5V4 and capacitive-input filter, supplies 300 volts for the plates of the speech amplifier and the plates and screens (through dropping resistors) of the r.f. exciter. Screen voltage to the v.f.o. is stabilized with a 0A2 regulator tube. A tap on this supply is used to operate the push-to-talk relay.

The second rectifier (half-wave) uses a 6BY5GA with its elements in parallel and a capacitive filter. It supplies a negative bias of 265 volts for the keying system and lower voltages for the final and modulator grids. The primary of this supply has a panel control switch which is in series with the primary of the 600-volt supply so that the latter cannot be turned on unless the low-voltage unit supplying bias is in operation.

The power unit is protected by a pair of fuses in the a.c. line plug and a separate fuse in the primary of the low-voltage supply.

Auxiliary Power Outlet

The auxiliary power outlet provides a means of using the "Valiant" high- and low-voltage supplies, filament supply and the modulator for operating other equipment. The voltages available are 620 volts at 350 ma., 300 volts at 75 ma., and 6.3 volts at 9 amps. The modulator power output is approximately 100 watts. Removing a jumpered plug from the outlet disconnects the power supply and modulator from the r.f. section, but leaves the modulator connected to its power circuits. The panel power switches and the push-to-talk system of the "Valiant" may be used for control of power to the auxiliary equipment. The control for the external relay is also still available, of course.

Metering

A milliammeter calibrated in three current ranges may be switched to read combined v.f.o. and 6CL6 cathode current, 5763 cathode current, grid or cathode current to the final, and cathode current to the modulators. There is also an off position to keep the meter from taking a beating during c.w. operation.

Mode Switch

The mode switch has three positions. In the c.w. position, the key is activated, the 620-volt power unit supplies final screen voltage through the clamper-tube system, the screens of the modulator are grounded, and the secondary of the modulation transformer is shorted. In the a.m. position, the key is shorted, the short is removed from the modulation transformer, and the modulator screen voltage is regulated by a pair of 0C3s in series. The clamper is still in operation on a.m. to protect the 6146s during adjustment, or failure of excitation. In the s.s.b. position, the grid of the 5763 stage (this stage as well as the final is operated as a linear on s.s.b.) is disconnected from the 6CL6 output and connected to the s.s.b. input jack, the screens of the modulator are grounded, and the screen voltage to the final is regulated by the 0C3s.

General

The "Valiant" is supplied with a one-piece cabinet, tightly bonded to the chassis with a generous supply of screws. The seam between the panel and cabinet is sealed on the outside by the panel which overlaps the cabinet, and on the inside by tightly-wedging baffle strips. All power leads, including those to the meter, panel lamps, auxiliary power outlet, antenna-relay jack, key jack and power plug have capacitor-inductor TVI filters.

The unit measures 21⅛ inches wide, 17⅜ inches deep and 11⅝ inches high. It weighs 83 pounds. Input from the line is 185 watts in stand-by condition, and 560 watts under fully loaded conditions on all modes. — *D. M.*

Strays

Because of the unprecedented number of entries in the 23rd ARRL International DX Competition, the June V.H.F. QSO Party and the 1957 Field Day, DX Test results cannot be presented this month. Logs are being processed by Communications Dept. personnel at a rapid rate, however, and final standings will soon appear in *QST*. Please bear with us.

—···—

The MARS-USAF Eastern Technical Net continues operation on 3295 kc. and 7540 kc. on Sunday afternoons starting at 1400 EDST.

The list of speakers for September, and their subjects, includes the following:

Sept. 8 — Mr. Robert I. Colin, of Federal Telecommunication Laboratories, will speak on "TACAN, Aerial Navigation."

Sept. 15 — Mr. James Douglas, of Yale University, will speak on "Venus Calling."

Sept. 22 — RADM Rawson Bennett, Chief of Naval Research, will speak on "What Research Has Done For Electronics."

Sept. 29 — Mr. Harry Wallace, of Interference Associates, will speak on "Radio Interference Reduction and Measurements."

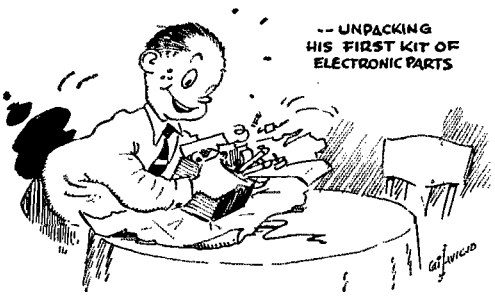
How's Your Soldering?

Practical Pointers on Making Good Joints

BY JOHN E. MAGNUSSON,* WØAGD

• **Everybody knows how to solder — or so they think. It will pay to read this, just in case you may have missed one or two of the fine points.**

UNDERSTANDING the art of soldering always has been necessary for the radio constructor, and since the introduction of kits for the amateur, the need is more apparent than ever because of the more complex equipment being put together by beginners. We hope that the following may be of as much interest to the old timer as to the new member of the club excitedly unpacking his first kit of electronic parts.



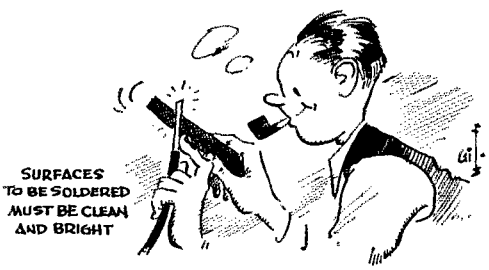
In order to understand some of the difficulties encountered in soldering it is necessary to appreciate exactly what it is that we are attempting to accomplish. Soldering is the bonding together of two similar (or dissimilar) metals by means of a third metal which exhibits the property of adhesion when in the molten state. The melting temperature of solder, a mixture of tin and lead, is determined by the percentage of tin. The proportions of tin and lead are usually indicated by the manufacturer, 50–50 being a common mixture for electrical work.

The principal obstacle to good soldering is oxidation. The rate at which a metal oxidizes is a measure of its resistance to the adhesive property of the solder. Aluminum will oxidize at a rate practically equal to that at which the melting solder is applied, so regardless of the size of the soldering iron or the melting temperature of the solder, attempting to solder aluminum turns out to be an exasperating ordeal as long as the oxygen ever present in the air is in contact with the aluminum. The thin coating of aluminum oxide that forms will not allow the solder to adhere to the clean metal directly below.

You say you can't construct a vacuum chamber in order to solder two pieces of aluminum together? No need to, since the application of a high viscosity oil or grease immediately on cleaning the surface to be soldered will protect it from the atmosphere and allow the melted solder to gain access to a clean area free of oxidation. An easier way to solder aluminum, should the occasion arise, is to use an aluminum flux. Even so, the amount of energy expended in the preparation of the surface before applying the flux will be reflected in the degree of success obtained. This also holds true for other metals than aluminum; stubbornness to the adhesion of solder with any metal merely indicates the presence of oxidation in varying degrees. Soldering two new and shiny pieces of copper together is a real pleasure. So the first rule is that the two surfaces to be soldered must be clean and bright.

The Importance of Proper Heat

Contrary to the general impression, there is a great deal more to soldering than merely melting the solder with an adequate amount of heat and piling it neatly (or otherwise!) on the junction to be bonded. Surprisingly, there are more people soldering poorly than there are doing an adequate job of soldering. Manufacturers selling equipment in kit form will concur that the largest percentage of trouble experienced by customers is directly traceable to the inability to solder properly.



Take the example of the too-common "rosin joint" or "cold joint." When several connections have to be made to a single tie point the result will often be a cold or rosin connection unless proper precautions are observed. As heat is applied to the solder and the connection, the rosin flows around each individual conductor connected to this particular tie point in order to keep the metal clean and free from oxidation for the solder to follow. If an inadequate amount of heat is applied the rosin will not be displaced by the solder, and as the connection cools a thin coating of rosin actually insulates each connection from the other and the tie point. In a circuit where an appreciable amount of voltage is applied the

* 2728 Dalewood Ave., S.E., Cedar Rapids, Iowa.

rosin film may break down and may never become evident to the builder. However, the connection might be for the grid of the first audio stage, where we are dealing with a few hundredths of a volt, and in that case we could just as well have left the connection out of the equipment for all the good it will do.

By the same token, excessive heating of a connection will have the same unhappy effects. The solder itself will oxidize when overheated. All of us have had the experience of picking up a soldering iron after a long period of heating on the stand and finding it practically useless. The gray and granular-looking appearance of the tip indicates oxidized solder. Eventually this gives way to a crusted black copper oxide which makes the iron useless until retinned.

Overheating of the connections may also have more serious consequences than a poor connection electrically. The values of composition resistors will change very appreciably with excessive heating, and the semiconductor devices employed in some circuits may be destroyed. A little common sense goes as far in soldering as it does in any other endeavor: use enough heat to make the solder flow freely but don't apply the iron any longer than is necessary to make a good joint.

Applying the Iron and Solder

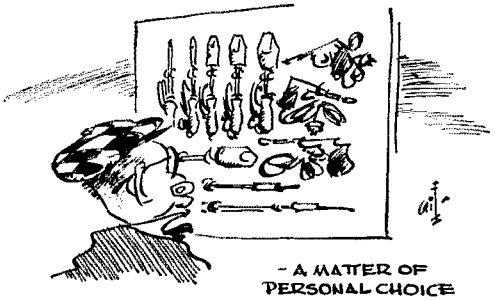
The old saying about the craftsman and the condition of his tools certainly applies when one considers the tip of the soldering iron — called, more correctly, the "soldering copper." This copper tip will oxidize at an alarming rate when heated unless it, too, is protected from the atmosphere with a thin coating of solder. During an evening session of soldering it is advisable to wipe the tip clean occasionally with a dry cloth and replace the excess solder just removed with a fresh supply. A heat-regulating stand also will add greatly to the life and usefulness of the instrument. With the tip of the soldering iron in top condition, and using a good grade of solder with a rosin core, one should be able to place the tip on one side of the connection to be soldered and the solder on the opposite side and actually pull the melting solder through the junction as it becomes heated to the proper temperature. In order to provide maximum heat transfer from the tip to the connections to be soldered, it is usually desirable to melt a small amount of solder between the tip and the connection before moving the supply of solder to the other side. But don't attempt to solder by melting the solder against the tip and letting it run onto the work. This will burn up the rosin before it gets a chance to do its job of cleaning the way for the solder itself.

Once the solder is flowing smoothly through the connection there is no need to pile on an excessive amount of solder since it will add little, either electrically or mechanically, to the connection. When in doubt as to the reliability of a given connection merely reheat it, adding the minimum possible amount of solder, and see whether there is any evidence of rosin boiling up through the melted solder. Again keep in mind that prolonged heating of a connection may have the same ill effects as inadequate heating.

It is generally safe to say that the ease with which the connection takes the solder is a good indication of the reliability of the joint. Connections that seem to take twice as long and twice as much solder as normally expected should be examined closely; the possibility that the solder has flowed away from the joint to nearby connections is ever present. This form of short circuiting is quite common in the crowded areas around tube-socket terminals and the terminals of multiple tie points. Such a difficulty is usually indicative of excessive oxidation of the leads or terminals, and usually a small amount of scraping is necessary in order to achieve the proper electrical connection. Patience is a very rewarding virtue in soldering, since tracking down a poor or intermittent connection later can be as frustrating as trying to put a raw oyster in a parking meter.

Soldering Irons

The selection of equipment is more or less a matter of personal choice. The present-day market displays a wide variety of soldering pens, guns, and irons of all shapes and sizes, with and without thermostatic control. Experience dic-



tates that at least two sizes are almost an absolute must. Perhaps the most generally useful soldering iron for general building, as well as repair work, is the 60-watt size. This size is small enough to get into fairly tight spots, but still has enough capacity for the heavier connections that are typical of transmitter tank circuits. A fine follow-up for occasional heavy work is the fast-acting two-speed 200–250-watt soldering gun.

A reasonable amount of care should also be used in the selection of solder. Never use reclaimed solder in the construction of electronic equipment of any kind. (If the solder is reclaimed it should be clearly marked on the end of the spool.) By the same token, avoid bargain solders and you'll avoid bargain connections. And always use rosin flux on radio gear.

As is true in all pursuits, experience is the best teacher. The knack of being able to solder almost anything at will comes after exposure to several discouraging defeats. One cannot expect to master soldering in a few easy lessons, but one can improve upon his present ability, regardless of experience, by assuming that there is possibly a little more to learn about it.

Transmitter Hunting—South Jersey Style

Hare and Hounds on 144 Mc.

BY T. E. STEWART,* W2TBD

The incidents related here are from a film on transmitter hunting that will be presented by the South Jersey Radio Association at the National Convention in Chicago. Whether you see the show or not, we think you'll enjoy W2TBD's story of a typical day in SJRA's summer hunting season.

TRANSMITTER hunting started on the v.h.f. bands, although in recent years it has degenerated, in many quarters, to an activity for mobiles on 10 and 75 meters. But not in Southern New Jersey. Always a hotbed for v.h.f. interest, the area served by the South Jersey Radio Association has seen 2-meter transmitter hunting (and hiding) developed to a fine art. Here is the story of a typical hunt, together with some ideas on equipment and antennas.

Saturday dawned bright and sunny; the first club-sponsored v.h.f. hunt of the season seemed assured of success. The Committee had outdone themselves in their intriuge. Plans called for a two-stage affair, beginning hare-and-hounds style and winding up with a hunt for a fixed station. As the day progressed it became apparent that Brownie and Joe, who manned the quarry, had provided us with some real teasers.

Everyone was checked in so, with putt-putt running in the trunk, Brownie's prewar sedan rumbled out of the park entrance. A vibrator in the audio of his mobile rig ground out a tremendous roar on the local net frequency. Around us the hounds waited impatiently through the specified 3-minute interval before the chase, a motley assortment of beams tracking the signal. At the starter's wave all sped off in the same direction in hot pursuit; all except Wrong-Way Charlie, who with cut-down 10-meter loop and knowing look edged furtively out the back way. Haywire Harry, beam pole set in a tomato can on the running board, made it to the edge of the park, but was forced out when his high quad ran afoul of low branches.

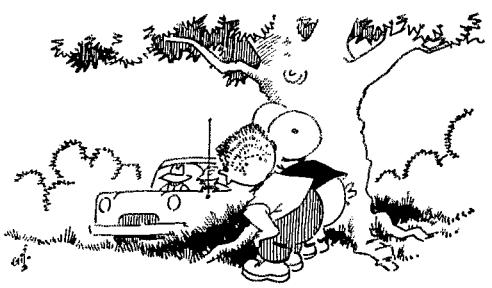
Brownie and Joe, proceeding according to plan, drove at once to Joe's almost-new black V8, parked a few blocks away. They jumped in, fired up an identical transmitter setup and returned to the park by the same route. As an extra dodge they changed from casual summer clothing to business suits, ties and sinister-looking slouch hats. Sitting at the edge of the parking lot they did their best to look like plain-clothes men from the local constabulary, investigating the strange activities in the area.

The parking spot was important, for it had been prepared previously by burying a long run of coax that extended several hundred feet across the bottom of a small lake. There it fed a quarter-wave hair-wire antenna, suspended at water level under a rustic bridge that would be crossed by the returning cars. A switch for changing between the car whip and the remote antenna enabled our rabbits in snap-brim hats to give the hounds a stereophonic feeling, as they followed the shifting scent.

The wagging of antennas in the traffic jam that built up around the bridge was a sight to behold, and the hares surveyed the scene with inward glee. When they felt that enough attention had been brought to bear on the bridge they switched to the car broadcast whip again, leaving the now-dismounted hunters with their sniffers in a disquietingly dead spot. Some of the die-hards persisted, however, and eventually, the hidden wire and its coax were discovered. But the purpose of the hunt is to find the *transmitter;* finding the antenna is only an early stage, especially in this instance where the coax ran off into the murky depths in a long loop purposely lying in the wrong direction. Everyone was here now but Wrong-Way Charlie, who was at a filling station several miles away, dissecting his gear to find out what had become of the signal.

Uncle Phil reasoned that even well-laid plans did not include waterproofing the transmitter. The coax must come out of that pond somewhere!

* Sunset Trail, R.F.D. 2, Medford, N. J.



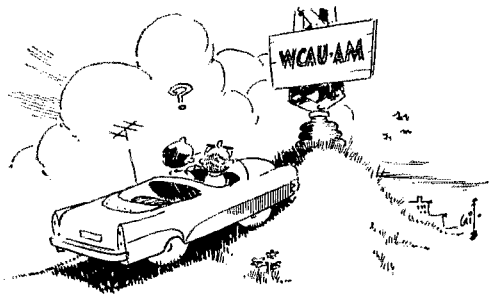
Finding a soft spot in the sand after much searching, he triumphantly dug up the cable — a few feet from the end recently cast off by the hares. They had moved unobtrusively to another spot, passing close by a bench where Eddie sat, changing batteries in his sniffer. Ed was startled to see his meter hit the pin, but he charged it off to a battery short!

From this spot the quarry maintained their outwardly unfriendly appearance until doggedly tracked down by Phil and Ed, who made several passes before building up courage to challenge the forbidding-looking pair. The field was close behind — all except Charlie, who was now beating his way back for a fresh start.

* * *

The second phase of the hunt got under way as soon as the hunters could get into position. This time a strong signal was picked up from a direction that indicated the heart of the city. Again everyone was off in the same direction — except Charlie, who had come up just in time to make a right turn and head for the suburbs.

Miscellaneous sources of r.f. power get "found" during these sessions. Chet and Augie thought that a main highway would save them time. Stopping for gas, they noted that their sensitive sniffer was showing a strong indication, while resting on the back seat. Hooking on the beam, they tracked down the source, and spent some minutes outside WCAU, 50-kw. a.m. station. A

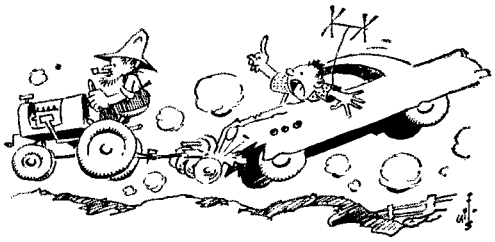


member of the hunt committee was employed there; this must be it. Disillusionment set in when they finally plugged in headphones and listened to the broadcast program.

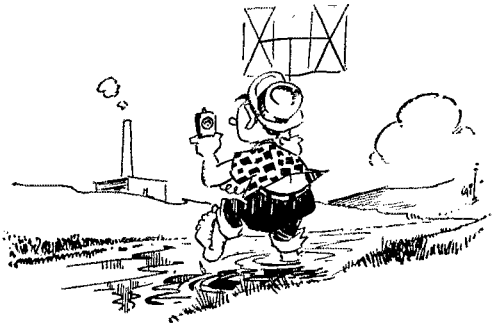
Frankie thought the country route was attractive. With a good signal on his meter he turned into a lane alongside a field where a farmer was working with a tractor. Making a sweep around the end of the field, the farmer turned close to the car to look over its crazy occupant suspiciously and started down another row with his cultivator — and Frankie's car, which had become firmly impaled, in tow!

Red was confused by a strong signal and wandered off into the suburbs. At one point he found it necessary to wade across a small stream. He was met on the other side by a helpful gentleman who suggested that a bath might now be in order, since he had just crossed the outlet of the village sewage-disposal plant.

Coop worked methodically downtown, and was



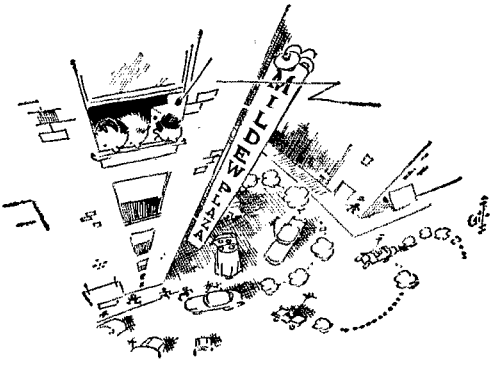
observed in the process of examining several metal trash cans in back of a local restaurant. Possibly they were close to resonance, for he seemed to be getting good readings. Sam was also working the downtown area, and getting good signals. His car began overheating, and he stopped to lift up the hood and have a look. The voice of the hidden station operator called through his receiver, "It's not in there!"



The fine view of the downtown hunting was afforded by the site of the hidden station, several stories up in a hostelry known locally as Mildew Plaza. Brownie and Joe watched the fun as each party arrived. Latecomers found Phil resting in the lobby. He had just discovered that the wide variety of readings he had obtained in sniffing the lobby had resulted from various positions of the old-fashioned cage elevator, and not from closeness or remoteness of the quarry.

Again everyone had arrived but Charlie. His propensity for wrong turns had worked out well, however. He'd found Frankie and was helping him drag his bus out of the cultivated field.

In the systematic floor-by-floor, door-by-door



search that followed, an unexpected clue gave the hiders away. CCS operation with ICAS ratings had proved too much for the hidden station. Sensing that the familiar smell of a hot power supply was positive evidence, Eddie abandoned radio methods and started sniffing at transoms. There was soon no doubt about which door to open. There was nothing left then but to air out the room and call the rest of the gang together for distribution of prizes and refreshments — and for the riotous post-mortems that are an inevitable part of any day's hunting.

Hints on Hunts

Receivers — Most hunters use Communicators, but they quickly find that the green eye is much too insensitive to serve well as a signal-strength indicator. A common approach is to connect a microammeter from the a.v.c. line to ground. This can be done with a wire connected at the magic-eye tube and brought out through the back of the case for connection to the meter. This reduces the a.v.c. action and gives a very satisfactory indication of signal strength.

Several fellows use converted 522 receivers, with conventional noise limiter and S meter circuits. The *Handbook* is helpful here.

My receiver is a Mallory TV tuner running into an old auto receiver chassis that still has its audio and power supply intact. Three stages of 21-Mc. i.f. and a diode detector and S meter were added. There are other more-or-less conventional converter-receiver combinations.

Hunting is a two-stage process. The general locality is reached through the use of a fairly sensitive receiver and indicator, and then the process is taken over by the "sniffer."

Antennas — The cubical quad with reflector is popular. The driven element usually has two turns, and is fed with 75-ohm coaxial line, through a balun. (See Fig. 1.) The reflector is a 1-turn loop, with hairpin or capacitor tuning. W2PAU

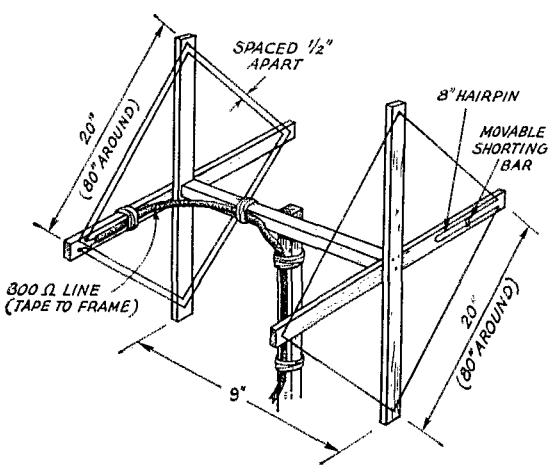


Fig. 1

uses a single-turn driven element fed through 75-ohm coax and a detuning section which is wrapped around the supporting pole. Quads seem to show less effect from the car body than other antenna types. By means of careful tuning they give a very useful pattern for hunting purposes: a broad frontal lobe and low back response. Tuning of the reflector is critical, but is found readily by adjusting for a single rear lobe, rather than a split one. The quad shown in the sketch is for vertical polarization. For horizontal, rotate the boom 90 degrees in the vertical plane.

Conventional parasitic arrays and all-driven arrays have been tried. The parasitic array varies so greatly with changes in its relation to the car body that it is somewhat unreliable. All-driven systems can be made to give very high front-to-back ratio, but adjustment is fussy.

Loops of the type used in hunting on lower frequencies are generally too insensitive for our purposes, where a single antenna is used for both initial reception and close-in tracking down.

A quad array is big enough so that few hunters care to carry two on the chase. They use a single array, arranged for quick disconnection from the car and reconnection to the sniffer unit. Ski racks come in handy for rigging mounts that are readily removed when the hunt is over. (Few families fancy riding around in a car that is permanently equipped with a 2-element quad!)

Sniffers — These are small portable field-strength meters. A parallel tuned circuit with a crystal diode and meter tapped down toward the cold end as shown in Fig. 2 will do. Transistor d.c. amplifiers are helpful in extending the useful

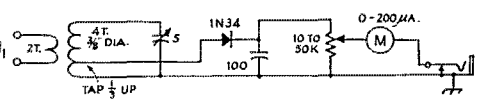


Fig. 2

range of such devices. R.f. amplifiers help still more. The 6AJ5 is a good tube for such r.f. amplifier service. It is like a 6AK5, but it works well on very low plate voltage.

Most sleuths like to have coaxial switching, so that the antenna can be changed from the receiver to the sniffer quickly. You soon get to recognize the approximate signal level at which the sniffer can be used, but it is helpful to be able to change back and forth at will. The meter should be arranged so that it can be "worn" but don't forget to provide for quick disconnecting here. RCA-type phono plugs and jacks are fine — and they will prevent you from breaking your neck or wrecking some of the gear, when you dash madly out of your car in the excitement of closing in on the prey!

Ideas from "SJRA Harmonics," June, 1957, Issue

Arrange your d.f. antenna so that it can be rotated from inside the car, and while the car is in motion. Too much time will be wasted if you have to stop to take bearings. Also, bearings may change due to reflections; the average of a number of readings is better than a single fix. And unless you are psychic, or have a partner who is,

it's best to arrange your setup so that you can work it while driving. Most successful hunters prefer to work alone. (Who cares about dented fenders, anyway?)

Existing antennas on the car should be removed, run down, or folded flat, to avoid the possibility of their gumming up readings. Minor reflections can prevent a sharp null, often helpful in accurate tracking close in.

Super-regenerative receivers are simple, but visual indication is difficult to obtain with them. Audio output meters can be used if the signal is modulated — but this opens up another avenue for the hidden station operator to confuse the hunters.

In using a conventional v.h.f. receiver for strong signals, it is handy to be able to reduce the r.f. gain. This can be done by applying controlled bias to the r.f. amplifier stage, or by inserting a variable r.f. attenuator in the antenna feed line. For best results the control should act on the first r.f. stage, and not only on the i.f. stages, as so many "r.f. gain controls" do.

Tuning the d.f. antenna for maximum front-to-back ratio is important. Do this under ideal conditions, if possible. This means a clear space free of reflections, with known direction to source of r.f. power having same polarization as your array.

New Life for Old Clubs

If your club customarily folds up for two months during the summer, you're missing one of the best possible bets for building up club spirit and giving everyone a pile of fun. Hunts held before regular meetings, or during week-end picnics, will make the summer season the best of the whole year for the club, instead of a time when club relations fall apart, and have to be picked up again in the fall. Happy hunting!

Strays

One of the most worth-while club projects which has come to our attention in a number of moons is the publication of a Greater Kansas City Call Book by the Heart of America Radio Club of Kansas City, Missouri. This project was sparkplugged by Ben Walker, KØAEU, President of HARC. All amateurs residing within a radius of approximately fifty miles of Kansas City are included, being listed by call and cross referenced by both geographical location and last name. The book is a standard 8½ x 11 page size and contains approximately one thousand hams. Wherever possible, their telephone listing is also included. This can be of tremendous advantage to travelling hams who approach the Kansas City area, for if they sight a ham installation, they will be more than welcome to stop and browse through the Call Book.

Other clubs can undertake a similar project with the entire cost covered by the advertising obtained. — *W1FL-WØWYK*

—···—

"Man bites dog," says W6YY. A Russian sent John a 10-ruble note, asking for W6YY's QSL.

—···—

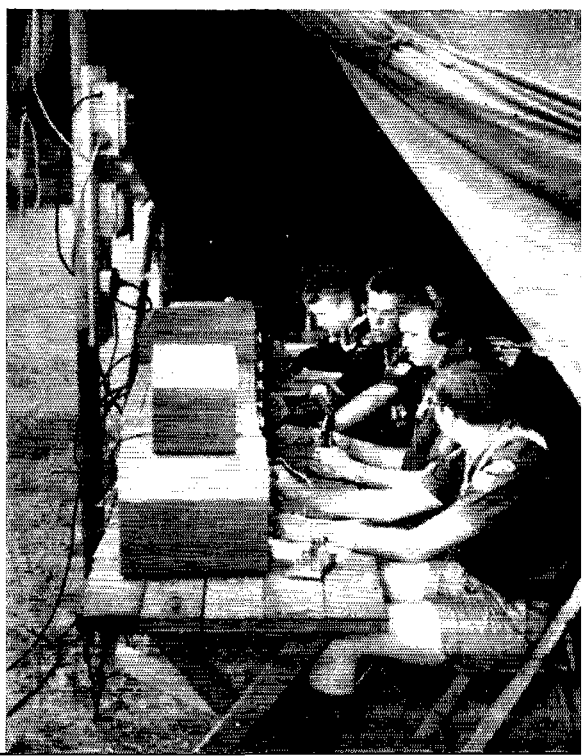
KN4OWM tells us that within less than two hours one morning he worked both KN4KID and KN4OLD!

—···—

How to confuse the postmaster! VE1QY and VE1YQ both live in Yarmouth.

—···—

Even W1AW has gotten into the coincidence act. Two consecutive contacts the other night were W3FOX and W3DEN.



Field Day? No, this is the General Class tent of K3BSA at the Fourth National Jamboree of the Boy Scouts of America. Another tent nearby housed the Novice shack. From July 12 through July 18 the station worked nearly a thousand hams, many of them Scouts, on all bands from 80 through 2 meters. About 350 amateurs and at least twice that number of SWLs visited the station in Valley Forge, Pennsylvania, during the week, but the lucky ones on watch when the Norristown Times Herald photographer came by were K9AYI, W9WVM, K2EAZ and Idaho SWL Kent Johnson.

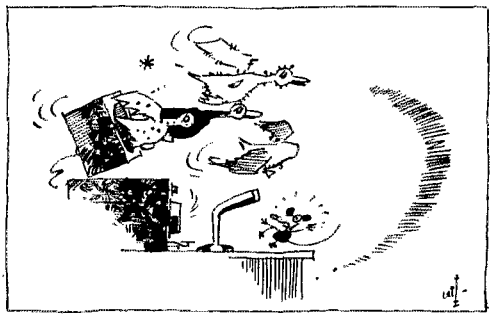
K3BSA also played an important part in the very beautiful ceremony used to close the Jamboree. Early in the morning of July 18 the station had a schedule with KC1USA and recorded the voice of Explorer Scout Dick Chappell, who is with the polar expedition, reciting the Scout Oath. That evening, the tape was played back in the main arena, and more than 50,000 Scouts, each holding a lighted candle, joined Dick in re-dedicating themselves to the principles of the movement.

Side Band

R. B. BOURNE,* W1ANA

THE EARLIEST recollections, 1924. The eavesdropping on transatlantic telephone conversations. The coming of the speech inverter. The end of the eavesdropping. The long lapse of time. The appearance of side band on ham frequencies. The articles in *QST*. The mild interest. Norgaard's demonstrations at hamfests. The appearance of more stations on the air. The unnatural sound of the thing. The difficulty in tuning it in. The acquiring of knowledge. The modicum of study. The fooling around. The irritations. The greater ease of tuning it in. The lousy rigs. The drifting v.f.o.'s. The drifting b.f.o.'s. The thumbs down.

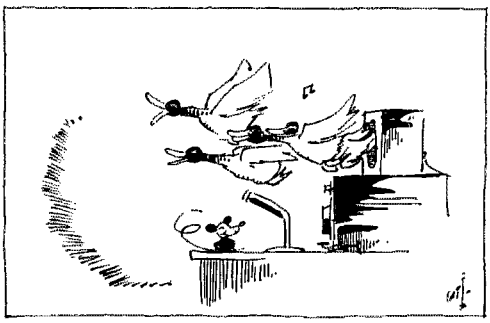
The old timers taking it up. The young squirts messing around with it. The encroachment on long-used spots in the band. The holier-than-thou's. The moving down of five kc. The further encroachment. The moving down of ten kc. The actual appearance of the stuff in "sacred" parts of the band. The recognition of well-known voices. The sprinkling of excellent side-band stations. The real nice guys. The stinkers. The compatibles



and the incompatibles. The neutral attitude.

The diehards. The never-dies. The delicate inferences. The polite innuendoes. The not-so-polite innuendoes. The horselaughs. The Disneyisms. The open insults. The bitter feuds. The face-the-facts arguments. The calm arbiters.

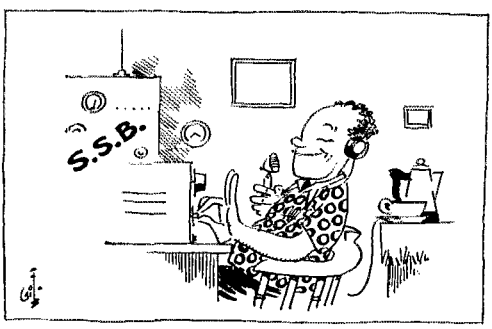
The proven worth of the stuff. The deliberate interferences. The mounting disgust. The changing to another band. The return to the original band. The changing face of the band. The realization of progress. The sensation of slipping a little. The borrowed exciter. The lash-up. The crazy patterns on the scope. The timid barefoot tryout. The immediate response. The considerable thrill. The making of new acquaintances. The renewing of old friendships. The new vocabulary. The adaptation to new procedures. The desire for more power. The attempt to get it. The bow tie from the exciter. The flattened bow tie from the lash-up "linear". The continuing contacts on a.m. The ribbing from old friends. The lingering doubts. The reluctant return of the loaned equipment. The gloating of the "I-told-you-so's."



The progress in the art. The appearance of modest "black boxes." The discussions of commercial rigs over the air. The troubles from too rapid development. The ups and downs in the trade. The careful watching of trends. The appearance of new rigs on the market. The lapse of time. The inescapable conclusion. The look at the checkbook. The unexpected expenses. The enforced delay. The appearance of a new package. The glowing reports. The continuing glowing reports.

The placing of the order. The cash on the barrel head. The early delivery. The peachy little wireless sender. The clacking antenna relay. The soundproof box. The noisy fan. The resilient mounting. The coax fittings and jungle of cable. The reluctance to give up the half-gallon a.m. rig. The making of more new friends. The swell guys. The genuine welcome. The compliments. The absence of wisecracks.

The slipping of some diehards. The appearance of same on side band. The pulling in of necks. The two-grand jobs. The homemade jobs. The not-so-linears. The power gluttons. The



timid ones. The chronic yackers. The sameness of voices. The learning to distinguish. The careful tuning. The passing of the armchair. The better stabilities. The return to the armchair. The enjoyment of side band. The enjoyment of a.m. The satisfaction of having good rigs.

It's here to stay.

* 27 Sulgrave Road, West Hartford, Conn.

Results of Armed Forces Day 1957

Two hundred and thirty contestants have been mailed certificates of merit signed by C. E. Wilson, Secretary of Defense, in recognition of making perfect copy of the special Armed Forces Day message to radio amateurs. The message was transmitted at 25 w.p.m. by military stations on 18 May 1957. Certificate winners of the c.w. message contest are as follows:

JA8AE, *K2s* CJQ GMF FMM KSP RMC UGZ UUU YOP OWZ, KA2NA, KN2HAR, *K4s* ARF ASU CQE HIA IFW LGA, KN4OSM, *K5s* AOV DMR, *K6s* CME CFC DCF DV DYX EKN GIV GZ IOY IYJ LNG NRV PXJ RQB VCT WDG, *KH6s* BLT BUU FX UK ZJX, KL7BZA, KL7WAF, K0CXD, *K9s* AMC GIB BHD, VE8OJ, *W1s* BGW GZQ JBZ LSX MEG SRM TNF WDW WPR YGV ZYO, *W2s* AXS CPA ENS GEX GWG JCA JOA KAT MZB NKD NVB SSC TUK UAP ZMK ZRX, *W3s* ADE BFF BKE CUL DAG ECP EOV JH KSQ LGK MCG VXI WHK WZC ZJ, *W4s* EFM HOJ IMI KLT LYV UHF UMO WDF WHK ZPR, *W5s* FEM FGO GKV JPC PCL PZP SPZ USA WUR ZU, *W6s* AAW ASH ASJ AW AXV BHG CG CIS CLB CWR ESQ EY FHI FJY FYW FZC GYH IZ FJY KF KG MAV MYP MGZ NAV OCX OES OWP THQ TXE USA USY VPC WLI WPI WX ZPX ZOL, *W7s* BHH CO DDY EBS EYF EYX FIX FOS FWD FWR KQX LT OCX SMR VI WYP YKT, *W8s* BKM DAE FFK HS IJV IEX PHA QIJ TND VMD YCP, *W9s* AKP CBE CXY HQZ HUP MAK NDN OCB STZ WNB, *W0s* ANB DRB ECE LHP NHZ UPE RXG TIU WET WIN WKO, KW6CB.

Archer, F. O.; Barney, E. E.; Baruti, A. M.; Becknell, J. D.; Bigles, C. Jr.; Brattland, A. D.; Brennan, F. P.; Campbell, E. S.; Conroy, T. V.; Cohen, B. I.; Cook, C. P.; Cook, R. C.; Correll, P. D.; Donberger, W. G.; Fowler, E. T.; Harrington, A.; Haughton, J. M.; Hinkle, W. F.; Koenig, P. W.; Lane, R. W.; Miller, P.; Norman, M. L.; Patrick, L.; Pea, O.; Rather, R. L. Jr.; Reding, P.; Ungari, J. A.; Weems, J. H.; Westney, C. F.; White, M. L.

Military-to-Amateur Contacts

Operating on military frequencies AIR, NSS, and WAR worked amateurs in the 80–40–20 and 15 meter bands, using c.w., a.m., s.s.b., and RTTY. The three military stations made a total of 1348 contacts.

Radioteletypewriter Receiving Competition

The radioteletypewriter receiving competition featured a joint message from the Chief Signal Officer, U. S. Army, Director, Naval Communications and the Director of Communications U. S. Air Force. A total of 121 entries were received with 102 of these making a perfect copy. A letter of acknowledgment was sent to each amateur participant who submitted a copy made from the transmission of this message. RTTY winners of letters of merit are as follows:

K2s DRN GMC CQ HHH HHJ, K4HIA, K5WAB, *K6s* BWJ GB BHF KFF NRK OUR WDG, KNOKV, *W1s* BGW EFF PIL, *W2s* CTQ CHH EBZ ICA KDW KLD LRW NRQ RTW RUI SMX TAM, *W3s* CA LGK MHD WTW, *W4s* AWN EAS EHW GVK MN RTZ ZJU, *W6s* AEE ASJ CG CBF CLW CQI CQK CV FHI FZC JAU MTZ NCP NSS OGG OJF PZV VPC YDK, *W7s* CO DDY MEV PSO RGD WQD, *W8s* CRY DXM HUG LEX TLW, *W9s* AKP GLR NVE GRW PTZ TCJ VOK EVN, *W0s* FWD HBD JHY JU RAC, VE3BAD.

The military departments are pleased with the increased participation of the amateurs in this contest. Next year's contest will be planned to provide for greater coverage and improved frequency assignments to lessen interference. Additionally, special attention will be given to the novice bands.

Text of Armed Forces Day Message From the Secretary of Defense

On this eighth annual observance of Armed Forces Day it is my pleasure to extend greetings to all radio amateurs throughout the world. Your participation in this phase of the Armed Forces Day Program indicates your interest in an alliance with a group of individuals which has an important role in this era of rapid technological advance. Through consistent voluntary effort you have earned noteworthy credits in research and development of electronic communications, in disaster relief and emergency situations, in the technical training of others in communications fields and in the betterment of international relationships. As Secretary of Defense I commend you for your valued contributions and welcome your participation in this Armed Forces Day Program.

C. E. WILSON
SECRETARY OF DEFENSE

Radioteletype Message to all Amateurs

The communications services of the Armed Forces take great pride in the development of Amateur Radio Teletypewriter services, the new techniques that have been employed and the technical advances that have been achieved in the course of this development. All amateurs are urged to continue the development and operation of this media of transmission. Your efforts in pioneering in new techniques and providing a superior traffic handling facility by developing Amateur Radio Teletypewriter Nets are instrumental in carrying on the great tradition of Amateur Radio. You are extended the congratulations and best wishes of your comrades in the Armed Forces for your continued success in this field.

ALVIN L. PACHYNSKI
MAJOR GENERAL, USAF
DIRECTOR OF COMMUNICATIONS-ELECTRONICS
J. D. O'CONNELL
MAJOR GENERAL, USA
CHIEF SIGNAL OFFICER
H. C. BRUTON
REAR ADMIRAL, USN
DIRECTOR OF NAVAL COMMUNICATIONS

Strays

W6NOB reports that Dr. Lee de Forest will be featured on the "This is Your Life" TV program Wednesday, September 11.

OUR COVER

We are beginning to receive the usual fine assortment of logs and photos resulting from Field Day activity. First reports indicate that in some areas the weather was beautiful, in others miserable. But rain or shine, all the "regulars" were on the air for this annual event, as well as many of the newcomers. Our cover this month shows the operating position at W9ERU/9. It was a two-transmitter setup on c.w., and the boys claim 628 contacts. That's W9CZB at the left, with W9ERU to the right. (You say this is a *wireless* station?) More details on Field Day in a later issue.

— *Photo by K9BJA*

West Virginia contacts were supplied by many club groups working from mountain sites in that hard-to-get state. Here members of the Aero Amateur Radio Club of Baltimore take time out from their operation of W3PGA/8. Left to right: W3KLA, W3JDF, W3YQD, W3WZL. WN3JJF was getting in sack time. Group made 286 contacts for 7300 points on 3 bands.

June V.H.F. Party Summary

50-Mc. DX and Widespread Portable Activity Trigger Reward Scoring

LOOKING through the file on the June V.H.F. Party makes a reporter wish that he'd saved up superlatives used in earlier reports, for the week end of June 8 and 9 provided more and bigger in just about every category by which such activities may be judged. There were far more logs than in any previous June or September Party, higher scores, more 6-meter DX, more ARRL Sections represented, more Technicians, more portable and multiple-operator entries — all of which added up to more fun, for nearly everyone. "Best contest ever!" appearing on numerous logs, just about sums it up.

For the first time in v.h.f. contest history, more than 500 contacts were made by two group stations at opposite ends of the country. With a tremendous cooperative effort, the Waltham Amateur Radio Association, operating W1MHL/1 from their accustomed haunt atop Pack Monadnock Mountain, Peterboro, N. H., made 592 contacts on 50, 144, 220, and 432 Mc. Ever expect to see a 32-element 6-meter beam? A 128-element 144-Mc. array — that tilts as well as rotates? They were only two of the features of the W1MHL/1 layout. Also used were a 64-element 432-Mc. array and a 32-element job on 220 Mc. Equipment included a kilowatt transmitter on 144, 500 watts on 50, 300 watts on 220 and 50 watts on 432, all with the best in crystal-controlled converters — the works set up for simultaneous operation on the 4 bands. Portable? Must have been, for it was all taken up to "The Pack" for that one week end! The 50-Mc. band provided 327 contacts, 144 Mc. 228, 220 Mc. 28 and 432 Mc. 9, for 36,482 points. Section multiplier: 58! How long will this record stand?

K6OEE/6, of the San Bernardino Microwave Society, operating from Sierra Peak in the Los

Helen Harris, W1HOY, Medfield, Mass., worked 309 stations in 28 sections on 50 Mc., for 8652 points for the country's highest competitive score by a home station. This won her the E. Mass. Section award, a Technician award, and the distinction of having broken about every 50-Mc. contest record. Rig, not in picture, runs 1 kw., and feeds a 16-element array.

Angeles Section, piled up 510 contacts on 50, 144, 220, 420, 1215, 2400, 3300 and 10,000 Mc. — 8 bands! Their multiplier of 29 (they were not favored with so much 50-Mc. DX as the easterners) gave them 17,110 points, a West-of-the-Mississippi record that will be hard to beat.

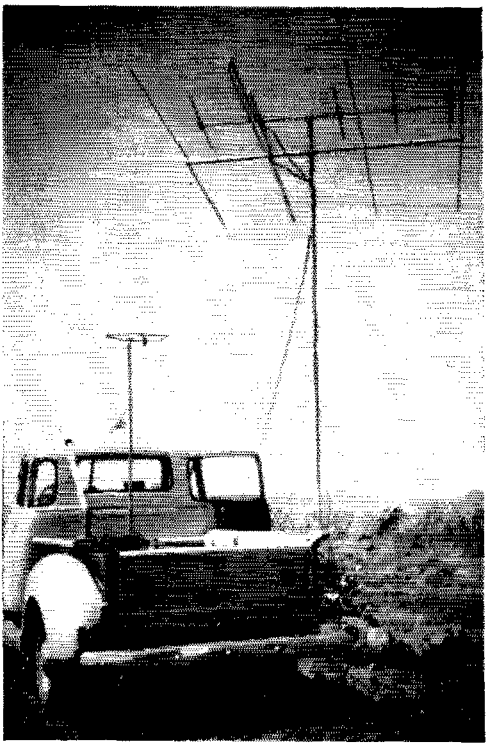
Top single-operator score made by W1UIZ/1, Mt. Equinox, near Manchester, Vt. George made 270 contacts on 4 bands, with a multiplier of 50, for 16,900 points. His 12 sections on 220 Mc. probably set a record for that band. The country's highest home-station competitive score was made by Helen Harris, W1HOY, whose sleepless iron-man operating netted 309 contacts in 28 sections, for 8652 points. This little chore was accomplished on 50 Mc. only — and it earned Helen the Eastern Massachusetts Section award, along with above-mentioned honors. A Technician award goes along with this, too. Other Technicians who won top honors in their sections, regardless of class of license, were W9ROS, Illinois, W9JCI/9, Wisconsin, W5KRH/5, Mississippi, W8SDK, Michigan, WØWEQ, Missouri, W1ZWL/1, Western Massachusetts, W7PRW, Washington, W6PBC, Santa Clara Valley, W5NSJ, New Mexico, W4AZC, Alabama.

With 50 Mc. open periodically through the party, that band played a larger part in the scoring than probably ever before, but there was some fine work in the 2-meters-only category, too. W2ONV, Garfield, N. J., did right well on 144 Mc. with 280 contacts in 17 sections, for 4700 points. KØEMQ, and WØYPT found it possible to work 7 sections on 144 Mc., surprising totals for Iowa stations.

Fine June weather brought out a phenomenal number of portable stations, and they stayed out through the whole party, in most instances. The expedition phase of the June and September parties is growing all the time, as groups find that, as on Field Day, just getting out to a choice location with a friendly gang and a collection of ham gear is great fun, even if you don't go for top honors. The means are more important than the end for many v.h.f. party expeditions, though multioperator awards are increasing steadily.

Expeditions to otherwise hard-to-get states and sections give the contests a big lift. Vermont and West Virginia were well taken care of in the East. The Aero Amateur Radio Club of Baltimore did yeoman service in West Virginia with W3PGA/8, making 286 contacts for 7300 points. They just nosed out the Nation Capital V.H.F. Society, making their first trip as a club group, with W3MPT/8. The Washington gang made 243 contacts in 28 sections, for 7140. Three other groups of W3s and 4s that we know of journeyed to the West Virginia mountains to help the cause along. Vermont, now boasting quite a few home-station regulars on 6 and 2, had W1NBN/1 on Burke Mountain, near the Canadian Border, W1UIZ/1 on Mt. Equinox, in the central part of the state, and W1FMK/1 and others on the always-populated Hogback Mountain, near the Massachusetts line.

W9JCI took the famous "Hearsemobile" 50-Mc. rock-crusher (pictures coming up in *QST* soon) out to Lapham Peak, Delafield, Wis., and worked an even 200 stations in 20 sections on 6. Special addition for this occasion was a 6-element



V.h.f. man from 'way back, W7QLZ, operated this pickup truck station from Humboldt Fire Lookout, Arizona. Modified TV antennas provide 4 elements on 50 Mc. and 5 on 144. Halo and whips can be used in motion.

long Yagi, which overpowered even the long black car underneath.

V.h.f. expeditions jammed the mountain peaks the length of the West Coast, from San Diego to Seattle, helping mightily to keep W6s and 7s happy with their otherwise rather limited possibilities in the section multiplier department. Rivalry between the San Bernardino Microwave Society and the Two Meter and Down Club of Los Angeles, W6EMM/6, was a considerable factor in promoting the use of the bands above 144 Mc. Reports from the Los Angeles and San Diego Sections, particularly, showed a sharp upswing in contest interest. W6CDT/6, San Carlos Peak, provided one of the best scores from the Bay area. Still farther north, W7OTV/7 and W7PUA/7 hit new highs for Oregon and Washington activity. W7PUA/7 used 50, 144, 220, 432 and 10,000 Mc. to work 137 stations for 2072 points.

Sharp operators on 50 Mc. showed that, band openings or no, ionospheric scatter is a fine way to build up section multipliers. W4IKK, Rome, Ga., picked up 8 of his 20 sections in this way,

(Continued on page 150)

Happenings of the Month

ELECTION NOTICE

To All Full Members of the American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1958–1959 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
West Hartford 7, Conn.

We, the undersigned Full Members of the ARRL residing in the .....Division, hereby nominate.....of..... as a candidate for director; and we also nominate..... .....of....., as a candidate for vice-director; from this division for the 1958–1959 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of an amateur license, and must have been a member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of the 20th day of September, 1957. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

Voting by ballots mailed to each Full Member will take place between October 1 and November 20, except that if on September 20th only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are as follows: *Atlantic:* Gilbert L. Crossley, W3YA, and Charles O. Badgett, W3LVF. *Canadian:* Alex Reid, VE2BE, and William R. Savage, VE6EO. *Dakota:* Alfred M. Gowan, WØPHR, and Forrest Bryant, WØFDS. *Delta:* Victor Canfield, W5BSR, and Milton W. Kirkpatrick, W5KYC. *Great Lakes:* John H. Brabb, W8SPE, and Robert L. Davis, W8EYE. *Midwest:* Robert W. Denniston, WØNWX, and Sumner H. Foster, WØGQ. *Pacific:* Harry M. Engwicht, W6HC, and Harold L. Lucero, W6JDN. *Southeastern:* James P. Born, jr., W4ZD, and Thomas M. Moss, W4HYW.

Full Members are urged to take the initiative and to file nominating petitions immediately.

For the Board of Directors:

A. L. BUDLONG
Secretary

July 1, 1957

TV RECEIVER RADIATION

In this department last month (page 63) we reported an FCC proposal to relax present restrictions on certain radiation from radio receivers and also published the text of the League's comment opposed to such relaxation. We are now pleased to report that the Commission's decision in this matter, Docket 12018, is wholly in our favor. In part, FCC said, "Comments from the American Radio Relay League, Inc., indicated that the Commission's proposal to relax the 100 uv limit above 9 Mc. will not afford sufficient protection from television broadcast receiver interference to amateur operations in the 14 and 21 Mc. bands. Comments have also been received from other parties recommending that the Commission not relax its existing radio receiver interference standards. It appears that the most prevalent source of power line interference is television broadcast receivers. The Commission has therefore decided not to relax its present limit with respect to this particular type of device . . ."

N. Y. TOWER CASE

While it is impossible for the League to provide

(Continued on page 158)

Correspondence From Members-

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

SORRY, SOLD!

17 Whittier St.
Dover, New Hampshire

Editor, *QST:*

Probably you have been advised of the "power" of the *QST* Ham-Ads before but W1AXW is yelling for help, succor, relief from further inquiries. All items were sold within one week after the June *QST* hit, mostly via long distance telephone and telegrams. Since then I have answered over one hundred inquiries, returned checks and not answered at all several more worded "if you still have."

Being conscientious, or something, I had to answer them all and my "profit" is diminishing rapidly as well as my "high moment of inertia" being seriously disrupted.

Anyway, my sincere compliments on the results. If I have any more items to clean out, the Ham-Ad is the way.

— *Homer H. Richardson, W1AXW*

ORDERLY PILE-UPS

7724 — 14th Fitzpatrick
Seattle 5, Washington

Editor, *QST:*

When a foreign station calls CQ DX, he barely has time to sign off before at least a dozen W stations are hot after him, and generally the one with the loudest and most powerful signal gets him.

Why would it not be possible for the foreign station to listen for several minutes, taking down the calls of the various stations who have answered his CQ, and then answer them in the order in which he copied them.

As an example of what I mean, suppose FJ1PA calls CQ DX and is answered by several DX hunters. Of this number in the confusion that reigns, he is able to take down the call letters of six.

FJ1PA then sends CQ DX de FJ1PA Nr 1 to Nr 6 BT W6— W6— BT W5— W5— BT W7— W7— de FJ1PA Nw Nr 1 W6— KN

When FJ1PA is finished with Nr 1 W6—, he sends 73 de FJ1PA SK BK (Break, not Back) Nw Nr 2 W6— de FJ1PA KN

After he has disposed of Nr 6 he could send out another CQ DX and pick up some of those who were not included in the first group.

With this procedure each answering station who is included in the multiple address, i.e. Nr 1 to Nr 6, knows where he stands and awaits his turn. This should eliminate a lot of unnecessary calling and confusion.

This idea may be a screwy one but remember you don't have to be crazy to be a communicator, although it helps.

— *G. W. Fitzpatrick, W7VX*

NEED WYOMING?

Box 670
Worland, Wyoming

Editor, *QST:*

Read OM Johnson's article in July *QST* on how he made his WAS. Would be glad to make a sked with anyone that needs a Wyoming contact and this offer is not restricted to ops with 47 states confirmed. Would like to make WAS myself but found out shortly after going on the air that almost every contact sent "Ur my first Wyo. contact, pse QSL" somewhere in the QSO. As a result I rarely send out a CQ of my own, but look for someone calling and I get just as much kick out of being a "First Wyo." as I do out of getting a new state. So any of you YLs, XYLs and OMs that want to RC, just give me a shout. Have the following crystals: 3.716, 3.726, 3.741; 7.156, 7.170, 7.177, 7.191; 21.22 and 21.15.

— *Bob De Vries, WN7HAL*

SWAP?

Mt. Washington Observatory
Gorham, New Hampshire

Editor, *QST:*

I'm just wondering if any other hams would care to trade a nice high mountain for an isolated little spot in the valley. If those fellows who live in the city think they have TVI problems, listen to what we have to contend with up here.

I work on top of Mt. Washington, N. H., in the weather observatory. This is the highest mountain in the northeastern U. S. and used to be a pretty good spot for ham radio, especially v.h.f. But now look what's happened. There is a TV station about twenty feet away. Inside the TV station there are three relay transmitters on three separate frequencies used for commercial aircraft flying up and down the east coast. Certain harmonics on all the ham bands up through 6 meters fall right on these frequencies. I've got so many little strips of tape pasted on my v.f.o. dial on spots where I would cause interference that the transmitter looks like an overgrown "Band-Aid." Now there is talk of two f.m. stations possibly moving up here in a vacant building about twenty feet away. If this happens, I may as well trade the v.f.o. in for one good stable crystal.

We have problems in our own building also. In the basement about ten feet from the hamshack we have some very sensitive electronic equipment which counts high energy neutrons coming in through the atmosphere. On occasion, my phone signal has been rectified in one of the numerous connections in these circuits and I have run the count up sky high. There are four TV sets on the mountain which are a potential problem. Ours, incidentally, is an old DuMont about *12 years old which still has the original picture tube* and is still going strong.

Even without these problems, you can't put up a decent antenna up here. It wouldn't stay up more than a day or two in the winter because of extremely high winds and heavy icing. Mt. Washington still holds the all-time record for the highest wind ever recorded over the surface of the earth, 231 m.p.h. on April 12, 1934. I bet Larson Rapp's antenna would work like mad up here if you could dig a hole through solid rock to bury it, hi. I have to be satisfied with two dipoles up in the attic. Nevertheless, I still think ham radio is the greatest hobby ever.

Incidentally if any of the fellows plan to come up here for any future v.h.f. contests, I think they would do better down around the seven mile post on the auto road (1 mile from the top) due to the interference they would probably get from us on our regular weather skeds on 34.02 Mc. and also from the strong r.f. from the local TV station.

You wouldn't think an old "rock pile" like this would present so many problems for ham radio.

— *William A. Harris, W1HQZ*

INCENTIVE, CONTINUED

1175 Laurelwood Road
Mansfield, Ohio

Editor, *QST:*

Let's quit kidding ourselves about the "incentive" angle to allowing special privileges for Class A Operators. Sure, those fellows deserve credit for taking the examination, whether they memorized the answers or not.

But Class A is a closed membership club now and those of us who don't belong to this exclusive circle are not even allowed to apply for membership.

Incentives are wonderful, but they should be open for anyone that can qualify, and not limited only to those lucky enough to have been in ham radio before the Class A was discontinued.

— *E. C. Ryan, W8LRR*

Hints and Kinks For the Experimenter

TRANSMITTER KEYING WITH THE SURPLUS TG-34-A KEYER

THE type TG-34-A keyer is an automatic unit for providing code practice signals from an inked recording. The output of the keyer is an audio frequency note with sufficient power to supply a number of headsets. However, if the machine is to be used for keying a transmitter during code practice transmissions, testing, etc., it is necessary to convert the audio output signals into mechanical energy that will control a keying relay. Fig. 1 is a circuit perfected by ex-WN8-WBO that will make the necessary conversion.

Fig. 1 shows the tapped secondary winding of the keyer output transformer (T_1) coupled through a crystal diode to the base of a type 2N36 transistor. The transistor operates in a grounded-emitter circuit with the keying relay, K_1, serving as the output load.

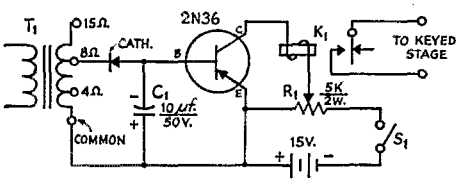


Fig. 1 — Schematic diagram of the TG-34-A keying accessory used at W8DAP.
CR_1 — Type 1N34A crystal diode.
K_1 — D.p.s.t. sensitive relay (Advance AM/2C; formerly type K150/RF).
T_1 — TG-34-A output transformer.

In operation, CR_1 conducts during negative half cycles of audio voltage, thus providing a negative base bias for the transistor. Although CR_1 rejects the positive audio voltage, it does charge C_1 while conducting. C_1, because of its high value of capacitance, *holds* the transistor base bias during positive-pulse periods of non-conduction with the result that a steady current flows in the base-emitter circuit whenever an audio signal of proper amplitude is applied to the diode. This, in turn, causes the collector current to *follow* the keyed input signal and properly energize the keying relay.

By using the 8-ohm speaker output taps and approximately one quarter "pot" of the bias and volume controls on the keyer, and with 10 to 12 volts applied to the transistor, perfect operation is obtained. The voltage divider, R_1, across the battery is used to find the proper transistor operating voltage and its setting depends on the amplitude of the controlled signal output of the keyer. Almost any type of battery may be used as the current drain is very small. A pair of Burgess type 4F5H 7½-volt batteries is used with the original circuit.

The relay listed is the only one of several tried that will follow the tape and still key the transmitter regardless of speed. This relay has two springs; one is a hinge type which connects the armature to the body, and the other is a "coil type" spring. Removal of the coil spring and adjustment of the hinge type until the relay *pulls in* at 3 ma. is necessary. Although K_1 is a d.p.s.t. affair, only one set of contacts is shown in Fig. 1.

With the exception of the batteries, all parts are mounted on a 1 × 3-inch "L" bracket attached to the keyer directly above the audio output terminals.

— *Lee Dilno, WSDAP*

"STACKING" CRYSTALS FOR CONVENIENT SELECTION

FEW mobile operators have a convenient storage system which permits rapid selection of crystals for the most frequently used frequencies. One method that has worked out exceptionally well in the W1TNS mobile installation is shown in section A of Fig. 2.

Crystals cut for local nets and other popular frequencies are arranged in stacks and then bound together with Scotch tape. Frequencies may be printed on paper tabs attached to the ends of the holders where they are readily visible, and the stacks may accommodate two or more crystals.

The crystal socket must ordinarily be mounted on the outside of the panel when this system is used. Make sure that the socket is at least 7/16-inch deep so that prongs of crystals *out* of the socket will not press against the panel and prevent the active crystal from seating firmly in place.

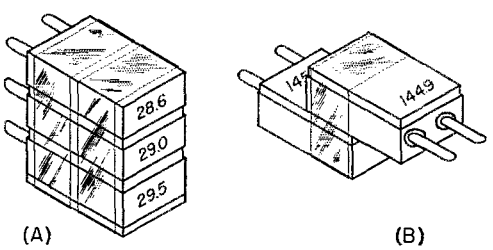


Fig. 2 — Two methods of "stacking" crystals for rapid selection and ease of identification. (A) Method used by W1TNS. (B) System suggested by W3ZRQ.

— *Chuck Newton, W1TNS*

Section B of Fig. 2 shows the crystal *stacking*

method used here at W3ZRQ. Scotch tape is used for clamping the holders together and for binding the frequency-identification tabs in place. The crystal socket may be mounted on the rear of the panel because clearance for the prongs of crystals not in use need not be provided.

If you care to, the stack may be made *four* high by adding a crystal to both the top and the bottom of the pile. Orientate the holders in the form of a cross so that the sets of pins are 90 degrees apart. A good grade of plastic cement may be used for bonding the holders together.

— *Allen R. Breiner, W3ZRQ*

NOTE ON SURPLUS TYPE BC-348 RECEIVERS

THE dial calibration on BC-348 receivers can be greatly improved by adjusting the inductance of the oscillator coils. To provide this adjustment (except in J, N, & Q series) proceed as follows:

1) Make certain that the i.f. is correctly aligned at 915 kc.

2) Note whether the dial spread is greater or less than the actual frequency band covered.

3) If the dial spread is greater, the inductance is too small.

4) If the dial spread is less, the inductance is too large.

5) Remove the top and bottom covers from the oscillator compartment and drill and tap a 6–32 hole over the center of each coil which requires correction. The covers are thin and best results will be obtained if the holes are punched through with a tapering punch to give more material for threading.

6) In the holes over low inductance coils, insert a small powdered iron slug with 6–32 screw attached.

7) In the holes for the high inductance coils, insert a 1-inch 6–32 brass screw, with the head inside the coil.

8) By alternately adjusting the trimmer capacitor (near the high end of the dial) and the slug (near the low end of the dial) bring the receiver as nearly as possible into calibration. Lock the slug adjustments with a 6–32 nut and cut off any excess screw length to prevent catching on case.

If care is used, the calibration over most of the dial should be off not more than the thickness of one of the heavy calibration marks on the dial.

—•••—

SINGLE-SIDE-BAND reception with the BC-348 type receiver can be improved by adding a small variable capacitor to permit fine adjustment of the b.f.o. frequency.

A double-spaced unit having a maximum capacitance of appximately 2 $\mu\mu$f. is recommended for the job. If a made-to-order APC type is not available, a larger size can be modified by removing plates

The capacitor may be centered above the "Volume" and "Beat Freq." controls by using a suitable bracket to avoid wires in the vicinity. The rotor should be grounded and the stator connected to Pin 5 of the 6F7 (VT-70).

Another installation places the vernier capacitor on the panel directly above the "C.W. Osc." switch. The rotor of the new vernier capacitor should be grounded, and the stator terminal connected to terminal "C" at the top of the c.w. oscillator inductor. Terminal "C" is already wired to Pin 5 of the 6F7 tube (VT-70).

— *George S. Carson, W0JV*

STORAGE RACK FOR *QST*S

MANY AMATEURS sooner or later come to grips with the problem of properly storing *QST*. The obvious solution is the League binder, but for many of us the binder funds have a way of winding up at the parts house for that always-needed component. Stacking the magazines on a horizontal shelf in library style will work, but necessitates repacking after a few issues are pulled for reference. This method also has the further disadvantage of bending and curling individual issues.

A partial view of the *QST* storage rack. The top shelf is just right for holding a copy of *The Radio Amateur's Handbook*.

Vertical stacking is attractive from the standpoint of required floor space but is almost unusable unless the issues are spaced by suitable shelves, preferably at yearly intervals. The rack shown here accomplishes these needs and requires only 11 by 8 inches of floor area and 48 inches in height. It can be built in an evening at a cost of three dollars or so and will accommodate ten years of *QST* with room to spare. If the issues are filed as received, the December index issue will always be the top number of each shelf.

In our case the shelves were cut 9⅝ inches long from standard 6-inch shelving. The uprights are 1 × 2-inch stock, 48 inches in length. We used two finishing nails through each upright into the shelf plus small iron angle brackets on the bottom side of the top and bottom shelves. The construction is apparent from the photograph and hams with woodworking ability can no doubt improve the design. A coat of stain matches the finish of the operating desk. From the standpoint of utility the rack leaves little to be desired.

— *Otto Woolley, W0SGG*

The World Above 50 Mc.

CONDUCTED BY EDWARD P. TILTON,* W1HDQ

BEYOND-THE-HORIZON work on 5 meters as early as 1926 — the discovery of tropospheric bending in 1934 — sporadic-*E* DX in 1935 — auroral propagation in 1937 — worldwide DX on 50 Mc. in 1946 — tropospheric propagation on 144 Mc. at distances beyond 1000 miles in 1950 — aurora work on 220 Mc. in 1954 — these are some of the high spots in v.h.f. history that can be seen in retrospect by leafing through a *QST* file. They and other v.h.f. firsts came about, in many instances, because hams were willing to try things that more learned people would have said were impossible.

Practically every known form of long-distance v.h.f. propagation was first discovered in this way, often by accident. The important factor was a willingness on the part of hams to *try anything!* The formula still works, and no better example has ever turned up than the feat that we reported in brief last-minute fashion last month: two-way communication on 144 Mc. across more than 2500 miles of Pacific Ocean. Nobody in his right mind would have given it a chance!

John Chambers, W6NLZ, and Ralph Thomas, KH6UK, first worked on 14-Mc. c.w. on October 20, 1956. From that day on they made regular tests on 144 Mc. From early November to July 8, these averaged better than six per week — all without the slightest indication of signal either way on the higher frequency. For several months the tests had been the same: a short QSO on 14.095 and then a 5-minute test on 144.000 Mc. by KH6UK. Results were always the same — nil.

But the true ham never gives up. The tests started after the best of the fall inversions had passed, and the period did not include the king of all the meteor showers, the August Perseids. The summer inversion season and the Perseids shower held out two admittedly forlorn hopes.

The evening of July 8, the inversion layer was clearly visible over the curving coastline from W6NLZ's escarpment location, 910 feet above sea level at Palos Verdes Estates, at the southern end of Santa Monica Bay. It was a long way to Hawaii, to be sure, but at least the West Coast end looked good. Weather information indicated that a highly stable inversion had been building up for several days. At Kahuku, on the northern tip of the Island of Oahu, the afternoon of July 8 was like any other summer day in Hawaii. Nothing showed that tonight would be any different from the more than 200 others when the 144-Mc. tests had been made. Tommy had given up listening on 2 long ago. The transmitters of RCA Communications filled the band with birdies, and he had seldom heard any 2-meter signals, anyway. But the transmitting tests still were made, and the W2AZL converter and SX-88 were ready to go, if anything happened.

The 2130 PDT sked was like all the rest: the exchange on 14.095, and the transmission on 144.000. But this time, as soon as W6NLZ got his 75A3 on frequency with the 417A converter — there was KH6UK! "Can it be? Is somebody pulling my leg? Am I getting i.f. feed-through? Am I dreaming?" All these and other thoughts raced through John's mind — and then came a wait that seemed an eternity, while the automatic transmission from KH6UK droned on. *Would the guy never stand by?*

No hurry about turning the thing off, Tommy thought, and the test ran on for some seven minutes before he heard W6NLZ calling him frantically on 14.095. Then came the quick change, the breathless moments, the fumbling sending, as two old c.w. hands who ragchew easily at 40 w.p.m. fell all over themselves in a rush of buck fever that is familiar to any ham who has tottered on the brink of a really big break. But the two-way worked — and good!

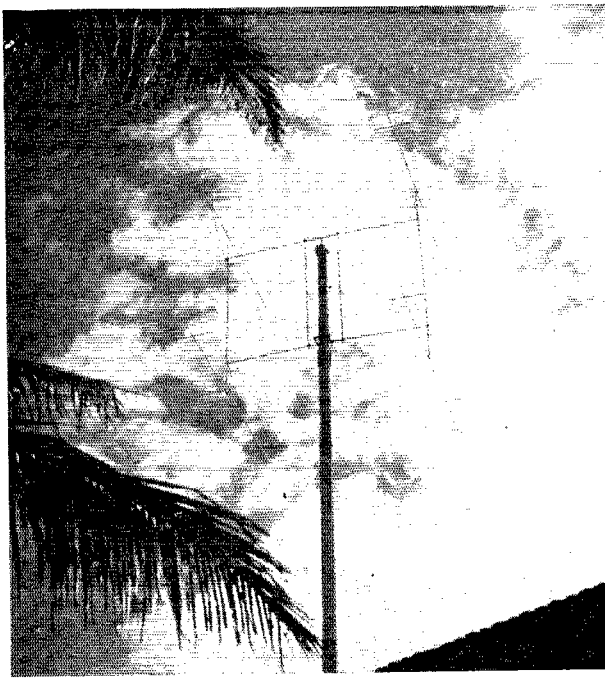
Signal reports were exchanged, and a few fumbling attempts at felicitation, and then on to see what else could be done while the rare opportunity still held. Tape recordings made at KH6UK tell the story. A period of birdies from the RCA transmitters, and then after some delay, a rather halting c.w. sig calling. A slow (this time) "QRZ de KH6UK" is followed by a call from W6NTC. Would this be someone a few miles east of W6NLZ, ready to claim the record, now that John had done the heavy spadework? Tommy replied with mixed feelings — and then learned that W6NTC is Mrs. W6NLZ, who was called in to run the rig while John placed a telephone call to W1HDQ.

The W6NTC-KH6UK QSO was still going on as John passed along the hot news over the landline at 0150 EDT, to your very sleepy conductor. But it was the last QSO over the 2540-mile circuit. Though John called several of the local 2-meter fraternity, none could be found at home with the necessary combination of gear, antenna and location to grab the plum that was waiting to be picked. KH6UK stayed on, calling CQ for three hours, but nothing more was heard but the RCAC birdies, and no other reports have been received of reception of Tommy's signal on the West Coast.

How did it come about? The evidence points toward tropospheric propagation. Tape recordings from both participants show the signal to be

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

The 2540-mile 2-meter QSO across the Pacific did not "just happen." There were superb stations, big antennas and capable operators at both ends. Above, left, John and Maureen Chambers, W6NIZ and W6NTC, smile happily over their DX record. Transmitter (in front of John) is modified KWS-1, that runs 1 k.w. on s.s.b. and c.w. on 144 Mc. and lower bands. Receiver just visible between the operators is a 75A3, used with a crystal-controlled 417A converter on 144 Mc. Communicator serves for local work on voice. The Chambers station comes as close to being "all-band" as any you're likely to see, there being facilities ready for all low-frequency bands, plus 50, 144, 220, 432, 1215 and higher microwave assignments. Location, Palos Verdes Estates, is 910 feet above sea level, overlooking the Pacific.



Above, right, Ralph E. Thomas, KH6UK, cuts a tape for use in his automatic keyer. At the far left of the picture is seen the 1-k.w. rig with a pair of 4-125A's in the final, that has served both W2UK and KH6UK on 144 Mc. Receiver, center, is an SX-88, with a W2AZL 417-A converter for 144 Mc. Note prized QSLs from W6NLZ and W6NTC in the speaker grille. The array that turned the trick at KH6UK is made up of four Gonset "Big Berthas" spaced two wavelengths each way, mounted on an 80-foot pole. Location: Kahuku, on the northern tip of the Island of Oahu.

essentially steady, with only the slow, typical tropospheric fade. There are no bursts; no wild excursions in signal strength that would almost certainly characterize meteoric or ionospheric reflections. The locations at each end are close to ideal, and the equipment the best obtainable. KH6UK uses the old W2UK rig with 1 kw. to a pair of 4-125As. The antenna is 4 long Yagis in box formation, with 2-wavelength spacing each way, 80 feet above ground. W6NLZ runs 1 kw. to a modified KWS-1, feeding a 24-foot Yagi 35 feet above a location where height above ground is of substantially no importance. His view out over the Pacific and northward along the curve of Santa Monica Bay is incomparable.

But other hams have good locations and fine equipment, and not a few are good operators. W6NLZ and KH6UK have earned undying fame in the annals of amateur radio because they had all the technical wherewithal — *plus* a willingness to try something that gave every indication of being a lost cause before they started, and to keep on trying it, again and again, in the face of almost certain failure! The job is just started, however. The feat of July 8 showed that it can be done. It remains, now, to show how it came about, and to determine how often it might happen again. Does working across the Pacific mean that a QSO across the Atlantic is within the realm of possibility? Can equal distances be worked over land areas? We won't know until we try!

June 30 Aurora and July Inversions Best in Years

Right in the middle of the 6-meter DX season the 2-meter band stole the DX show. One of the most widespread auroras on record, June 30, netted contacts on both 6 and 2

over practically the entire country east of the Mississippi. No end of instances showed farther south penetration than any previous aurora. Then from July 2 to 9, and again July 15 to 17, there were tropospheric conditions over the Middle West and South that broke all records in that department as well. Space limitations prevent detailed reporting, but here are a few high lights:

Perhaps the first aurora contact ever made from the state of Florida was W4RMU's 50-Mc. QSO with W4UVP, Johnson City, Tenn., at 1750 EST, June 30. This was followed by one with W4NWB, Traveller's Rest, S. C., at 1905. The aurora was in from 1730 to 1930 at W4RMU, but it took Allen some time to realize what was happening. Who is there who hasn't investigated his receiver power supply filter, or checked the operation of his b.f.o. when first he heard aurora signals?

W8KAY, Akron, reports 19 states heard on 144 Mc. W4LNG, Atlanta, Ga., worked W9KLR and W4HJQ. W4GIS, East Point, Ga., heard W8GZW, W4HJQ, W9KLR, W8SFG and many others. W9AAG, Woodhull, Ill., worked

1	**WØZJB**	7	**W6OB**	13	**WØDZM**	19	**W3OJU**
2	**WØBJV**	8	**WØINI**	14	**WØHVW**	20	**W6TMI**
3	**WØCJS**	9	**W1HDQ**	15	**WØWKB**	21	**K6EDX**
4	**W5AJG**	10	**W5MJD**	16	**WØSMJ**	22	**W5SFW**
5	**W9ZHL**	11	**W2IDZ**	17	**WØOGW**	23	**WØORE**
6	**W9OCA**	12	**W1LLL**	18	**W7ERA**	24	**W9ALU**
		25	**W8CMS**	26	**WØMVG**		

W1VNH	47	W4EQM	47	W6WNN	48	W9UIA	45
W1CLS	47	W4FBH	46	W6UXN	48	W9UNS	45
W1CGY	46	W4LNG	45	W6ANN	45	W9MHP	43
W1LSN	46	W4CPZ	45	W6NDP	45	W9JCI	42
W1AEP	46	W4UCH	45	K6GTC	44	W9MFH	42
W1RFU	44	W4IKK	44	W6GCG	43	W9EPT	41
W1SUZ	44	W4QN	44	K6HYY	43	K9EID	38
W1FOS	44	W4EQO	44	W6ABN	43		
W1KHL	42	W4AZC	43	W6NIT	42		
W1ELP	41	W4FLW	43	W6IWS	41	WØQIN	47
W1SPX	36	W4RFR	42	W6CAN	40	WØNFM	47
W1UHE	35	W4OXC	41	W6BWG	39	WØTKX	47
W1LGE	33	K4DJO	42	K6RNQ	38	WØKYF	47
W1FVZ	32	W4MS	42	W6ERG	38	WØJOL	46
W1FTF	31	W4ENR	40	W6OJF	31	WØUSQ	45
W1WAS	31	W4ZBQ	40			WØFKY	45
W1MFM	30	W4AYV	38			WØPFP	45
W1FMK	31	W4HUJ	38	W7FFE	48	WØOFZ	44
		K4DNG	37	W7HEA	47	WØQVZ	44
		W4HHK	37	W7BQX	47	WØCNM	44
		W4AKX	36	W7FDJ	46	WØYJF	44
W2MEU	47	W4YRM	36	W7DYD	47	WØURQ	44
W2RGV	47	W4GJO	35	W7ACD	45	WØJHS	43
W2AMJ	46	W4ZD	35	W7JRG	44	WØIPI	43
W2BYM	46	W4HZG	34	W7BOC	42	WØWNU	42
W2FHJ	45	K4AGM	32	W7JPA	42	WØPKD	41
K2ITP	43			W7FIV	41	WØZTW	41
K2ITQ	43			W7CAM	40	WØYZZ	38
W2SHV	43	W5VY	48	W7UFB	33	W9KLR	36
K2JNS	42	W5LFQ	47			WØVIK	36
K2AXQ	42	W5GNQ	46			KØBPM	35
W2GYV	40	W5FSC	45	W8OJN	46		
K2HPN	39	W5ONS	45	W8SQU	46		
W2ORA	39	W5JLY	45	W8NQD	45	VE3AET	46
W2QVH	38	W5MI	44	W8UZ	45	VE3AIB	35
K2HRB	37	W5JME	42	W8RFW	45	VE1EF	35
K2LTW	35	W5VV	43	W8LPD	44	VE3BBX	33
		W5CVW	41	W8HJR	43	VE1QY	32
		W5EAL	41	W8WPD	43	VE2AOM	31
		W5HEZ	41	K8ACC	41	VE3DER	31
W3TIF	47	W5BXA	41	W8YLS	41	VE3BHQ	30
W3KKN	45	W5FXN	42	W8PCK	38	XE1GE	27
W3KMV	44	W5EXZ	38	W8NOH	34	VE1PQ	23
W3NKM	41	W5EUQ	38			VE3OJ	22
W3MQU	41	K5ABW	38			VE1WL	21
W3RUE	41	W5HFF	38	W9BRN	48	CO6WW	21
W3MXW	41	W5NSJ	36	W8ZHB	48	VE4HS	20
W3OTC	40	W5FRK	36	W9QUV	48	CO2ZX	16
W3FPH	40	K5CYK	36	W9VZP	47	LU9MA	16
W3LFC	40	W5WZF	33	W9RQM	47	PZ1AE	15
W3AMO	36	K5AJW	33	W9QKM	47	KL7VT	9
W3TDF	36	W5ZVF	31	W9JFP	47	JA1AUH	5
W3UQJ	32	W5LFM	26	W9AAG	46	VQ2PL	5

Calls in **bold face** are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on unverified reports.

W5DFU, Tulsa, Okla., for the latter's first aurora contact on 144 Mc. Stations as far west as WØRYG, Lincoln, Neb., were worked by W9AAG. W4ZXI, Greensboro, N. C., was heard all over the Middle West, and the scramble for North Carolina contacts was more than Russ could handle. His state had never been in most of the Middle West via aurora before.

The long tropospheric session on 144 Mc. began early in the evening of July 2, with W5RCI, Marks, Miss., running S7 at W8KAY by 2045 EST. Many stations were on all night, and those in the Cincinnati and Dayton areas worked Missouri, Kansas and Oklahoma stations on phone. W5DFU, Tulsa, started with WØUOP, Des Moines, Iowa, at 2245, followed by WØWRT, Omaha, Neb. (state No. 15), W9s REM WOK ZIH LF AAG, and several more Iowa and Missouri stations. At 0245 on the 3rd, Warren worked W8IFX for No. 16. There were pronounced meteor bursts on nearly all these signals, and a check with W5AJG, Dallas, showed that signals were strongest with Warren's beam *northeast!* Here's something to look into; has anyone found other instances like this? Tropospheric back-scatter?

At 0715 W5DFU heard a 3-minute meteor burst from W8PT, Benton Harbor, Mich., while Jack was sending to W4LTU on schedule. At 1916 on the 3rd the opening was going again. W5DFU heard a W2 on voice, and a CQ raised W4HJQ, Glendale, Ky., No. 17. This set off another 8-hour workout of such 2-meter DX as Warren never dreamed of. W4WCB, Memphis, Tenn., 18, and W3FPH, Leechburg, Pa., 19, were high spots. Working until 0330, W5DFU knocked off 3 stations in Kentucky, 2 in Indiana, 7 in Illinois, 11 in Ohio, 1 in Pennsylvania, and scores in nearer states.

W8KAY says that still another session started just before 2300 EST July 7, with stations in the Cincinnati area calling W5AJG. This went on all night again, with Art taking time out for sleep between 0400 to 0630. W5AJG and W5IOW, the latter at Ada, Okla., were worked between 0700 and 0900, when a thunderstorm finished it off at Akron. Texas calls heard included W5s BEB JQU and AQS. W5AJG was heard as far to the northeast as W8SFG, Hubbard, Ohio, near the Pennsylvania border.

W5RCI, Marks, Miss., lists 35 stations in 14 states as his bag for the July 3–5 opening. W8EP, Terra Alta, W. Va., was a new one, and this undoubtedly was the first QSO on 144 Mc. between these two states. As to a complete record of "firsts," we've long since lost track.

We don't have much information on the mid-July tropospheric opening, but there was another probable first made — a Minnesota-New York contact by WØIFS and W2ORI July 17. Meteor bursts were noted on this one, also.

At the start of the July 2 festivities, W5AJG could hear nothing but W5DFU working all the DX. Meteor bursts were heard from numerous stations, but no tropospheric DX of major proportions until the night of the 7th, as related by W8KAY above, and running far into the 8th. Leroy worked then steadily until 0300 CST, took off a couple of hours for sleep and was back at it again for several hours more beginning at 0600. The signals from W4, 5, 8, 9 and Ø were fantastic, far exceeding anything in W5AJG's long experience on 144 Mc. He finally called it quits around 1000, when his noise level was getting bad.

W5FSC, Houston, sent in the July 8 weather map from a local paper, showing a stationary cold front lying diagonally across the country from western Texas to the Great Lakes region. From there a warm front extended out over the Atlantic Seaboard. Even the limited data on the typical newspaper weather map shows this to be propagation along an extended and stable front, in the classic tradition; the sort of thing we usually look for in September.

W5DFU had hardly recovered from his exertions of the previous week, when he was into another DX marathon. The same territory was in again, and in addition, Warren worked W8PT, Benton Harbor, Mich., another interstate first on 144 Mc. He also worked down the Texas Gulf Coast for the first time, as far as W5KGO, Baytown. To show that DX is not all high power and big arrays, W5DFU worked W9PSJ, Muncie, Ind., 640 miles, with the latter using a Communicator and a TV antenna!

International 50-Mc. DX Prospects

Special IGY authorizations for 50-Mc. work in Sweden, Poland, Portugal and the Azores and Madeira Islands have already been announced in these pages. Word from LA2AD says, "We have now obtained permission to work 50 to

54 Mc. during daytime, up to 1900 GMT, through July 1, 1958." It is not known at this writing whether the "we" means Norwegian amateurs generally, but LA7Y has been reported as ready to work on 6.

Word came to our PRP office recently from SP5HS, via SWL Pickering, that Russian authorities are encouraging crossband work between their amateurs on 38 Mc. and American hams on 50. Soviet stations with v.h.f. licenses have had number call signs in the past, but are reported to be getting Soviet Union type calls now, except that the prefix R will be used, in place of the usual U. Example: A Ukrainian v.h.f. station would sign RB5 instead of UB5.

At least one UB5 was heard last winter on 28 Mc. soliciting crossband contacts on 38 Mc. with American stations. Reports in the Russian journal *Radio* indicate that considerable DX is being worked within the Soviet Union in their 38–40-Mc. band.

European countries using the 70-Mc. band are finding it open for spradic-*E* quite often, and international DX has been reported. G5KW, well known to 6-meter men as MD5KW, worked FA3JR in Oran, June 16, and F8GH on June 20. The first is the current 70-Mc. DX record, and the latter is the first work on the band with France. We feel sure that Ken will be looking for 50–70 opportunities across the Atlantic, though we have had no direct word from him as yet. EI2W, near Dublin, is checking the 70-Mc. band daily, and listening on 50 Mc. if he finds evidence of sporadic-*E*, in the hope of catching a transatlantic opening. He will be on 28 and 70 Mc. (70.66 Mc.) through the fall, prepared for crossband work to 50 Mc. at any propitious moment.

Prospects for work with the Azores rose markedly with the shipment to CS3AC of a 6146 transmitter by K6RNQ and K6EDX. CS3AC is at the American Air Force base, and we understand that they now may operate only on 50 Mc. and higher — which should not do the v.h.f. cause any harm! Two frequencies in the first 200 kc. will be used.

Also from K6RNQ, via KH6BRJ and K6TYW, comes a report that KG6BAA, Guam, and KR6AF, Okinawa, are on 6, and that there are promises of activity on Midway and Kwajalein.

220 Grows Up

From many quarters come reports of regular 220-Mc. activity, showing that use of the band has long since passed the "How-about-a-220-check?" stage. W8WRN, Columbus, Ohio, writes that there is something doing nightly in Central Ohio around 2100, with W8s CSW NVI HOF HPT BPJ and WRN most active. W8NVI, visiting W8IJG, West Richfield, during the June 30th aurora, heard 220-Mc. signals from W3, 8, 9 and VE3 coming through in good shape.

VE3BQN, Toronto, has a 9903 final and a 5-over-5 array on 220. Ted keeps skeds with W3ARW, near Scranton, Pa., Wednesdays at 2015, 2245 and 0030, and Saturdays at 2015, 2215 and 0030. He and VE3AIB look for W8IJG nightly at 2315. VE3BQN would welcome Detroit area or W1 skeds on Wednesdays and Saturdays. Frequencies: VE3BQN 220.056, just above W8IJG; VE3AIB 220.103.

W3LZD, Dunmore, Pa., worked W8DX, W8LPD, VE3BQN, W1RFU and K2DZM on 220 Mc. during the aurora of June 30. He and W3LCK are working on plans for aurora tests on 432 Mc. as well.

W1RFU reports that W3LZD was S9 on 220 Mc. June 30. Bill also heard W8DX, Detroit, via aurora, at 1533 EST. At 540 miles, this is the best 220-Mc. aurora DX yet reported, that we can recall.

W2AOC, Brooklyn, N. Y., long a 2-meter stalwart, now finds extensive activity regularly on 220. Signals from W1s are frequently stronger on 220 than 144, Marv says. He looks for business nightly at 2000 EST, first in the direction of W1, then elsewhere. A "cliff-dweller," he finds n.f.m. a great aid in keeping the neighborhood peace.

(*Continued on page 160*)

RECORDS

Two-Way Work

50 Mc.: LU3EX — JA6FR
12,000 Miles — March 24, 1956

144 Mc.: W6NLZ — KH6UK
2540 Miles — July 8, 1957

220 Mc.: W8BFQ — W5RCI
700 Miles — October 9, 1954

420 Mc.: G3HAZ — DL3YBA
500 Miles — June 19, 1957

1215 Mc.: W6IHK/6 — W6VIX/6
190 Miles — June 9, 1956

2300 Mc.: W6IFE/6 — W6ET/6
150 Miles — October 5, 1947

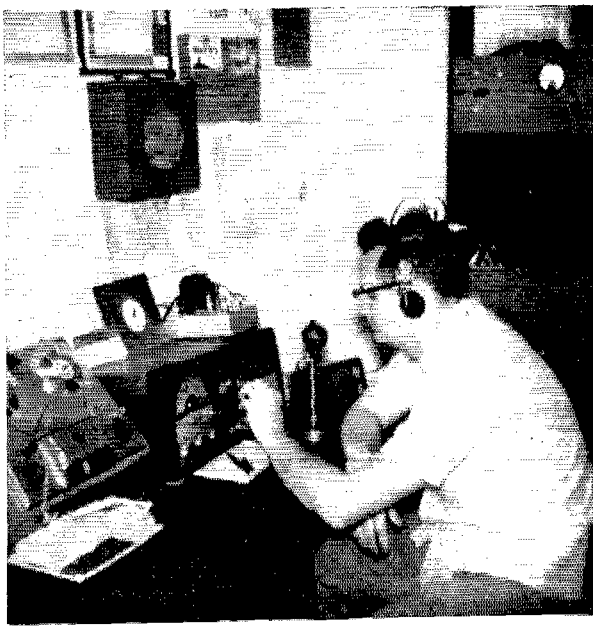
3300 Mc.: W6IFE/6 — W6VIX/6
190 Miles — June 9, 1956

5250 Mc.: W2LGF/2 — W7FQF/2
31 Miles — December 2, 1945

10,000 Mc.: W7JIP/7 — W7OKV/7
109 Miles — August 8, 1954

21,000 Mc.: W1NVL/2 — W9SAD/2
800 Feet — May 18, 1946

Mr. Meteor-Scatter of 1957. Walt Bain, W4LTU, Orlando, Fla., has probably done more than any other ham in recent years to further the cause of meteor DX on 144 Mc. Antenna that has made possible contacts with 18 states, mostly via meteors, is 4 12-element Yagis, with trigonal reflectors.



YL News and Views

BY ELEANOR WILSON,* W1QON

FORSAKEN HOMO SAPIEN

or

How to be Alone When There Are Two in the House

BY MISTER X

THE IDENTITY of the author of the following treatise will be immediately recognized by rather a large group of people, for the discerning Mister X is a regular contributor to a certain West Coast radio company monthly.

"In the living room a soprano was giving out with both lungs over the hi-fi system; in the kitchen the kettle was bubbling over and from the edge of the stove door issued a thin plume of acrid smoke. Down the block and rapidly nearing was the eerie wail of a police siren. But in the den all was happy and serene.

Pushing open the door, the OM was greeted with a too familiar sight. There was no "welcome" on her face; no gladsome greeting; just a frown of concentration or irritation and a vigorous hand signal demanding QUIET!

"Yes . . . yes . . . Roger . . . it was a VK . . . running a 12 ounce Budweiser can to a pair of quart milk bottles . . . and a ten over twenty revolving beam . . ."

Quietly, the OM closed the door and tip-toed back to the kitchen to see what he could salvage, muttering: "Five'll get you ten there'll be no dinner tonight." And he envied those cops in the patrol car, eventually rolling home to a luscious hot repast.

Call it, if you wish, my friends, the electronic atomic, nuclear phase of the Battle of the Sexes. The little lady whom you once thought you couldn't live without is now firmly demonstrating to you that you CAN and that you'd better *like* it.

Somewhere in the dim past some misguided male initiated the first YL into the ham racket, starting a chain reaction beside which the legendary Pandora's curiosity was child's play. The rapid spread of the YL Menace threatens the very foundations of civilization. We have learned to adjust ourselves to the forces of nature, to combat and in some cases even to nullify their effects. But would you dare to combat the YL? Not all your piety nor wit could nullify:

" . . . FB, OM. Ah read you just 100 purcent . . . it's a Gollyfolly pushing 800 watts into a 4-

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

K5ALF, Mae Brewer of Houston, Texas, was one of several W5 YLs who put in days of handling emergency traffic following hurricane Audrey which devastated towns in southern Louisiana in June. Before the storm hit, Mae had alerted stations in the area and along with OM W5SDA formed an emergency net on 40 meters which operated continuously for several days. Some other YLs heard helping out day and night were K5s BNH, BWM, CRH, GMI; W5s EGD, EYE, HWX, KEC, SYL, ZJT, ZLU, and ZPD. All involved shrugged off praise heaped upon them with the feeling that they were just glad they were able to be of service when it was needed most.

To add to the story the sign in the picture tells, seven "WHOs" took turns operating two transmitters, one a.m. and one s.s.b., under the call W5PFU/5 at Oakland Park in Ft. Worth, Texas. K5s BJU, CRH, EGB and W5s ETH, GXG, IHB and PFU enjoyed 21 hours of "good contacts, good food, and an all-around good time". Six novice YLs kept logs while several OMs stood by for duty as messengers and technicians. That's K5CRH toting 54 lbs. of Viking Ranger with seeming ease; K5BJU carries the conelrad gear.

element beam . . . Mmmmmmmm yes..... mah QTH is in most any *Call Book* . . ."

You learn to sew on your own buttons because you can never find a safety-pin, she having used them to couple the anode to the diode, or the exciter to something equally irrelevant in terms of kitchen mechanics. But, cheer up, Old Boy. The time will come when she masters the manipulation of pliers and soldering iron. And if she hasn't yet borrowed your Sunday pants to climb the beam and make an adjustment, it'll come, brother. It'll come. Would she wear her own new slacks? Never!

Ask her to get up at four in the morning to accompany you on a fishing expedition and she gives you but a glance of withering scorn as she burrows her pretty head into the pillow. But she'll hop blithely out, bright-eyed and loquacious, to work a "Zed-S" at two A.M. and love it.

And so, dear friends, one who has unwittingly contributed in small measure to the rise and spread of the YL Menace, in a belated effort to atone for his sin, gives you this advice: Love 'em, tell 'em nothing; and leave them alone until they come to you sweetly with that honeymoon look in their eyes and murmur gently, "Jim, darlin', that lil ole rotary beam's stuck again, and ah simply can't fix it." Then is the time for you to put on those Sunday pants and keep 'em on.

YL Certificates

Interest, both male and female, is keener than ever in the three major YL certificates issued by the Young Ladies Radio League. Here are the complete rules for each certificate. Count your cards — you may be eligible for an award right now.

YL Century Certificate (YLCC)

The YL Century Certificate for confirmed contacts with stations operated by 100 or more different licensed women amateur radio operators is issued by the YLRL to all amateurs, YL or OM, at no cost to the applicant upon compliance with the following rules:

1) Two-way communication must be established on the authorized amateur bands with stations — mobile or fixed — operated by 100 *different* licensed women amateurs. Any and all amateur bands may be used. (Note that one YL operator worked under different calls count but once.)

2) All contacts must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.

3) Contacts may be made over any period of years, provided only that all contacts are from the same location as defined in Rule 2.

4) Contacts with YLs anywhere in the world are recognized provided that confirmations clearly indicate that the stations contacted were operated by duly licensed women amateur radio operators.

One of the newest YL clubs, the Camellia Capital Chirps of Sacramento, launched right into its first Field Day this year with members K6s ENK, HHD, HOI, PWH; KN6ZVX, and W6HTS putting in 22 hours of continuous operating. Competing with four other clubs in the area, the girls stuck it out for 115 contacts on 80 and 41 on 40 meters, even tho' the mercury reached a torrid 108°. The photo shows KN6ZVX logging for K6HOI. Site of operations was a hilltop overlooking Folsom Lake, twenty miles from Sacramento. *(Photo courtesy The Sacramento BEE)*

A girl just never knows what a QSO will bring. For Eda Williams, W7EPZ, a contact with OM W8CMS one fine June day brought a gift guaranteed to make a YL feel like a Queen for a Day —one dozen red roses. W8CMS wired his floral thank-you after Eda supplied him with his 48th state (Montana) on 50 Mc, thus making Claire the first W8 to WAS on six meters. As we've said before, it pays to get on the air now and then. (Photo via W1HDQ)

5) One hundred QSL cards or other written communications from the stations worked confirming the necessary two-way contacts, accompanied by a list of claimed contacts which should include the full names of the operators alphabetically arranged and the dates and times of contacts, must be submitted by the applicant directly to the YLCC custodian. Sufficient postage must be sent with the confirmations to finance their return by first class mail. The YLRL will not be responsible for any loss or damage to same.

6) Endorsements: Confirmations of contracts, accompanied by alphabetical list, as per Rule 5, from stations operated by additional YLs may be submitted for credit each time 50 additional confirmations are available. Endorsements, gold and silver stickers, will be made to the original certificate as applications are approved.

7) Decisions of the YLCC custodian regarding interpretation of these rules as here stated or later amended shall be final. All inquiries regarding cards, applications, or certificates should be addressed to her.

8) The YLCC custodian currently serving the YLRL is Katherine Johnson, W4SGD, Box 666, Fuquay Springs, North Carolina.

W6NZP and Friend? Or, we always knew our YLs were plucky souls, but isn't this the limit? Not so, says Evelyn Scott's OM, who treaded close enough to take the picture. "His lordship the snake never had a chance." That slimy, writhing creature is really only a six foot carpet snake which Evelyn and Harold met during their wanderings through the Australian "outback". Between their world travels the Scotts conduct a radio business at Long Beach, California, and work their many DX friends on twenty phone. Evelyn is currently serving as chairman of women's activities for the ARRL Southwestern Division Convention. Right after attending the coming National Convention in Chicago, the Scotts fly to American Samoa, where they plan to set up an amateur station at Tutuila.

YL Worked All States Award (YL/WAS)

The YL Worked All States award is available to all amateurs, YL or OM.

1) Two-way communications must be established on the amateur bands with a YL in each of the 48 states. Any and all amateur bands may be used. A card from the District of Columbia may be submitted in lieu of one from Maryland.

2) Contacts with all 48 states must be made from the same location. Within a given community one location may be defined as from places no two of which are more than 25 miles apart.

3) Contacts may be made over any period of years provided only that all contacts are from the same location as defined in Rule 2.

4) Forty-eight QSL cards, or other written communications from stations worked confirming the necessary two-way contacts, must be submitted by the applicant to the custodian for the YL/WAS award. Sufficient postage must be sent with the confirmations to finance their return. The YLRL will not be responsible for any loss or damage to same.

5) The custodian for the YL/WAS award is Grace Ryden, W9GME, 2054 North Lincoln Avenue, Chicago 14, Illinois.

YL Worked All Continents Award (YL/WAC)

The Young Ladies Radio League issues a YL Worked All Continents certificate to any licensed amateur, YL or OM, who meets the following requirements:

1) Two-way communications must be established on the amateur bands with the six continents: North America, South America, Europe, Africa, Asia, and Oceania. Any and all authorized amateur radio bands may be used. Cross band contacts are permitted; contacts may have been made over any period of years.

2) Contacts with all six continents must be made with duly licensed women operators.

3) Contacts must be made from the same location. Within

(*Continued on page 148*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

As indicated at the conclusion of this month's column in lines regularly devoted to long-haul happenings of yore, DX news of more than passing significance was transpiring a decade ago. The year 1947 saw an unprecedented boom in serious large-scale organizing of amateur groups and clubs primarily on the basis of DX interest. And the onset of this trend was truly a departure from tradition. In prewar DX pursuits DXers characteristically hunted the stuff in low-pressure lone-wolf fashion, hoarding rather than pooling secrets and tricks of the trade.

Statistically it can hardly be disputed that the California coast long has been the operational capital of our DX world. That prefix *W6* somehow just reeks of DX implication! [And they're so doggoned *loud*, Boss. — *Jeeves*] Hence it's fitting that a bunch of Sixes founded the Northern California DX Club late in '46 as the vanguard of this movement. Southern Californians quickly followed suit, and now there are prominent constituencies operating under West Gulf DX Club, Willamette Valley (Wash.) DX Club, and other long-distance labels here and abroad.

Oh, yes — another budding DX outfit enrolled its first postwar member in 1947. In fact, its first *pre*war member signed up *twenty* years ago. Right — your ARRL DX Century Club, now going stronger than ever!

—···—

We receive an occasional letter from OM Reader urging that more "How's" space be made available for the reporting of single-side-band DX doings. At such times he appears unaware that Jeeves & Co. welcome postal contributions of DX data bearing on *any* legitimate mode of emission, especially one so promising as carrierless phone. Space certainly is available. And we attempt no arbitrary rationings based on types of emission, a policy obviously indispensable if we purpose to represent and document our diverse DX world's bustling activities in these pages month by month in true color and perspective. So the extent of "How's" linage dealing with s.s.b. DX activities holds in direct proportion to the amount of unsolicited sideband gist received. And that's up to Mr. Reader.

So far as side band itself goes, 'tis a big lad. Its ham history dates from 1933 and its practical postwar application began ten years ago. It can earn promotional publicity on its own merit now that technical bugaboos of complexity and expense have been wonderfully tamed and the benefits of this emission are within reach of almost every amateur. Apparently what we need at this time is a little *operational* pioneering.[1]

For a technique whose applications, it is said, could supersede less efficient contemporary modes of phone transmission there were too few winning scores posted by side banders in the 1956 ARRL Sweepstakes (check p. 51, June '57 *QST*); there were far too few s.s.b. users observed seriously competing in this year's ARRL DX Test; and, as friend Reader points out, there are far too few side-band DX reports being filed with this office. Why?

A missionary task is all cut out for suppressed-carrier advocates and they now have plenty of effective tools for the job. Cozy band-edge round tables are well and good, and letter writing has its merits; but most hams are from Missouri and like to be impressed by competitive results. How about it? Demonstrate that nine-db. superiority over "ancient modulation" — *compete!* "How's" stands ready to record your results.

What:

Hey, that magical month is here! Summer's drowsy DX tempo now turns to an agile allegro; then the all-band transoceanic ionospheric chorus really swings on out in a cool, crazy crescendo, entirely *a capriccio*. You and your sender all set to face the mad music of this year's DX September song? July and August trumpeted the following teasy intro. . . .

*4822 West Berteau Avenue, Chicago 41, Ill.

[1] S.s.b. DXpeditions to rare areas serve to demonstrate the medium but this approach is promotionally feeble. Shucks, accumulating a fast logful of QSOs from Nepal with a loop-modulated Type '10 breadboard rig would prove only that hams love to work Nepal.

20 phone first, and our Fours and Sixes set the pace. Here's *K4HQD:* **VP9**s CZ and DM (14,170 kc.) 20 GMT. *K4IEX:* **KG4**AO (250) 17, **VP9**HH (200) 4. *W4HKJ:* **SVØWB** (195) 2 of Rhodes. *W4TFB:* **VR6**TC (famed Fletcher Christian's great-great-great-grandson), stalks **CR5**SP, **FK8**AC, **FO8**AC, **HS1**A, VE3AHU/**SU** and **VS4**JT on voice. *W6ZEN:* reached 217 on **VR6**AC, **ZS8**I. *K6GLC:* **EL5**A, **HP1**JF, **VK9**YT of T.N.G., **VQ2**DC, XZ2TH, FO8. *K6LZI:* **FU8**AD (160) 10, s.s.b.er **KA5**MC 7, KH6BZZ/**KJ6** (229) 9. *W7PHO:* **VR4**/B (200). *W9UNW:* notes 20 phone activity by M1B, resident **3A2**BF (150). *DL4YE:* **CN2**AY, **HA2**TY, **HZ1**NA, **OE**s 1WD 6PF, **SP9**KAJ, YU3EL, **5A2**TY. *XE2BM:* K4HIG, NCDXC's *DXer:* **BV1**US (187) 9, **CR4**AH (132) 5, **EA**s **6**AR (160) 4, **9**BK (105) 2, **FK8**AS (147) 5, **FO8**AB (110) 4, **KC6**SP (200) 15, **KC4**USH (271) 5, **KG6**IG (250) 10-11 of the Volcanoes, **KP6**AK (298) 7-8, **KX6**BQ (270) 7, **LX1**DA (130) 6, **OK1**KTI (120) 5, **SP7**HX (174) 6, **SVØ**WH (180) 6, **TF2**WBU (146) 4, **UA**s 1AD (131) 5, **9AA** (120) 5, **VKØ**CJ (129) 6, **VR2**CC (152) 5, **VS4**JT (110) 18, **ZB2**R (160) 1, **ZD4**CR (140) 7. **5A1**TB (180) 5.

20 c.w. next, and we reverse the callphabetical sequence of reports for luck. *W9LNQ:* **CN8**GL, **LU1ZB.** *K9ECO:* **CR6**s CK CZ, **CT2**BO, **DM3**s ADL KHN, **EA9**AP, **FE8**AH, one HAØHN, **HC1**LE, **HK3**JC, **JA**s 1DO 6AD, KA8RA, **KG1**BB, **KG4**AO, **KR6**SS, **LU7ZC**, **PZ1**AI, **SP3**AD, **TG9**MR, **TI2**EA, **UA**s 1KAQ 1KAR 3AN 3HI 3JB 4FE 9AA, **VR3**B, YO2BU, all with a Viking II, Windom, and S-85. *W8IBX:* **FP8**AA, **HB1**UQ/FL, **OE6**DK, **SVØ**WR. *K8ANX:* **VP7NZ**, FP8. *W7CSW:* reached 156/140 with **BV1**US, **CR7LU**, **EA9**DF, UA1KAE of the polar south, **UC2**KAB, **UL7**KAA, **UQ2**s BA KAA, **UR2**KAA, **VSs** 1HB 1HJ 4BA, **XZ2**AO, **ZC5**AL. *W7DJU:* DU1RTI, **HP1**LO, **JA**s 1AG 1AJN 1AJU 1AXV 1BCO 1DM 1GW 1KM 1PS 1VE 2AE 2AW 2BJ 2DN 2NX 3AAA 3VN 4CF 5AA 5AB 5AF 5AI 5DF 5GZ 6FB 7BO 7IV 9GA, **KAs** 2KS 2MP 2YD 3BE 4EB 8RA, **KC4**USN, **KG6**s AHA NAA, W9NTJ/**KG6**, **KR6**s BF GT QW RX, **UR2**AO, **VS1**GY, ZC5, most of these worked at his office station (W7GYR). *W7FBD:* up to 185 with **FB8**XX, **YJ1**DL, also got unusual **HB1FE** and one F2AN. *W6DZZ:* notes activity by **FB8**CD, **KW6**CB (42) 8-9, **VR6**TC (19) 5-8, **XW8**AG 14, **ZK2**AD (6) 8-9. *W6KG:* **CR6**DA (45) 6, **DM2**ALN, **DU1**OR (90) 18, **EL1**R (18) 8, **HH2**LD (88) 3, **KP6**AL (80) 7, **LU8ZC** (70) 7-8, **TI2**PZ, **UA**s 1KAS (55) 20, **9**KCC (60) 20, **VSs** 1GY (16) 15, **2**FF (28) 16, **ZP5**AY (85) 1-2, VR6 XW8, all in one 10-day period. *W6NTR:* **ZD4**CM (28) 6. *W6PUY:* the real **ST2**AR (73) 16 who works only 20 meters at present. *W6RLP:* 122/96 via **KC4**s USA (21) 9, USB (82) 7, **KG6**IG (98) 15 of Chichi, OH3TI/**Ø** (79) 7 of the Alands, **W7FNK/KP6** (47) 6, **9S4**AX (2) 5, EL FO8, Kergueléns FB8. *W6ZEN:* **CEØ**AC, **UM8**KAA, **VS9**AD, **ZD4**BX, Kergueléns. *W6ZZ:* struck 20 hard for **CE3**RE, **DUs** 1CP 7SV, **JAs** 1AJU 2JW 5DF 7HL 9AC ØGG, **KA2**s MP YD, **KG1**BB, **KV4**AA (80) 19-23, **UA3**HI, **UAØs** KFF KJA, **VR3**G, missed out on **FK8**AT (12), **UL7**KBA (74), **UAØ**CN (40), **VQ6**AC (33), **ZL5**AA (47), now has all-band tally of 168. *K6GLC:* **CT1**JS, **LAs** 3TF 5B, **FK8**AH, **UAØ**FR, **UQ2**AB, **VKØ**AB, VR3 ZC5 ZK2. *K6ICS:* **CE3**CU, **LU9**XA. *K6LEB:* FK8 KP6 ZK2. *K6LZI:* **FO8**AQ 8-9, **KR6**s RX (50) 17, SA (84) 13, **OQ5**RU (78) 16, **VS1**GL 10-11, **VK9**NM (48) 11, **UAØs** FB (40) 7-8, OM (39) 12, **ZC5**RF (40), **ZK1**BG (81) 8, **5A2**TP (20), heard **CR9**AI (45) 15, **UAØ**KCO (78) 14, *K6OPI:* **FB8**YY, **LU1ZS**, **VS1**DU, KP6 VR3 VS2. *K6SRZ:* **OK1**CG, **KX6**NA (80) of Majuro, **JA7**s AZ BO (50-60), **VP9**BU/P. *W4AUL:* **CR4**AH (11) 22, VR3, suffered from "high noise levels, sunspots, fall-out, and eternal QRM from the XYL" (and we hope she doesn't read "How's"). *W4EJP:* **OA4**FM (38) 1. *W4HKJ:* HA1KSA, **JAs** 1AXV 5CP, **UAs** 2KAW 3XL 4KAB 6LF **9CC**, **UB5s** BC KAB KBU KIA VU, **UC2**AD (51) 3-4, **UI8**KAE (100) 13-14, **UP2**AT (41) 1, **VK9**VM (14) 12, **VU2**JA (19) 11-12, registers a strong protest against uncouth operating tactics and plain operational clumsiness and carelessness. *K4BXT:* **CR6**CV (110) 7, **JAØ**BR (82) 9, **KR6**AC (39) 9, **SP6**BY (90) 5, **VP3**YG (30) 9, **SVØ**WR (32) 8, **VR3**H (54) 9, **9S4**AZ (51) 7, Antarctica KC4, UA9 UR2 on DX-100, SX-100 and folded dipole for 75 countries. *K4DRO:* **FM7**WR HH2Y. *K4EYT:* **CN8**FW, **DM2**ACN, **PJ2**ME. *K4IEX:* IT1AGA, **UB5FC** (70) 3-4, KV4. *W3LMA:* LA2JE/**P** on Hopen (25) 1-2. *W3GRO:* **YU2**DU. *W2HMJ:* **CP1**CJ (37) 0, EL1C (ex-EL12C) 23, K2ILQ/**KG6** (78) 11, **VR4**JB (78) 10, **VSs** 2FB (30) 10-11, **6AE** (37) 11, **VU2SX** (40) 12, **YS1**O (85) 4-5, cruising ZA2ACB (DM2ACB), KC4 à la Antarctica, VK9 VR3, heard DL1GV working **AC5PN** (50) 0-1. *K2IKS:* **HA5AP**, HH SP. *K2MGR:* OH3AA/**Ø**, **SM1**BJA, now at 89/55. *K2OEA:* **VU2JG** (10-20) 0-1, M1H (100). *K2PHC:* **CE9AK**, **FY7YE**, **HB1**MIX/FL, **MP4BBA**, **PZ1AP**, **LU9ZC**, UA6LF, **UR2AK**, **VP3**VN, Sint Maarten. *K2QXG:* **VKØAS** (90) 5, **VSs** 1CZ (20) 5, 2HB (20) 5-6, **ZCs** 4FL (15) 15-16, 5AL (40) 3-4, ZK2, all heard; worked **VU2BK** (30) 7, ZD4 VS1 VS6. *K2SLL:* **CN8**FW, KV4, Sint Maarten on 30 watts and nondescript wires. *W1BDI:* hooked **SP3**DG (50), VK7NM/**VK9** (50); heard **KG1**JA (W3JAK), HA5TH (70). *W1BPW:* **OY1**R (8) 23, UP2, close with 97 worked. *W1DBA:* **DMs** 2BCO (50), 3KCH (30), JA3MC/MM off Houston, **LZ1**s KBR KNB both 1-3, **OE1**TA (50) 3, **SPs** 8CP 9KAS both 1-3, **UAs** 1KFA 3KAF 3KUA all (20-60) 2-3, **UB5s** KBR SD (30-40) 1-2, **VP6s** GC PJ (30-40) 1-2, **XE2HU** (80) 23, **YUs** 1AG 1ML 3LF 3NR, **YV5HL** (35) 3, **4X4IL** (40) 2, St. Martin PJ2, ZK2. *W1YNP:* **CE9AS** of Chilean Antarctica, **FB8CC**, **HK3PC**, **JA1AA**, **KC4USV**, **VP7NM**, FM7 PZ1 VR3 to reach No. 142. *DL4YE:* **CN2**AY, **HAs** 2TV 5KBP, **LZ1**s KPC KSZ, RAEM, **SP9**KAJ, **UA9DT**, **UC2**KAD, **UG6**WD, YO3CZ, **ZB2A**, uses DX-100, long-wire and SP-600. *KL7CDF:* 1100 DX stations in 90 countries within seven weeks including **CRs 6**AI 6DK 7AB 7AG, **DU6**IV, **ISIs** FIC MM, **JZØ**PB, LX2GH, **OD5**LX, **OQ5**s CB DC, **SVØ**WP (W3JTC), **UF6s** FF KAC, **UG6**AW, **UI8BA**, **UI8**KAA, **UJ8**AG, **UL7s** AB GN, **UN1s** AA AE, **UO5s** AA PK, **UQ2s** AD AG AS AW KAB, **VKs 9XT ØAB**, **VQs 2**AB 4FM, **VR2s** DA CV, **VSs** 1GX 6DV, **ZB1**BJ, **ZC4s** BN JX, **3V8**AB, **4X4s** FA GC JH, **5A5TH**, **9S4s** CH CM. Who said KL7s have it rough?

15 c.w. brings the Zeroes into the act, especially *WØQGI:* **HB1**MIX/FL, **M1H**, **ZC5**AL (60) for No. 186, **3V8AD.** **4X4s** FN FR IV. *KØGJD:* **CT3**AB, **DU7SV**, **FF8**AJ, IT1AI, **KG1**KK, OA4AU, **PJ2**AJ, **UA1s** DZ KBB, **UQ2**AS, **VP7NM**, **4S7**GE, now 60/45 on 50 watts to a 3-el. twirler. *W9NLJ:* **CE3II**, **FF8BZ**, TF2WBU, UA3KWA, **UC2**KAB, **VP8**AI, **ZB1**BQ, **ZC4**JX, **4X4**DR. *K9ECO:* **OA1**FM, **UA1**DH, **UB5UW**. *W8CSK:* **WP4**AIJ. *W8GKB:* **VS6**DV, **4X4**BX, **9S4**CM. *W7DJU:* **PY3**AOF, heard the posse hunting down **XW8**AG with a vengeance around 18 GMT. *W7PEG:* **OH3**TE. *K6ICS:* **LU6**DEC. *K6LEB:* **DM2**AEB, **HA5**AM, **KR6**AK, **OA7I**, **OE3**RE, **OK1**KTI, VK7KM/**VK9**, VS6 for 72/46. *K6OPI:* reached the 100-mark by way of **EA6**AF, **FO8**AD, **HI8**BE, **PJ2ME**, **SV1**AB, **TF3**KG, **TI2**DL, **UAs** 3AA **9**KSA **ØKBB ØKFC ØKFC ØSK**, **UB5WF**, **UP2**AS, **UQ2**KAA, **YO3**WL, YV5BZ, ZE5JA, HA UP2 ZC5. *W4AUL:* **UO5AA** (58) 20. *K4DRO:* **FP8AA**, **OE5GR**, **SP2BK**, YO3CA for 90/69. *K4ELG:* **KG1JA**, LA2NE. *K4HIG:* **KL7**WAF. *K4HQD:* **JAs** CS (25) 23, RR (70) 16, **OK1**MB (20) 23 with ticket back in good standing, **SP8CK**, **YO8MS** (30) 21, **YU2DU**. *K4IEX:* **CN8JO**, he on phone; **CX6CM** (60) 23, HI OK, Sint

HS1A and his senior junior op pad Bangkok's local QRM with 100 watts and a 15-over-20 rotary. Ken, a USAF major, expects to use s.s.b. extensively on 14 and 21 Mc. henceforth. That stack of outbound QSLs, not the first such shipment, attests to HS1A's immense popularity at DX points. (Photo via W7PHO)

Maarten. *W3GRO:* **OK**1KSR (110), **SP**6KBE (110), **UA3**KAH (103), all 18-19. *K2PHC:* **ET2**RH, **IS1**MM, **VQ3**TL, **ZE5**JL. *W1BDI:* heard **VP5**BL (44) 0, **ZB1**DC (78) 23. *W1YNP:* **JA1**CO, **SV0**WR, **UN1**AB, **UQ2**AS, **VP3**HAG, UB5 VP5 ZC5. *KP4KD:* **EA0**AC, OH2AA/**0**, **PZ1**AH, **UC2**CB, **UF6**AC, **VP7**NM, **VQ6**LQ, **5A2**CO, UO5 for 222/213.

15 phone hit its annual depths but came through with enough DX desiderata to delight the faithful. First, *W9NLJ:* **CT1**CF, **HI8**BE, **5A1**TG. *W8IBX:* **VP7**BO. *K8ANX:* **HH5**DS. *W7PEG:* **VS1**HC. *W6ZEN:* **CR5**SP. *W6ZZ:* **BV1**US, **HR1**EZ, **KV4**BU (XYL of KV4BD), **VKs** 2AGX 3APM 3ZJ, **VR6**TC (244), **ZK1**BS, **ZLs** 1AE 1BE 1DE 2AIL 2AJQ 2MA 4HE 4KE 4KL for 133 countries on 15 meters; gottaways were **KB6**BE (377), **HI7**LMQ (222), **VS9**AI (159). *K6OPI:* **CE2**HX, **CT1**PW, **EL2**F, **HP1**RB, **KA2**KS, **KR6s** BN MD, **OQ5**BG, **VK6**RU, **VPs** 1HA 6LT, **VR2s** AZ BC, **VSs** 1FE 1GX 1HC 2DB 2DY 6CO, **XE1s** AX MO, **ZK1**AU, **ZP5**KK, "Get a nice Asian opening on 15 two or three times a week which helps some!" *W4TFB:* **DU6**IV, **MP4**BCC. *K4DRO:* **KG1**HL, **KW6**CA, **TI8**MU. *K4HIG:* **VP5**WS, **ZL1**CH, **5A2**TZ, HH. *K4HQD:* **CN2**AK (240) 2, **CR6**BT (165) 22, **CT1**GE, **HP1**LB (350) 2, **KV4**BD (390) 4, **OA5**C (200) 3, **VP7**NB (210) 22, **4X4**JT (215) 21, HR KW6. *K4IEX:* KV4BI (270) 2, **TI2s** DLM IO, W5CQB/**VE8** (300) 21, **PJ2**AX (350) 4, **VP7s** BI NV (260) 0. *W3DDV:* **KA8**RA, **KX6**AF, **VK9**HO, **9S4**CM, KW6, heard one XU2CB of "Peiping" although *XU* now is Cambodian property. *W1YNP:* VK9 5A. *KL7CDF:* **JZ0**PB, **VSs** 4JT 6DV. *ON4KT:* **YN1s** FV Mf. Ron Moss omitted his call but recounts contacts with **HH3**VC, **HI7**HL, **KG1s** CG KK, **TF2**WOK, **YV5**FH and other desirables.

15 Novice activity, or lack thereof, should be bolstered by a rising m.u.f. henceforth. Hot-season luck here and there, first *KN0IKR:* **KH6**AHQ, **KZ5**BE. *KN5JCC:* **HR1**VS, **KH6**CDI, **PA0s** FLX HP, **PY1**BDU, **ZL1**APM, now should be K5JCC. *KN5HQE:* **JA6**CX, **VK3**VJ. **VP7**NO, **WP4**AIU, has an Adventurer, S-40B and Reyco skywire. *KN6HYB:* **CM8**EM, **PA0**GF, **PY3**AOF, **TI2**LA, **WL7**BYA, **WP4**AJT, Cs KH6 ZL. *KN5IID:* **DU7**SV, **KV4**BB, **KX6**BQ, **OA4**AU, **VPs** 5CP 6LT, W9KLD/**KL7**, **WH6**CCL, XE1AX, **ZS5**KA, awaits his General passport to 20 meters. *KN4MWB:* **EA7**TA, **GM3**FGJ, **KA8**RA, **VP5**CM, **WP4**AJS, **YU3**KS, **4X4**JS, this with AT-1, NC-88 and 7-Mc. doublet on one (21,140 kc.) crystal. *WN8LAX:* **KP4**KD, **OK1**KQ, **PA0**NV, CM G, *KN2UPD:* **EI0**J. **GC2**CNC, **KH6**SP, **OKs** 1MB 1KSR 1KTI 3DG 3EA, DX-peditor **PX1**FC, **PY1**RW, **UF6**AC, **VK3**AXX, **WP4**AJZ, **YO6**AU, has **FF8**BZ and **VP8**CC staked out. *KN1ACJ:* **EA1**DD, **ON4**AC, **YU3**SG, **WP4**AHM, DJ/DLs on DX-35 and AR-3 combo . . . . . The sharp Novice who gets his ticket about now and who really applies his talents to 21-Mc. DX for the next year or less stands a dandy chance to snag the first Novice DXCC on record. Fifteen-meter conditions may not be so good for years and years and years and years. Who'll make the odds?

10 phone slithered through the torrid months without blacking out completely and *that's* something. We find, at *W8IBX:* **CX8**CD, **YV5**EW. *K8ANX:* **HP3**DA. *W6ZZ:* **KH6**RS, **ZLs** 1AKW 1APM 3AY. *K6OPI:* the 12-watter of **VK9**BS. *W4EJP:* heard **TI2**BX (600), **YV5**ABD (500). *W4TFB:* **CT3**AI, **ZD1**EO, **ZD4**CD/M (W1WWA/MM). *W3ZKH:* cracked the doldrums for **CRs** 6DA 9AH, **EA0**AC, **FQ8**AF, JA3AB, **OX3**LD, **ST2**DB, **UB5**KAB, **VPs** 4TS 5BH, **VQs** 3ES 5GC, **VR2**BC, **YO3**VA, **YU1**FC, that ZM1BL, ZD1, made it 127 worked on 28-Mc. voice, watches for ten DXCC-clinching QSLs, hunts his stuff with a Viking II, NC-300 and 3-el. rotary. *HK7LX:* gives the equatorial angle with **EA8**BV, **OQ5**AZ, **VQ2**NS, numerous ZSs . . . . . **Ten c.w.** is kept alive by *K2PHC:* **GD3**FXN. *W3ZKH:* ZM1BL again. *W4EJP:* **HK5**BY (80) 14-15. *K6OPI:* assorted ZSs.

40 c.w. contended with what seemed to be the heaviest helping of thundershower activity in years, from coast to coast. But the gang persisted, coming out with several satisfying odds and ends. *K9ELT:* **VP5**BL (37) 3. *W8CSK:* **WP4**AIS, **XE1**KD. *W7DJU:* **FK8**AT, **JA1**AEA, **KR6**AK, VKs ZL. *W7ULC:* **DU7**SV (30), **ZL1**AFZ, FK8 KR6, heard DU7SV hook **VU2**RM, "Find best conditions are 1300-1500 GMT." *K6KIV:* pipeline to Japan, **JAs** 1AEO 1AGU 1JH 2AQ 2OF 2UW 3MF 3ZP/3 9BY 9NN (all near low edge, some c.w. to phone), DU KR6 VK2, VK3s, heard tabooed HL2AC, runs a DX-35, BC-455 surplus inhaler, doublet. *K6LEB:* FK8. *K6SHJ:* **XE2**LT (50) 9, VK. *K6SRZ:* **KL7**WAF, JAs. *K4EYV:* **KZ5**WU. *K4JMN:* **HAs** 5TZ 8WZ, **HR1**HZ, **KZ5s** BB BC, **OK1**EV, XE1NF/1, **YO5**KAI. *W3MQY:* **FA9**FQ (28) 1, **TI2**DN/8 (17) 0, **LZ1**KPB (38) 0, **YO5**AU (20) 0-1, **UA2**KAW (16) 1 of Kaliningrad, heard **EA0**AC (10). *W2JBL:* **VK7**OM (12), DLs. *W1YNP:* one ZA1AA . . . . . **Forty Novice** frequencies gave up a few nuggets for the newcomers. *WN8HLL:* G6IL, *most* rare on 40 for various reasons. *KN5HQE:* **WH6**CFY. *KN5JCC:* **XE1**RR. *KN6VXS:*

Mogadiscio's 15FL stirs up storms of competitive QRM on several phone DX bands. The XYL frequently pitches in to assist in providing Somalia DXCC credits to the persistent W/K/VE pack. (*Photo via W9WHM*)

JA1EF, **WH6s** BYG CBY CEA, **WL7s** BWD CEB CEE . . . . . **Eighty c.w.** writhed painfully under its blanket of QRN for *W1YNP:* **DJ2**HC (also worked on 75). *K4ELG:* **EI9J** (4) 4, KZ5WU (20) 4. *W7DJU:* **ZLs** 1CI 3RQ/4 . . . . . Now let's shake the static out of our ears and scrutinize the QSL situation. . . . .

Where:

Oceania — W6ZEN advises, "Have made arrangements with ZK2AB to handle all his QSLs. I would like to ask all W/Ks working him to send me self-addressed stamped envelopes with their calls thereon. ZK2AB will reply 100 per cent to all cards received by me, which information I will pass on to him via skeds. He will make out the cards and send them to me for relay." . . . . W6ZVQ handles QSL matters for ZK2AD, according to SCDXC's *Bulletin*, and this new Niue nifty is reported active on 20 around 0530 GMT . . . . KC6UZ has mailed out over 1000 QSLs since January, 1954, but his tally of cards received barely exceeds the 500-mark. He has yet to score DXCC. Because of this QSL situation Carl usually sidesteps contests and now restricts his DX activities to one evening per month. "From reports received from KC6 amateurs, as well as from a review of cards going through our bureau, numerous amateurs are indulging in wishful-QSOing or they are actually working bootleggers in other parts of the world. KC6UZ has received numerous QSL cards resulting from the usual pile-ups when some amateurs claim contacts though my log shows me working another station at the time. . . . If the call of a KC6 station you are working is not shown in your *Call Book* don't hesitate to cross-examine the station. If you are still suspicious, address an airmail inquiry to Director of Communications, Trust Territory Government, Truk, Eastern Carolines." . . . . "Was on Wake Island from March to July 29, 1956. If anybody missed out on a QSL from KW6CD I will reissue a card from my present Hawaiian QTH." That from KH6AFI whose address follows . . . . Off the mill of W4DNU/KH6: "Due to the inadvertent destruction of my logs from March 1, 1956, to March 1 of this year, for aeromobile operation in the Far East and Hawaii I now find I am unable to QSL stations worked." Those still needing W4DNU/AM cards can contact Mac at the address that follows, giving full QSO particulars, and he'll do his best to recall QSOs for verification purposes . . . . W4DNU/KH6 has this to say about ex-VR3E QSL considerations: "VR3E was short on materials when he made his first batch of photographic QSLs on Christmas Island. He was unable to treat the prints adequately and the first 300 have been found subject to severe fading. Anyone who received such an unsatisfactory QSL can drop Lester a line (to G3FYW) and a replacement of better quality will be sent immediately."

Africa — Via W1UED, REF makes it official that 3V8AD heads the Tunisia QSL bureau at P.O. Box 303, Tunis . . . . Walt Snyder, on-the-ball QSL manager for the ET2US gang for some time, left Eritrea in favor of Germany where he hopes to land a DL label. "Twenty years ago I used the call K6DV in Hawaii where I was with the old 11th Signal Company of the Pineapple Division." . . . . Enthuses W6NTR: "For speedy Ghana QSLs orchids go to ZD4CM. Received my QSL airmail only seven days after QSO!"

Europe — G3AAE informs, "Between June 4th and 19th I was on vacation in Jersey, Channel Islands, and operated

as GC3AAE on 14-Mc. c.w. I contacted over 200 stations in 40 countries on all continents. Half the chaps I worked had never QSOd a GC before! All contacts will be confirmed via RSGB." . . . . SM5WI, convalescing from a gall bladder operation, assisted W7DJU to secure SM1BJA's QSL for WASM purposes . . . . . SWL Bill Rice at 4 Plain Dr., E. Hartford, Conn., still handles LZ1KPZ's QSL chores for this hemisphere and repeats his request that an IRC accompany each QSL . . . . . W1MAN reports receipt of UR2AK's QSL via ISWL QSL Bureau, 86 Barrenger Rd., London N.10, England.

Hereabouts — "I returned to the States from KG1AG last fall but I'm still receiving QSLs for that call. I may have missed some stations as I have been in quite a rush since getting back. I welcome inquiries and will QSL all bona-fide contacts." Ken's old KG1 suffix probably has been reassigned at least once since his return, one of this department's pet peeves, so 1957 KG1AG QSOs should be QSLd elsewhere. Ex-KG1AG — this one, anyway — is former K4IWH and his QTH follows . . . . . "Anyone who worked VP5BE, Turks, between January 19 and May 4, 1956, and who has not yet received a QSL may obtain same by QSLing Wm. G. Rost, W8QLF/1, at P.O. Box 981, Nantucket, Mass." . . . . . Regarding TI9CR's March-April Cocos venture, TI2IIP advises: "All cards received to date have been answered. I have been taking care of the QSLs and there are a few which I have not sent out because the lists in the TI9CR logbook are somewhat confused. I would appreciate your making mention that those who have not received their deserved cards should reapply at the address of Radio Club of Costa Rica or directly to me." . . . . . HK7LX rushed out QSLs 100 per cent via air for his first 110 QSOs from Bucaramanga. We hope Edmundo's returns will be high enough to justify such a liberal QSL policy . . . . . W1s BDI DBA WPO YNP, W2s HMJ IEK SUC, K2s IKS MGR OEA QXG, W3s GRO LMA MAC, W4s ANE HKJ, K4IEX, W6s DZZ KG NTR PUY RLP, K6s GLC LZI, W7PHO, W8FPR, W9CFT, K9COF, W0QGI, G2PL, SP6XA, KC6UZ, clubs ISWL, JDXRC, NNRC, NCDXC, SCDXC, WGDXC and M. Heins supply the following QTH roundup:

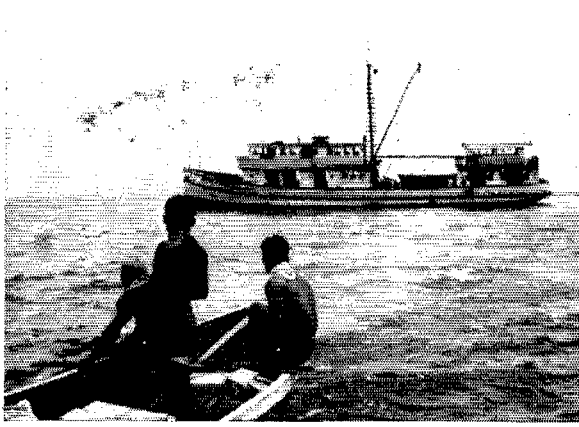
CN8FD, D. L. Thompson, 3150th Maint. Gp., Box 98, SAMA(EUR), APO 30, New York, N. Y.
CN8FY (to K4ESI)
CP1CJ, c/o U. S. Embassy, La Paz, Bolivia
CR9AL, A. Rodriques, Military Hospital, Macao
DL4BH, Kaufbeuren ARC, 7331st TTGP MAP, APO 191, New York, N. Y.
ex-DL4UP, D. Hamill, W9UNW, 4210 Wanetah Trail, Madison, Wisconsin
DM2ALN, Box 666, Halle/Saale, East Germany
EL1R, I. C. Rothnie, Box 36, Harbel, Liberia
ET3PRS, Police Radio School, P. O. Box 621, Addis Ababa, Ethiopia
ET3XY, Telecommunications Radio Club, P. O. Box 1047, Addis Ababa, Ethiopia
FA8SD, Box 2, Cap Matifou, Algeria
FK8AS, Box 151, Noumea, New Caledonia
FM7WT, A. Meunier, P. O. Box 7, Lamentin, Martinique, F.W.I.
GC3AAE (to G3AAE or via RSGB)
HA5AP, I. Rostas, I. k. Hess A. ter. 5 sz., Budapest, Hungary
HK4BQ, Box 728, Medellin, Colombia
HP2CC, P. O. Box 196, Colon, Republic of Panama
I5FL, Fabio and Lia Martini, P. O. Box 247, Mogadiscio, Somalia
KA2JE, 2713rd Whse. Sqdn., Box 703, APO 323, San Francisco, California
KC6KG, K. R. Groote, Koror, Western Caroline Islands, T. T.
ex-KG1AG (see text preceding)
KG1FA (to W3ZZG)
KG1HL, APO 121, New York, N. Y.
KH6BZZ/KJ6, P. O. Box 84, APO 105, San Francisco, Calif.
KL7CDF (W9KLD/KL7) (to W9KLD or via W9CFT)
KP6AL (W7FNK/KP6) (to W7FNK or via KH6BA)
KW6CB, G. R. LeCaille, Box 72, Wake Island
ex-KW6CD, R. F. York, KH6AFI, 210 Makee Rd., Honolulu 15, Hawaii, T. H.

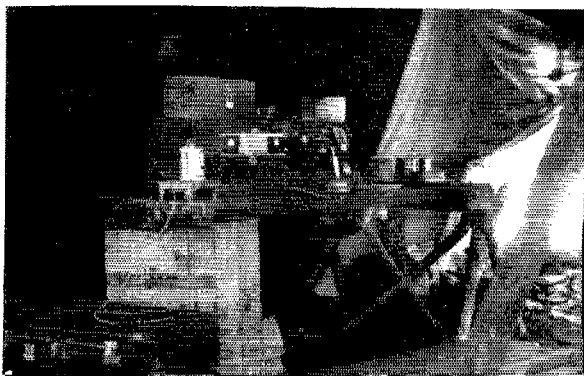
M1H, 28-year-old San Marino electronics engineer and teacher, currently panics the 14-Mc. c.w. crowd with a Geloso exciter driving 807s, a war-surplus receiver and a long-wire radiator. When jaded by intensive electromagnetic pursuits Aure relaxes in the sonic spectrum with some real cool jazz. (*Photo via W8OHV and W0QGI*)

KX6BV, C. W. Anderson, 1960th AACS Sqdn., FPO 824, San Francisco, Calif.
KX6BW, Capt. W. J. Goldring, USN, FPO 824, San Francisco, California
KZ5RF, R. F. Meaney, Box 735, Fort Kobbe, Canal Zone
LA2JE/P (via NRRL)
LU5DEL, Box 6, Quilmes, So. Buenos Aires City, Argentina
OA4BP, L. Schweiger, P. O. Box 538, Lima, Peru
OK1AW, A. Weirauch, Mestec Kralove c. 9, Czechoslovakia
OK1KGR, Lovosice, Czechoslovakia
PJ2AX, C. G. Wilson, Box 710, Lago Colony, Aruba, N. W. I.
PX1FC (via UBA)
PY1BP, A. Teixeira, Rue Humaita 270, Rio de Janeiro, Brazil
SP5LM/LA/P (via PZK)
SV0WB/Rhodes, USCG *Courier*, WAGR-40, FPO, New York, N. Y.
TA2AB, Box 38, Trabzon, Turkey
TF2WBV (to W4JOS)
TF2WBZ, APO 81, New York, N. Y.
TF2WOK (to W8OK)
TI2IO (ex-DL3IO) E. V. Hernandez, P. O. Box 4155, San Jose, Costa Rica
UA4AG, Box 58, Stalingrad, U.S.S.R.
UB5WF, V. Goncharsky, P. O. Box 41, Lvov, Ukrainian S.S.R.
VE3AHU/SU/Gaza (to VE3AHU)
VK7KM/VK9 (to VK7KM)
VK9AJ (Les) 7 Grenstead Rd., Newby, Scarborough, Yorks., England
VK9VM, P. O. Box 300, Rabaul, New Britain, T. N. G.
VK9YT (via W8FOG)
ex-VP5BE (see text preceding)
VP6US, H. Wheeler, USN Mobile Construction Unit, Box 7, FPO, New York
VP8BJ, Box 246, Port Stanley, Falkland Islands
VP9CY, Box 275, Hamilton, Bermuda
VQ4GQ, P. O. Box 30163, Nairobi, Kenya
VQ6ST, Berbera, British Somaliland
ex-VR3E (to G3FYW)
VR4DW (via VR4JB)
VR4JB, Box 49, Honiara, Guadalcanal, British Solomons
VS4BA, Dick Hawkins, c/o P &T Dept., Simanggang, Sarawak via Singapore
W4DNU/KH6, P. G. Roemer, FAW-2 Base Radio, Navy 14, FPO, San Francisco, Calif.
W5CQB/VE8 (to W5CQB)
W9NLJ/VE1 (to W9NLJ)
XE1YI, H. P. Villar, Calle Guillermo Prieto 107, Apto. 7, Col. San Rafael, Mexico, D. F., Mexico
XE2TA, P. O. Box 846, Juarez, Mexico
XW8AG, Renuf Maspimby, MMF/GRL, Det. EM, Vientiane, Laos
YN1FV, Box 1769, Managua, Nicaragua
YN1MF (via YN1FV)
ex-ZB1AJX, G. Stanton, 54 Lynford Way, Winchester, Hants., England
ex-ZC4FB, Ted Ross, 18 Abbey Grove, Abbey Wood, London S. E. 2, England
ZC4II (via ZC4IP)
ZD2MFM, c/o DCA, Kano, Nigeria
ZD4CM, M. Coleman, Box 100, Hahoe, Ghana
ZK2AB (via W6ZEN)
ZK2AD (via W6ZVQ)
ZS8L (to ZE1JV)

Whence:

Oceania — An old favorite is back, gang! Next month WIA (Australia) invites world-wide participation in the 1957 VK/ZL DX Contest to be held (phone) 1000 GMT October 5th to 1000 October 6th, and (c.w.) October 12th-13th, same hours. VK/ZLs will work as many non-VK/ZLs as possible and, naturally, vice versa. The serial exchange is the usual five-digit (phone) and six-digit (c.w.) figure — RST001, RST002, etc., and your initial Test QSO can start with any number between RST001 and RST100. Scoring has changed somewhat: five points per contact, each station to be worked but once per band, and fifty "bonus" points for each different VK/ZL call worked per band (ZL1

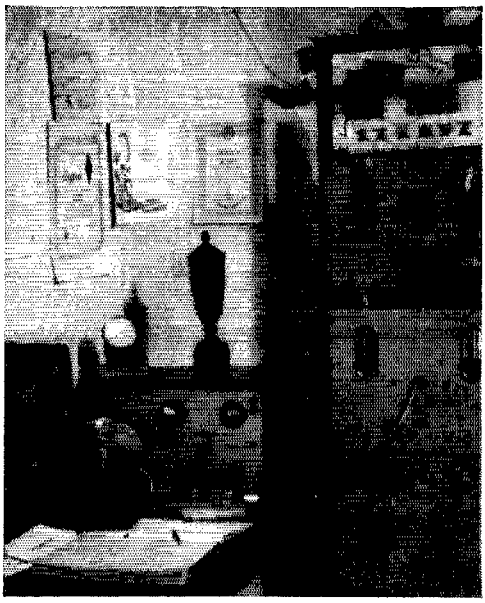




TI2HP contributes this photofactual sequence of goings-on last March and April when the Radio Club of Costa Rica activated TI9CR on rare Cocos Island. Participating TI2s LA and CAH collected 560 QSOs in 44 countries, including 218 phone and 156 c.w. contacts with the U. S. A. TI2HP writes, "This expedition was organized in less than a week to take advantage of a very rare trip to the island which was made by a prospecting company. We regret that it could not be prolonged and that we did not have enough time to warn all appropriate journals so that more amateurs could have taken advantage of it." Humberto had hopes of hitting TI9 again last month but the odds are always long in Cocos plans. TI9CR opened fire on All Fool's Day, a cute psychological plot that fired the skeptics.

through ZL4; VK1 through VKØ, excluding VK8). Log the date, GMT, band, call, and serials sent/received in that order, indicating contact and bonus points for each QSO in right-hand columns adjacent. Separate band-sheets are not desired this year; keep your log in the normal chronological sequence of contacts. Attach a summary sheet bearing total claimed score, a brief station description and a signed declaration that rules have been observed. Entries postmarked no later than October 31, 1957, sent to Federal Contest Committee, WIA, Box 1234K, GPO, Adelaide, So. Aus., Australia, will be eligible for certificates of performance which will be awarded to the highest scorer in each country and in each U. S. call area. Here's the year's best chance to salt away key credits toward such Down Under awards as WAP, WAZL and WAVKCA. Good fishin'! . . . . . VS4BA's new Simanggang QTH is afflicted with d.c. mains but Dick is undaunted. "In June I loaded up my TX — a 6AG7-6L6-807s combo — into a 60-watt bulb. That lamp's filament just curled up on its toes. So I stretched a long-wire on the floor and CQd. That's how I raised my first W in years, and I hammed for two nights with gratifying reports from the antipodes. Now I'm making a cabinet, sprucing up the aerial and rigging for break-in. Right now I have but two crystals, both slap-bang on commercial f.s.k. stations. Tough luck!" . . . . . W7PHO has it that VR4DW is about to joint VR4JB in expediting Solomons DXCC credits. The latter likes phone and c.w. on 14,200 and 14,080 kc., respectively . . . . . The steady performance of ZC5RF's 60 watts and AR-88 impress K6LZI. Incidentally, it costs ZC5RF $1.50 to ship one airmail letter to the U. S. A. . . . . More from K6LZI's DX notebook: FO8AQ, frequently found on 20 around 0830 GMT, runs 50 watts to a Windom and receives with a venerable S22-R. Ray, a former French Navy non-com, is in charge of the port office and coastal radio on Raritaia, Ututoa, 120 miles northwest of Tahiti . . . . . Lines from YJ1DL, now back at Espiritu Santo after travels and a visit Stateside: "I'm extremely busy these days as chief op-technician at the government radio station here. Yet in spite of many and varied duties I cannot keep away from ham radio and find myself once again pounding out the call YJ1DL, chiefly on 14 Mc. I can often be found on 14,020 kc. around 1000-1040 GMT but my time is limited because I must run a large diesel engine for power." You probably know that Dave previously signed VK2DE, VK4DL and ZC3AB . . . . . KX6ZB, ex-KC6ZB, worked 107 countries from the Marshalls and now is sweating out his last few DXCC QSLs in California. "Didn't manage WAS because Vermont and Delaware played hard to get." Pappy and XYL Dusty call your attention to the Second Far East Hamfest to be held in Guam come November . . . . . KH6AFI and others halfheartedly seek info on one VR9A . . . . . W2HMJ says FO8AC returned to the air after a

At Pazardjik on Bulgaria's river Maritsa the LZ1KPZ gang holds forth. From left to right, front, we have operators Pavel, Jo and Luben; at rear are Lubo, Ray, Neiko, Angel, Ivan and Velno. Their club station features a home-made VFOd five-stage 150-watter, six- and seven-tube receivers, and various antennae for 10 through 80 meters. LZ1KPZ's co-op affair is typical of amateur radio in the Russian orbit where private at-home hamming is rarely encouraged. (*Photo via Wm. Rice*)



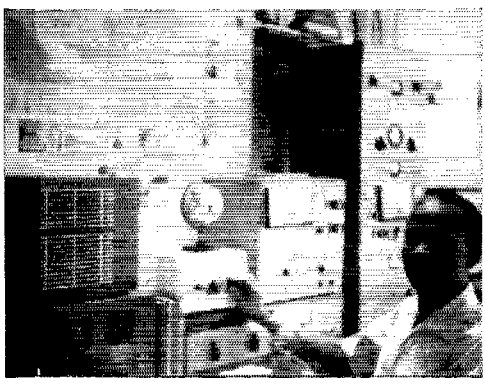
two-year QRT and now is living it up with a Viking I. Georges gives W2HMJ to understand that FW8AA is off the air for lack of power source . . . . . W6ZZ's research reveals no previous amateur work from Jarvis Isle of the Line group . . . . . Samoa is under heavy DXpeditionary attack with W6s HS UOU and KØDEX intending KS6 operations around this time. W6ZEN adds that W6UOU has operational eyes on VR5 and ZM7, too. The *SS Monterey* DXcursion of W6HS and XYL terminates on the 4th of this month after calls at Papeete, Auckland, Sydney, Suva, Pago Pago and Honolulu. Chas. lugged a handy HT-32, SX-101 and vertical skyhook along . . . . . W6ZEN credits ZL1PA with prime assistance in getting ZK2AB back on DX bands . . . . . Pacific Trust Territory notes courtesy KC6UZ: "KC6RK has returned to school on the mainland. Former colleague KC6JC recently graduated from Novice to General Class and will keep the Eldico on 20 phone. KC6NC, KX6s AK and AL have left these parts. KC6AB is Stateside-bound after four years on Ponape. KC6UZ plans to visit the U. S. after almost ten years of island-hopping in the Central and South Pacific. Upon his return the DX lads will find him on s.s.b. as well as a.m." KC6UZ likes c.w. work, too, but the rudeness of many pilers-up spoils his fun. Carl hints that the T.T. power limit of 600 watts may soon be relaxed to the full gallon . . . . . Now from W4DNU/KH6: "Those who worked VR3E on 10 phone may appreciate the fact that he was using only the power supply of his Super Pro as a transmitter h.v. supply. Lester left Christmas in July, leaving only VR3G in operation; VR3F departed some time ago. It is suspected that VR3G also will not be on Christmas much longer." W4DNU/KH6 tosses his vote in for some form of "carpetbagger's DXCC." Every place he sets up DX shop he reaches only the 90-country mark and then must off to new horizons. All told W4DNU has worked 178 different countries from such varied locales as Florida, Illinois, Hawaii and Japan. "I've gone stark raving mad just trying to complete one DXCC!" . . . . . Tantalizing skeds observed by W6RLP and K6GLC: KG6IG on Chichi, W6FVK keying, working his dad, W6JLV, around 14,100 kc.; and VKØAB gassing regularly with VK2EG on 14,095 kc. just after 0900 GMT . . . . . K2QXG, sort of magnetizing the alphabet soup, raised VK4s DO and DP on the same dead-band 20-meter c.w. CQ.

South America — Peru's RCP invites North and South American amateurs to participate in a Panamerican Contest to be held (phone and c.w.) between noon EST September 21st and midnight September 22nd. Object? Work as many North and South American stations as possible outside your own country once per band. For your first transmitted exchange send RST (or RS on phone) followed by any three digits. From then on transmit the last three digits received from the previous station worked. Phone and c.w. entries are to be considered separately, and all entries must record at least 20 QSOs and must include at least one QSO with a Peruvian station. Final score results from multiplying contacts by: the number of American republics worked (21 counting Alaska and the Canal Zone) plus the number of different bands used. Depending upon response, certifications of merit will be awarded to high scorers. To be eligible submit your log transcript within 20 days of the Test's conclusion to Radio Club Peruano, Contest Commission, Casilla 538, Lima, Peru . . . . . *Reminder:* LABRE's annual world-wide DX test comes off September 7th–8th (c.w.) and 14th–15th (phone) as detailed here last month. Have fun! . . . . . CE3AG reports that the worst local storms in 25 years were responsible for the abandoning of sailing-raft *Tahiti-Nui* off Juan Fernandez isle in late May. A new raft is planned for return voyage from Peru to Tahiti á la *Kon-Tiki*. CE3AG's alert ham work is credited with saving the lives of all aboard . . . . . C6ZO closes CE3ZO for return to England . . . . . W4HKJ scheduled a summer trip through LU PY CX VP1 and other areas south of the border.

Asia — From ex-YA1AM via W1RDV: "It certainly has been a ham's paradise here, and in closing down I wish to thank all the gang for many kindnesses. We arrive Los Angeles in mid-August and hope to make the ARRL National Convention in the Windy City on Labor Day week end. Then we must report for work in Washington on September 15th." HS1A tells K6GLC that wispy CR8BB (W5LAK) runs a mere six watts . . . . . ZC4II returns to England next month after an enjoyable Asiatic DX spree . . . . . 3W8AA, whose QSLs are handled by OK1FF, uses all the tricks in the book to lure W/Ks into taboo QSOs. Would Phan be so eager if the flood gates were down? . . . . . AJD No. 3 and WJDXC No. 1 for the U. S. A. are certifica-

(*Continued on page 144*)

CR4AD of Sal ably represents the Cape Verde Islands, one of the more elusive entities on ARRL's DXCC Countries List. Hilario particularly likes 20 meters, phone and c.w. (*Photo via W1QPN*)



Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
PHIL SIMMONS, W1ZDP, Asst. Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., Phone

Radio Clubs and Emergency Equipment. Equipment-wise a 1956 survey disclosed that about 49 per cent of all affiliated clubs have club-owned emergency power units useful for Field Day or public service. In 70 per cent of the clubs individual members have gas-electric units, these averaging 2.4 per club. It is important that every active amateur licensee be ready to do his part and assist in using his amateur facilities and authorization in taking on communications radio responsibilities in any emergency, natural disaster or other. The average radio club can be described as having 32 members, 27 licensed, five interested but unlicensed persons, and 10 per cent of those licensed holding the Novice or Technician Class licenses. Our statistics also show 6.4 mobile-installations per club.

Looking for a possible shortage of equipment in some categories, we find plenty of home (fixed) stations and that the mobiles permitting us to ride around and push buttons and communicate are also reasonably plentiful. The unfilled emergency need in the equipment field seems to be for more hand-carried units of which but three per club were reported. To operate from battery supplies such as available by taking over or cannibalizing the nearest automobile for a battery (in dire emergency), we determined (from our figures) that there are available about 4.7 vibrapacks per club and 6.35 dynamotors in each club group. Multiply this by 100 active affiliated clubs and you have quite a showing of equipment. The fact that we have a successful Field Day demonstrates our know-how in making this equipment operate. The trend in U. S. A. operations has been to establish a thirty-watt class as the lowest power category in Field Days. The RSGB used to set up a *weight limit* for equipment categories although now the trend on the continent seems toward higher powers. But do we perhaps not need some hand-carried equipment category or ARRL Field Day credit for lightweight equipment that can be carried on one's person . . . into zones where automobiles cannot go?

The club sampling indicated about 12 operators per club in RACES plans and about 8.9 as the number of *station authorizations* covered in RACES plans in a given club's member-participation. FCC records of FCDA approved plans of course give a better idea of the number of station authorizations in the nation. At the end of last year the Federal Civil Defense Administration indicated 42 states as having approved state-level RACES plans; others are still in the making. There are now over 500 such *local* plans officially approved and in operation.

Save Air Mail, Enclose Stamps. Many an American amateur writes us about the problem of getting the pasteboards (QSLs) from overseas stations. It may help all concerned if we consider this matter from the viewpoint of amateur operators overseas, especially from those so active as to receive a large volume of requests for QSLs. There's no question that "the QSL is the final courtesy of the QSO." This becomes a matter of each of us noting any way to make it easier to QSL. What little contribution to speed and convenience can we make to assist a fellow amateur on meeting the practical problems? KH6IJ (via W2SDB) in *Harmonics*, published by the South Jersey Radio Association, reports that keeping up with QSLs, especially when you make over 5000 contacts in one contest, seems futile. Many even expect him to answer every card by return mail. "If the fellows would only save their air mail stamps on their outgoing letter and enclose a stamp instead, they would get quick action," he writes. Going on with his letter, the bulletin relaying Katashi's remarks says, "While I try not to unduly encourage QSLs, apparently a contact automatically calls for a card when it is a new one. Only one card in each thirty received is now stamped . . . Please help. Tell them to enclose stamps." Where KH6IJ refers to stamps this can apply in US territories *only* of course, enclosure of *return postage* in other areas requires International Reply Coupons, available at U. S. post offices.

For DX, QSL Follow-ups. On the hard-to-get ones we are surprised that more amateurs interested in DX are not using the International Reply-Paid postal cards. These are available at your local U. S. post office, a double card to be sent with both halves joined. The reply half, pre-stamped and marked "Carte Postale Réponse" will be accepted in other countries for return, by surface means only, and without payment of additional postage. This of course is not as fancy as your personal imprinted card, but how can you lose at only 8¢? It necessitates no delay or load on the overworked QSL Bureaus. You know that your own address is complete and correct because you put it there. An exact blank form like the ARRL log form *can* be reproduced on the return part of such a double card, of course. The chances are that (from the rare ones) you are looking for reliable acceptable confirming-QSO information instead of exotic scenes or a display of color in the call letters.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

3550	3875	7110	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,550	145,350

Therefore you can use these IRP postal cards without *any* printing, *after* some six months or more have elapsed — and still no QSL.

As to the mailing of this follow-up or repeat card, be sure you include all data the original card carried as to the QSO that took place. Your earlier normal QSL may not ever have arrived, and this one will *require* a check-up in someone's log before he's going to respond to such a follow-up. And you will *not* want your attempt to be spurned as a spurious request! Both halves of the card we suggest should show spaces for the essential data. *Your* side filled out fully will assist the operator in locating the part of the log to be followed when he fills out the part to come back to you. *Both* station calls, the fact that a QSO is confirmed, the date and time it took place, the frequency, mode, signal report and the operator's signature should be on any such documentary proof sent back to you. These items are all more likely to be there if you take the trouble to stress the need or indicate by space provisions for specified information on the form to be sent back to you that all this information is desired.

The regular international reply coupons can be used in any letter sent overseas to prepay for the overseas amateur an ordinary surface-mail letter reply — which you hope will contain your QSL! Such single coupons cost 13¢ each at your local U. S. post office. They are good in all countries except Korea, so far as we know. The call-book's table of mail rates to different countries also gives an indication of how many international reply coupons are required to prepay an Air Mail reply.

Fall Season Announcements. Some of that good fall operating weather should be just around the corner as this *QST* arrives. We also hope to be meeting many of you at the ARRL National Convention at Chicago over the Labor Day week end. Returning home from that you and I will be set for on-the-air activities to make the best of the good September operating conditions. What we do through the medium of our stations is a key to our amateur progress. Don't forget that your SCM will welcome your monthly report of your station activities whatever frequency or group you work with. Your Section Net will give you a warm welcome. Holding down an ARRL station appointment such as the SCM can offer, if you rate it, or getting into spot activities, will increase your circle of ham friends. Accelerated communication results come from any taking part in organized amateur radio communications.

With things looking up for the best operating season ever in every amateur specialty let us try our equipment where possible in the special activities scheduled for September. (1) See the announcement elsewhere in this issue for the ARRL Frequency Measuring Test, the evening of Sept. 18. If you have a BC-221 or LM-frequency meter or receiver with 100 kc. crystal and good calibration and stability, give this a whirl and *see* how well you can do. (2) Don't forget the Code Proficiency Qualifying Runs from W6OWP and W1AW . . . Sept. 5 and 17 respectively. (3) The W/VE Contest is put on by the Montreal Amateur Radio Club for dates of Sept. 28–29. We think you will find it interesting to try your hand. Send *them* your results (not us) per the notice of this activity elsewhere in this issue. (4) Try the Virginia Free-For-All QSO Party (rules this issue) the week end of Sept. 14–15. Here's plenty of inviting activity. Don't pass up these opportunities! For the *coming* months we also invite attention to the ARRL Activities Calender. See you on the air!

— *F. E. H.*

A.R.R.L. ACTIVITIES CALENDAR

Sept. 5: CP Qualifying Run — W6OWP
Sept. 17: CP Qualifying Run — W1AW
Sept. 18: Frequency Measuring Test
Sept. 21–22: V.H.F. QSO Party
Oct. 2: CP Qualifying Run — W6OWP
Oct. 12–13: Simulated Emergency Test
Oct. 16: CP Qualifying Run — W1AW
Oct. 19–20: CD QSO Party (c.w.)
Oct. 26–27: CD QSO Party (phone)
Nov. 7: CP Qualifying Run — W6OWP
Nov. 9–10, 16–17: Sweepstakes
Nov. 14: CP Qualifying Run — W1AW
Dec. 4: CP Qualifying Run — W6OWP
Dec. 20: CP Qualifying Run — W1AW

OTHER ACTIVITIES

Sept. 7–8: New York City-Long Island QSO Party, New York Radio Club (page 108, this issue).

Sept. 7–8: LABRE DX Contest (c.w.), LABRE (page 74, August *QST*).

Sept. 14–15: LABRE DX Contest (phone), LABRE (page 74, August *QST*).

Sept. 14–15: Virginia Free-for-All QSO Party, W1KX (page 128, this issue).

Sept. 21–22: Pan American Contest, Radio Club of Peru (page 74, this issue).

Sept. 28–29: W/VE Contest, Montreal Amateur Radio Club (page 81, this issue).

Oct. 5–6: VK/ZL DX Contest (phone), NZART and WIA (page 72, this issue).

Oct. 12–13: VK/ZL DX Contest (c.w.), NZART and WIA (page 72, this issue).

The following lists date, name, and sponsor. Details will be presented in future issues of *QST*.

Oct. 5–6: Connecticut QSO Party, Connecticut Wireless Association.

Nov. 1–2: RTTY Sweepstakes, RTTY Society of Southern California.

Nov. 23–24: 21/28 Mc. Telephony Contest, RSGB.

One thing that is impossible to simulate in any hypothetical emergency is the chaos and consequent loss of efficiency which would be so definite a part of any real attack. In the Operation Alert just concluded, there was a tendency on the part of participating personnel, both communications and otherwise, to make the exercise a "picnic" as an outlet for humor, kidding, fun and jokes. It's all a big game of make-believe, and we try to hide our sheepishness at playing this kids' game by indulging in a little humor. Some of us (*i.e.*, those who *are* kids) participate mainly for the enjoyment we get out of this aspect.

And why not? It is enough to simulate the situation itself without being asked to simulate the reactions that would result if the situation were real. We are communicators, not actors. Yet, in our analysis of results of simulated emergencies, especially those dealing with wholesale enemy attack, we ought to take these things into consideration. If fifty million people out of 150 million people were wiped out by the attack, this would mean that 50,000 amateurs were wiped out with them, and that our communications force, whatever its make-up, would be reduced by one third. Many of our facilities would have gone with them, reducing our capacity to communicate. Communicators left alive and able to perform would blanch as the reports of destruction and chaos poured in, would be excited, nervous, worrying about their loved ones and about their own safety. Some would, let's face it, desert. Would *you* stay on duty if you were separated from your family and had no knowledge of their whereabouts or their welfare? Those remaining would be overworked, overwrought, emotionally unstable, and would quickly reach the point of physical and mental collapse. Both the confusion and the traffic load would be multiplied at least tenfold over anything we have ever simulated. The real thing would very little resemble the most realistic test we have had. And yet we try to estimate the actual situation on the basis of tests and simulated attacks.

Speaking on the average, if the real thing came along we would need at least ten times the facilities, personnel, installations, supplies and channels that we now count on. For a long time, there would be no "routine" or "deferred" traffic. It would all be "urgent" and, under the pressure of officials desperately needing communications, circuit discipline would be worse, not better, than it always has been — a lot worse.

Usually, when someone starts talking as above, he prefaces it by saying: "I don't want to frighten you, *but* . . ." It seems to us that it's about time we start getting frightened, or at least looking at the situation realistically instead of wishfully. We are woefully unprepared, and this is mainly because, although everybody who thinks about it at all realizes it *could* happen, very few really believe that there is any likelihood of its happening. To those who are convinced that it will never happen (they hope), all this preparation is a waste of time, energy, and money. If it *should* happen, they will show up to offer their services and succeed only in adding to the confusion. Meanwhile, they exercise their right to sneer.

No immediate solution is suggested. What *is* suggested is that we face facts, and one of the facts is that our communications facilities in RACES are still a long, long distance from being in an adequate position to handle the emergency communications load that would be dropped on us in the event of enemy attack. We can and will continue to do what we can with what we have to do it with, and we can be proud of the fact that our results are probably closer to adequacy than those of most c.d. services, but let's not indulge in wishful thinking, fellows. Let's not kid ourselves.

— • • • —

W3CVE suggests that each emergency net take upon itself the responsibility of having one of its stations monitor the National Calling and Emergency Frequency at all times during any emergency. The frequency monitored would normally be the one in the band which the emergency net is using. In this way, stations with traffic for the affected area would not need to know the frequency of the emergency net serving that area; they would simply call their traffic onto the NCEF. Such stations need not be in the emergency area, but should be capable of handling traffic to and from that area.

— • • • —

On April 11 a Navy plane out of Jacksonville Naval Air Station was reported missing somewhere in the Charleston/Savannah area. W5CQF, who lives next door to the missing flier's parents in New Orleans, on April 14 contacted the Charleston Navy Yard by amateur radio, which reported no information available. Later that evening W4NEK at Jacksonville was contacted, and one of the search pilots spoke directly to the missing flier's parents. Contact was maintained with W4NEK for 14 days, usually via relays since band conditions seldom permitted direct contact. Amateurs who participated in relaying included W2BGY. K4AAF, KP4DP, W2GBU, W1VP, WØTGL and W2EWL. — *W5CQF.*

— • • • —

Alabama's Azalea Emergency Net (AENG) was in operation on April 14 when floods theatened Mobile. NCS was W4QEE with K4EEH (EC) and K4JOK operating. Handling traffic for the Coast Guard, Red Cross and National Guard, the net was instrumental in the evacuation of 50 people ahead of the flood waters. Amateurs participating included *W4s* FBZ/m, LPU/m YAI WHW/m CSA/m IAX/m NU, *K4s* ESR BVG, W5HAL/m4. — *W4TKL, SEC Ala.*

— • • • —

Lubbock County (Texas) EC W5BFK reports amateurs in his organization were active in nine tornado and storm alerts in the period April 20 to May 31 involving roughly 46 operating hours and 1156 man hours of operation.

— • • • —

During the early May dry spells in the Northeast, many forest fires broke out, the most serious of which appear to have occurred in Eastern Massachusetts. Reports from W1BB, W1PST, W1ALP, W1IBE and W1KCR will supplement the information already provided by W1TZ in August *QST* (p. 80). Members of the Winthrop Emergency net reported for duty in Manchester, under the leadership of alternate radio officers W1DLY and W1DEL. Around-the-clock operation was maintained from Winthrop to Manchester, Beverly, Topsfield and other points by twelve amateurs, both from their own stations and field points. Operations at Manchester were conducted by W1DWY, radio officer for Beverly. The following additional Winthrop amateurs participated: *W1s* WLP CEJ JJT IOO IRV DPN EAJ BDU MQB YZN KN1AIQ/m. W1IBE sends, through W1ALP, an interesting report of his activities in this area. It seems that Area 1 of Mass. C.D. asked him and W1DWY to set up communications between Manchester and Topsfield, and they finally wound up atop the old WWZ tower 80 feet high, the only point from which they could contact Topsfield. Contact with the town hall of Manchester was then established through another 2 meter link. W1IBE was on duty atop the rotting tower for over six hours, and later went to Topsfield to help man that end of the circuit for another eight hours. The following additional amateurs were reported to have participated in fire activities from the Manchester area: *W1s* AR LLY NAD NDI EIQ RSY AQE ZGA YEP CQL ENS KTG JPS EZZ NAR ZAW DKS FTX NF DWY and K2UHU. W1PST reports that on May 9 he was requested to provide communications between Area 1 Sector 10 and the fire at Plymouth. W1VBC was activated and manned by *W1s* PST YZG and ABJ. *W1s* BAB TTS and KTJ provided the link to Topsfield on 10 meters. At Sector 1B in Plymouth *W1s* MME DXQ and CRO were mobile in the heart of the fire, keeping communications lines open with *W1s* NLJ MIO HSN ALP

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

IPE and TZ. W1KCR reports that he relieved W1RJC at the police station in Plymouth and worked with W1EIF until W1MYE arrived to relieve the latter. W1GLF was operating from Kingston and at times from his mobile. W1LJH and BTL dropped in during the evening. W1KCR operated for 24 hours solid, with no sleep.

—•••—

On the evening of May 14, greater Cleveland was visited by a violent windstorm with winds up to 90 m.p.h. Because of severe damage, civil defense in the western part of the city was alerted. When c.d. officials arrived at their headquarters they found the amateurs already there and in operation. The following amateurs participated: *W8s* AJH BUQ FKB HFE INO NGY OTO OKI VM ZEU, K8AAG. — *W8EAU, EC Cuyahoga Co., Ohio.*

—•••—

On the evening of May 20 a tornado storm system moved across Kansas into Missouri. Funnels wreaked damage on Ottawa, Spring Hill, Martin City, Hickman Mills and Ruskin Heights, the latter two suburbs of Kansas City. Working under the general control of WØRVG, the Heart of American Radio Club station at Kansas City Red Cross, 10-meter mobiles provided communications between the stricken area and Red Cross. Telephone communications were non-existent. WØMID in southern Kansas acted as net control for the mobiles, who were working with Red Cross disaster teams. Mobiles were also dispatched to various hospitals to provide for better routing of patients. Later, Red Cross centers were set up at the disaster area with a mobile assigned to each. KØAFW of Hickman Mills is reported to have been the first station in action. The Johnson County Radio Amateurs Club station WØERH was set up at Johnson County Red Cross headquarters to provide communication with mobiles. This is the substance of a report of this emergency in *Midwest Clixs.*

Within less than an hour after the tornado struck Spring Hill, KØESW/m and WØWJC/m arrived from Kansas City, assisted by KNØHWM. KØEOR arrived a few hours later, set up as a base station at the disaster center, and acted as NCS relaying instructions to the mobiles; he was assisted by KNØHVF. The amateurs aided the Sheriff's Patrol, the Highway Patrol, local police in controlling vehicular traffic, search parties, directing clean-up crews and providing communications between officials. Thanks to KØEOR for the report on details at Spring Hill.

During the afternoon of May 21, tornadoes struck several Missouri communities, with maximum damage at Fremont and Desloge. A group of six-meter mobiles was sent from St. Louis to set up relays to Desloge. First traffic from Desloge was originated at 1135, only two relays being required (although three were set up) until 0330 May 22, after which no relaying was necessary. Traffic was handled for the Red Cross and Weather Bureau. WØWEQ traveled between the three relay stations to help as needed. Relays were set up at High Ridge (WØNYF and KØIEK), Herculaneum (KØABA), Flat River (WØTHC and KØBVL) and Desloge (KØCRR and WØUWK). KØCVS aided KØDGG at the St. Louis terminus. The station at Flat River was finally set up as a fixed portable with a 100-watt linear amplifier. Operators were released by the Red Cross at 0940 May 22, at which time two telephone lines were in service to St. Louis. WØGPB furnished some initial information from Desloge. Other amateurs participating included *WØs* ODI CVS GEP WPS AUO CDA CPI GMG GPB LFE MRR NVH OMG PTG QMP RMX UXT YOR ZZI, *KØs* DCQ DGE, *W9s* BDW SBO AIU. Thanks to Missouri SCM WØGEP for this report.

—•••—

On May 21 the Gadsden (Ala.) Emergency Net (AENH) went into emergency session to assist in communications connected with a lost boy in the local mountain area. Information was relayed by AENH to a local broadcast station for dissemination to the public and searchers without direct communication. When the lost child was located two hours later, the information was relayed from K4BTO/m to K4AJK/m to K4BWR who phone patched this contact direct to the b.c. station. Also assisting were W4YPC W4DEQ and K4JMC. — *W4TKL, SEC Ala.*

—•••—

When W9RUK heard a call for assistance from W2ZXM/mm on June 5, he made contact and was told that the Flying Enterprise II had a sick seaman aboard with no doctor. W9RUK called a doctor friend at the Glenview (Ill.) Naval Air Station and patched him to W2ZXM/mm, for consultation and diagnosis. The malady was diagnosed as penicillin allergic reaction and treatment was prescribed. The following day, when another contact was made, W2ZXM reported that the seaman was much better and would soon be up and around.

—•••—

On June 29, a train wreck at Guthrie, Ky., alerted a number of Tennessee and Kentucky amateurs who were able to assist by providing information concerning the wreck and handling welfare traffic on 3980 kc. for a period of about 6 hours. Stations participating were *W4s* WHR CVM GEN PFP AYQ BMI AND WQT. W4WQT served as NCS and is proud of the fact that he did this with a 20-watt s.s.b. rig.

—•••—

On July 5 EC W2GTI was called upon to assist in operations connected with dragging the Hudson River 16 miles south of Albany in search of a drowning victim. Communications were needed between ships and the Yacht Club pier from which operations were being conducted. W2FOO and K2EJV immediately proceeded to the scene in their mobiles, while K2MBF stood by as a base station for Albany. K2HQI, W2FEN and K2HPM also readjusted their personal holiday plans in order to help. Continuous operation of the ship-to-pier and pier-to-base station circuit enabled keeping track of many search boats, food and gasoline requests, messages for the coroner, undertaker and, finally, the "mission accomplished" message to state police headquarters, which arrived by amateur radio several minutes before other facilities for its transmission were available. *W2s* DIF and LXP and *K2s* RDI and HVO also assisted. All equipment used was owned and operated by the AREC members. — *W2GTI, EC Bethlehem, N. Y.*

—•••—

Twenty SECs submitted reports on May activities on behalf of 5647 AREC members. This is a slight increase over last year's record. Rhode Island reported for the first time this year, putting our total sections heard from at 32. So far, 13 sections have 100% reporting records for 1957. Mid-year summary next month. Other sections reporting for May: Ga., Minn., W. N. Y., N. M., Colo., E. Fla., Wis., San Joaquin Valley, NYC-LI, Santa Clara Valley, Mont., Maritime, Ont., Wash., So. Tex., Conn., Ore., Mo., Ala.

RACES News

Quite an extensive RACES-AREC program is being planned for the National Convention in Chicago over the Labor Day week end. See page 54, August *QST* for details.

Hope you can be there. RACES and the AREC will have a special room available, open during the entire convention, and no doubt we'll be hanging around there a lot, so be sure to drop over to say hello and to talk over your RACES problems with Jim McGregor from FCDA and yours truly. ARRL and FCDA are going to get together in person before the convention to map strategy, agree on what to disagree on, and in general get our signals straightened out; so if you're expecting to observe any fist fights from that quarter, you'll be disappointed. However, there should be plenty of fireworks from other sources. If present plans materialize, W1NJM/m will be on the air en route to the convention on Thursday, August 29 and Friday morning, August 30, on 80, 40, 20 or 10 meters, phone and/or c.w., so give a listen for us. See y'all in Chicago.

—•••—

RACES news is scarce this month, probably because everybody is so busy with Operation Alert. If you have not yet sent us any information on your participation, it is now too late to do so if our plans to have the write-up in October *QST* have materialized. But send it anyway, in case the write-up has to be deferred a month (as it was last year). If we get it too late, we may still be able to summarize in this column. Don't forget to send us any pictures you may have taken.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for June traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W7BA	29	1109	1069	39	2246
W3WIQ	151	981	971	71	2174
W2KEB	62	990	722	130	1904
W3CUL	199	837	724	83	1843
WØBDR	25	747	695	2	1469
W4PL	6	728	697	20	1451
W9SCA	5	580	562	2	1149
WØPZO	5	542	519	9	1075
WØCPI	11	510	483	27	1031
W7PGY	31	429	382	47	889
WØLGG	27	394	368	18	807
W9MAK	36	375	327	22	760
W5RCF	2	367	332	35	736
W9DO	22	334	331	25	712
W7APF	9	346	345	1	701
W7VAZ	27	307	253	54	641
WØBLI	5	319	311	3	638
W6GYH	340	175	91	29	635
K7WAT	18	312	281	19	630
W9CXY	5	305	275	30	615
WØGAR	4	288	286	6	584
K6DYX	7	271	232	25	535
K2PHF	136	203	121	54	514
W2KFV	2	257	201	49	509
Late Report:					
W5UXE (May)	72	227	154	73	526

More-Than-One-Operator Stations

K5WAB	47	826	775	52	1700
K7FAE	48	613	633	28	1322
K6MCA	128	221	220	1	570

BPL for 100 or more *originations-plus-deliveries:*

K6GZ	301	W3TN	107	K2MMM	101
W9NZZ	164	KØCVD	107	Late Report:	
W8CSK	132	WØNIY	106	W1WTG (May)	125
W9JYO	121	W1FUA	105		
KN1BCS	109	K7FBN	103		

More-Than-One-Operator Stations

K9USN 192 K5FFB 103

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: W2BXP, W4FPC, W4RLG, K5AEX, W5ESB, W6BPT, K6DYX, K6OZJ, W9HXB, VE3DPO.

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

TRAFFIC TOPICS

Last year we promised to try to get the net directory out a little earlier. We still intend keeping that promise, but we need your help. The main reason we have not been able to produce it before the end of January in the past couple of years is that registrants do not send us their registration information in decent season. When you read this, if you have not yet re-registered your net (since August 1) for the fall season, how about sitting right down and doing so? Give us the following information:

(1) *Name of Net.* We want the *official name of the net*, not what you think it ought to be. If your net has no official name, how about adopting one? Remember that whatever name you adopt will appear on the list, so let's try to keep a semblance of dignity in order to impress, not simply to amuse.

(2) *Net designation*, if any. The set of letters which identify the net on the air or in conversation.

(3) *Frequency* or frequencies, in kc. If more than one frequency, be sure you line them up properly with days of operation.

(4) *Days.* Tell us *which* days, not how many. "Daily," for this listing, means *every* day, including both Saturday and Sunday.

(5) *Call of net manager.* The net manager is the amateur who organizes the net, arranges for NCS, conducts correspondence, etc. If these are different people, give us the call of the over-all boss.

(6) *Net starting time(s).* Net ending time(s). If your net has no specific ending time, indicate it approximately. Use *standard* (not "daylight" or "local") time, or use GMT. Be sure to indicate your time zone by AST, EST, CST, MST or PST.

(7) *Direct coverage.* This is the coverage of your net by stations who actually report in, not including the coverage of nets or stations with whom regular liaison is maintained.

(8) *Purpose of net.* We are not interested in registering strictly social or ragchew nets. Indicate purpose as traffic, emergency or both. If neither, leave blank.

(9) *Starting date.* If a new net, the date it started. If a net recessed for the summer, indicate its fall starting date. If an old, continuously-operating net, the *year* it was founded.

(10) *Net control stations.* List them by call. They go on our mailing list to receive certain bulletins.

(11) *NTS?* Indicate whether net is an integral part of the ARRL National Traffic System. In other words, is this net represented in its NTS regional net in accordance with the NTS plan?

(12) *Liaisons.* We'd like to know the names (or designations) of nets with which regular traffic interchange is conducted.

(13) Call of the amateur who submitted this information.

We are making Form CD-85 net registration cards available through the medium of September LO Bulletin and the October CD Bulletin, as usual. These cards will be sent to anyone on request. Net Managers of record are receiving reminders to re-register their nets, as are all other persons who registered nets last year. Generally speaking, it is not possible for us to go through reports, bulletins or miscellaneous correspondence to ferret out registration information, so better make a special point to send us the information requested above.

First *QST* list will be in November *QST;* let's make it a big one. Supplementary lists will appear in the January, March and May issues. As soon as registrations appear to be complete, we'll compile the annual complete cross-indexed net directory. This year, we'd like to *close out* net registrations for the completed directory by November 1, so that the directory can start distribution by the end of that month. It's a worthy objective: whether or not it can be realized is pretty much up to you guys.

NET REGISTRATION

Name of Net.....

Net Designation.....Freq.....Days.....

Mgr.....Starts.....Ends.....ST

Direct coverage.....

Purpose of Net.....Starting date.....

NCSs.....NTS?.....

Liaisons.....

This info submitted by.....
(Name and/or call)

CD-85 (Rev. 9/54)

The best way to register your net is to request a copy of this net registration form from ARRL, or to put this form on a postcard. It contains all the information we need on your net.

Important Note: registration of your net in our net directory gives you no special status as over an unregistered net. The net listing is for *information only.*

— • • • —

Going to the National Convention in Chicago over Labor Day week end? Art Swinfin, W9DO, and Jim Wilson, W9BUK, are cooking up an interesting traffic program. See details in August *QST*, p. 52. Hope to see you there.

— • • • —

Miscellaneous June reports: Dragg Net held 20 sessions, handled 1615 messages, checked in 386 stations. Interstate Sideband Net handled 481 messages, had 43 stations in an average session in an average time of 1:20. The Early Bird Transcontinental Net reports a traffic total of 428 in 29 sessions. North Texas-Oklahoma Net reports 30 sessions, 954 check-ins, 291 messages. Transcontinental Phone Net reports: 1st Call Area — 1171; Second Call Area — 939; 4th, 9th and 0th call areas — 875; Total — 2985.

— • • • —

National Traffic System. In NTS, net managers for section nets are appointed by the SCM concerned; this takes the matter nicely out of the hands of headquarters people. At regional, area and TCC levels, however, it's a different story. The rules and regs of the Communications Department require that NTS net managers at regional and area levels be appointed by the Communications Manager. Under certain procedural requirements, this responsibility has been delegated in almost *carte blanche* fashion to your NTS Manager.

We thought you might like to know just how we go about selecting appointees for these important posts.

First of all, we get a recommendation from the outgoing manager, if he has one. If we agree (and we usually do) that this is desirable, we then write that person to ask if he's interested, and if he will accept. This letter, although addressed to the prospective manager, is mailed to his SCM with instructions to remail it to the addressee if he approves the appointment. After all, the SCM knows the people in his section better than we do, and on occasion this procedure has prevented us from appointing some undesired amateurs; it has also caused delays and embarrassment. Anyway, after the SCM has indicated his approval by forwarding the letter, and the prospective manager agrees to tackle the job, we send him full particulars on exactly what is expected of him, plus whatever forms or other supplies he needs. After he has held down the job for a while, he gets a special hand-lettered certificate from headquarters.

In the event that no replacement for an outgoing manager is immediately available, the selection of one can be a time-consuming process. It is seldom easy to find the best combination of ability and willingness, and once in a while the former has to compromise with the latter. A regional or area net managership can be as hard or as easy as the man selected himself makes it. Most managers seem to feel that it is their job to take assignments as NCS or liaison stations when no one else is available. We don't look at it quite this way. The manager is the leader, the coordinator, not the man of all work. While it is all very well for him to set an example by taking a regular assignment himself, he is not expected to carry the full load, or even more than his fair share of it. We occasionally have an NTS manager who finds it unnecessary to take *any* regular assignments, who can thus devote himself entirely to seeing that the NCS and liaison rosters are full and to doing the necessary paper work. That this is a rarity is unfortunate, and is an indication that all is not as it should be.

Being an NTS net manager or TCC director can be rewarding in its own right, without paper recognition, although we do our best to provide this too. We would like to have a situation in which more traffic amateurs are not only willing but eager to take on such leadership roles and to express this eagerness without undue modesty when a managership is "up for grabs." We would like to see it a position to be sought after rather than to be avoided. And we would like to see their jobs made both easier and more enjoyable by their having plenty of willing operators to choose from to fill all NCS and liaison positions in operation of their nets. This is where *you* can help.

June reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation %*
1RN	24	271	0.56	11.3	82.7[1]
2RN	49	277	0.43	5.7	92.5
3RN	40	158	0.57	3.9	81.7
4RN	20	126	0.33	6.3	41.4[1]
RN5	25	225	0.20	9.0	42.0
RN6	28	391	0.70	14.0	22.4[1]
RN7	42	185	0.61	4.4	——
8RN	45	190	——	4.2	74.8
9RN	52	755	0.71	14.5	79.3
TEN	88	1367	——	15.5	58.9
ECN	9	27	——	3.0	77.8[1]
EAN	21	716	1.28	34.0	94.4
CAN	29	1000	1.65	31.0	100
PAN	30	905	0.50	30.2	100
Sections[2]	539	3515		6.5	
TCC Eastern	40[3]	83			
TCC Central		1446			
TCC Pacific	131[3]	765			
Total/Summary	1041	12402	CAN	9.7	CAN/PAN
Record	1041	12402	1.77	15.9	100

[1] Regional Net representation based on one session per night. Others are based on two or more sessions.

[2] Section nets reporting: GSN (Ga.); ILN (Ill.); CPN (Conn.); Iowa 75 Phone; QKS, QKS SS & QKN (Kans.); NTX (Texas); KYN & KPN (Ky.); NJN (N.J.); MSN (Minn.); WVN (W. Va.); AENB, AENP & AENT (Ala.); WSN (Wash.); S.D. 40 Phone & S.D. 75 Phone (S. Dak.); Tenn. CW; QMN (Mich.).

[3] TCC functions reported, not counted as net sessions.

Note the 100% reporting reflected in the tabulation, due to conscientious reporting of two non-managers who knew the net data would not otherwise be reported.

Starting next month, the "rate" column will be calculated somewhat differently. In accordance with a proposal by W2ZRC, with which a majority of regional and area net managers seem to agree, in the future the "rate" will be the month's traffic total divided by the total number of minutes the net was in session that month. It is felt that this will give more significance to this column of the tabulation.

W2ZRC reports that 2RN is now holding its first daily session (at 1745 EST) on 7100 kc., to overcome local conditions; a 2RN certificate has been awarded to K2PHF. W3UE is encouraged about activity on 3RN. W4AKC reports for 4RN in the continued absence of W4LAP from the scene. W5RCF and W4RLG reported for RN5 in the absence of an RN5 manager. RN7 is being troubled by conditions. W8DSX can't see why other net managers have no success with the 2130 regional session. Tornado weather washed out eight TEN sessions during June; note their resulting low traffic total. Poor conditions and vacations are taking their toll on ECN. Nice report from PAN manager K6DYX, who says that W6PLG has received his regional net certificate and gives some potent thoughts on NTS.

Transcontinental Corps. W3WG and WØKQD both reported on Form CD-133, so here are their data:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-net Traffic*
Eastern	39	84.6	365	83
Pacific	131	87.0	1528	765
Total	170	86.5	1893	848

The TCC roster: Eastern Area — *W1s* AW NJM BDI EMG, *W2s* HDW ZRC, W3WG, W4ZDB, W9CXY, W9DO; Central Area — *W9s* CXY DO JUJ, *WØs* BDR SCA LGG KJZ; Pacific Area — *W6s* ADB GIW YZT PLG YHM EOT RFW RPT IPW VPC HC, *K6s* CME DYX GZ ORT, *W7s* GMC UJL ZBO, WØKQD. These boys and gals are doing a terrific job.

FREQUENCY MEASURING TEST, SEPTEMBER 18

ARRL invites all amateurs to try their hand at frequency measuring. W1AW will transmit signals for this purpose starting at 9:30 P.M. EDST (6:30 P.M. PDST), Wednesday, September 18. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3539, 7044 and 14,095 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 9:36 P.M. It is suggested that frequencies be measured *in the order listed.* Transmissions will be found within 5 or 10 kc. of the suggested frequencies.

At 12:30 A.M. EDST, September 19 (9:30 P.M. PDST, September 18), W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies used will be 3667, 7015 and 14,056 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for *QST* listing of top results. Listing will be based on over-all *average* accuracy.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on September 17 at 2130 Eastern Daylight Saving Time. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7080, 14,100, 21,010, 50,900 and 145,600 kc. The next qualifying run from W6OWP only will be transmitted on September 5 at 2100 PDST on 3590 and 7128 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-Practice transmissions are made from W1AW each evening at 2130 EDST. Approximately 10 minutes' practice is given at each speed. References to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text sometimes is reversed. To improve your fist, hook up your own key and buzzer or audio oscillator and attempt to send along with W1AW.

Date	Subject of Practice Text from July *QST*
Sept. 3:	*Test Meters and How to Use Them*, p. 18
Sept. 6:	*A Saw-Tooth Crystal Calibrator*, p. 22
Sept. 9:	*Rule 11*, p. 27
Sept. 12:	*Simplified CRPL DX Predictions*, p. 28
Sept. 19:	*1957 Novice Round-up Results*, p. 46
Sept. 23:	*Simplified Transmitter Control*, p. 39
Sept. 26:	*Operating Achievement Awards*, p. 50

W1AW SUMMER SCHEDULE

(All times given are Eastern Daylight Saving Time)

A printed local map showing how to get to W1AW from main highways or from the Hq. office will be sent to amateurs advising their intention to visit the station.

Operating-Visiting Hours:

Monday through Friday: 1300–0100 (following day).

Saturday: 1900–0230 (Sunday). Sunday: 1500–2230.

Exception: W1AW will be closed from 2230 Sept. 1 to 1300 Sept. 3 in observance of Labor Day.

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

Frequencies (kc.):

C.w.: 1885, 3555, 7080, 14,100, 21,010, 50,900, 145,600.

Phone: 1885, 3945, 7255, 14,280, 21,330, 50,900, 145,600.

Times:

Sunday through Friday, 2000 by c.w., 2100 by phone.

Monday through Saturday, 2330 by phone, 2400 by c.w.

General Operation: Use the chart on page 86, May *QST* for determining times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in EDST, the operation between 0000 and 0100 each day will fall in the evening of the previous day in western time zones.

Code-Proficiency Program: Practice transmissions at 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and at 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday are made on the above-listed frequencies. Code practice starts at 2130 each day. Approximately 10 minutes' practice is given at each speed. On Sept. 17, Sept. 18, and Oct. 16, W1AW will transmit certificate qualifying runs and a frequency measuring test instead of the regular code practice.

DX CENTURY CLUB AWARDS

W1FH.....272
W6AM.....272
W8HGW.....271
W6ENV.....270
W9NDA.....269
W6MX.....267
PY2CK.....266
W6DZZ.....265
W8SYG.....265
W8NBK.....265
W3GHD.....264
ZL2GX.....264
W8BRA.....264
W6CUQ.....263
W6TT.....263
G2PL.....263
W5ASG.....262
W8KIA.....262
W3KT.....262
W6RW.....262
W7AMX.....262

Radiotelephone

PY2CK.....263
VQ4ERR.....256
W1FH.....251
W8HGW.....251
W8GZ.....247
ZS6BW.....247
CN8MM.....246
W9NDA.....243
W9RBI.....242
W8BF.....241
W3JNN.....241
W6AM.....238
CX2CO.....236

From June 15, to July 15, 1957 DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

W8VDJ.....200
VQ2DT.....188
ZS6IX.....159
W6CLS.....148
CX1CX.....138
W2GDX.....136
ZS1OU.....127
G3GQS.....124
ZS1RM.....120
W6PLK.....116
W4YHF.....115
W9YRO.....115
GM5RH.....112
HZQ.....111
W6ZVQ.....109
W4LHT.....108
G3ISV.....108
SM5KB.....108
W5GNG.....106
G3HIW.....106
W1IJB.....105
G3IOR.....105
W8YPT.....104
W9WHY.....103
OH3OD.....103
W0OAQ.....102
ET2PA.....102
W1WTF.....101
W4USQ.....101
K4BZL.....101
W1OOA.....100
W5NXF.....100
K6AQP.....100
K6CEF.....100
W9ESD.....100
W9IZ.....100
W9POC.....100
G2NS.....100

Radiotelephone

W8UAS.....195
VQ2DT.....183
ZP5EC.....126
W1NBI.....116
W9YSX.....111
W5JUE.....105
W6BJU.....105
FA8RJ.....105
W5RNG.....104
HK3PC.....103
W7YAM.....102
W8JXM.....102
W9YRO.....102
CT1DU.....102
G3HRO.....102
GM3BCL.....102
HB9FS.....102
W5JCY.....101
W7DND.....101
HB9EM.....101
VE1DR.....101
K2BZT.....100
W5GNG.....100
W5NXF.....100
W6NOT.....100
YN1RA.....100

ENDORSEMENTS

W6SAI.....260
W6VFR.....260
CN8MM.....250
W2JT.....246
W5EGK.....241
W2GT.....233
W8DHC.....227
W0QVZ.....222
LU7CD.....222
G3DO.....221
W7GXA.....220
W9QLH.....216
W6WO.....203
W6LN.....202
W7HIA.....202
W9FNR.....201
EA2CA.....201
SM7QY.....201
W2REF.....200
W5LGS.....200
DL7AH.....200
ON4PA.....199
W2JB.....197
K2BZT.....196

W9VIN.....192
W2JJU.....190
K6CJQ.....190
W6YMD.....185
CT1JS.....185
W6UQQ.....183
W5HDS.....182
VS6AE.....181
W4IMI.....180
W5VIR.....180
W6QNA.....180
VE7VC.....180
F9RM.....177
VK3YL.....174
HB9QU.....172
W4NBV.....170
W9JUV.....170
VO1DX.....170
W6NHA.....169
W2GTL.....162
W6KBC.....161
DL1YA.....161
DL3RK.....161
PY7VG.....161
W2FBS.....160
W4JBQ.....160
W9NN.....160
G6GH.....160
PY4AJD.....160
EA1BC.....158
PY5UG.....158
G2BXP.....155
ZS6KK.....155
W8UMR.....151
KR8SC.....151
W6OUN.....150
G6XL.....150
ON4KT.....147
EA9AP.....144
W6SUQ.....141
W6YMH.....141
G8QX.....141
SM7AKG.....141
VK5QR.....141
W1WAI.....140
W6LTX.....140
W7GHB.....140
KH6WW.....140
VE1EX.....140
YV5FK.....140
W3WSF.....139
VE7AIH.....136
W4FYI.....135
DU7SV.....134
JA1AG.....132
4X4CT.....131
W3KFQ.....130
W4AVY.....130
W4TAJ.....130
W8ZCK.....130
W0VIP.....130
ON4TX.....130
K6BCC.....128
W4YK.....126
W4FN8.....124
W9WYB.....123
I1DCO.....121
K2JYH.....120
W4FTX.....120
K6IYJ.....120
W9ZTD.....120
GM3BCL.....120
ZD2DCP.....120
K5ADQ.....113
W6VX.....113
W5YPU.....111
W5QVZ.....111
HK3PC.....111
VE5GF.....111
W2PXA.....110
W2PDB.....110
W3BOA.....110
W3NQC.....110
W5DNF.....110
W8ONA.....110
W9MPX.....110

Radiotelephone

W1JCX.....230
W8KML.....227
G2PL.....224
W8VDJ.....200
EA2CA.....200
YV5EC.....190
W9QLH.....189
W1PST.....180
W2JT.....179
W4ANE.....179
DL3IR.....174
F8LE.....170
PY2JU.....170
W4FPS.....160
W0HX.....160
G2BXP.....153
PY7VG.....153
PY1AGP.....152
EI2W.....149
W6CLS.....145
CX3BH.....143
I1GZ.....141
EA9AR.....135
VE7AH.....135
W2PBI.....134
W7PHO.....133
I1KDB.....133
W3BUX.....130
W3BYL.....130
W0QFQ.....124
W1JXM.....112
W5RHW.....110
YV5BS.....110

W/VE/VO Call area and Continental Leaders

W2AGW.....261
W4TM.....255
W0AIW.....252
VE1HG.....164
VE2WW.....192
VE3QD.....210
VE4XO.....118
VE5QZ.....140
VE6VK.....164
VE7GI.....224
VE8AW.....191
VO6EP.....190
ZS6BW.....251
4X4RE.....222

Radiotelephone

W2BXA.....207
W4HA.....212
W5BGP.....222
W7HIA.....189
W0AIW.....231
VE1CR.....122
VE2GQ.....130
VE3KF.....163
VE6NX.....101
VE7ZM.....178
ZL2GX.....227
OD5AB.....180
EA2CQ.....230

Station Activities

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

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Clarence Snyder, W3PYF—RM: YAZ. PAM: TEJ. EPA nets: 3850, 3610, 3915 and 3997 kc. This will be my last column. Pressure of my work has made it impossible for me to give this job as your SCM the time necessary and your new SCM, Dick Mesirov, JNQ, will succeed me following this month. To all the members of the EPA organization I would like to express my sincerest thanks for the fine cooperation achieved in this section during the past 25 months. To the club secretaries and the club newspaper editors who were kind enough to put me on their mailing lists, I say "thank you." To those of you who have had difficulty in getting correspondence from me, I want to express my apologies. I have been traveling from coast to coast and my time at home has been extremely limited. If nothing else, I think that the cooperation between the c.w. and phone nets has increased to a point where there is no more animosity and many appointees are members of both section nets, making liaison extremely easy. UQJ reports two new stations on 50 Mc. in the York Area: K3AVF and HXB. The Harrisburg Amateur Radio Club's new officers are BQA, pres.; VDA, vice-pres.; RPG, secy.; and ADE, treas. PNL has a new 10-meter ground plane. IM did the art work for the July issue of Philmont's *Blurb*. KN3ATV is an active member of the Wilkes Barre Post of the Ground Observer Corps with 250 hours to his credit. WJY is operating portable all summer at Lake Harmony. New officers of the Pocono Amateur Radio Klub are LLR, vice-pres.; GIV, vice-pres.; KN3KCZ, secy.; and MDO, treas. JNQ tested this reaction to poison ivy during Field Day. The reaction—positive. CUL has a 7-day-per-week sked with the West Coast. She has summer skeds into 31 states daily. IZI has an AT-1 and an HQ-100 into a dipole on the air in the Camp Hill Area. NNT has resigned as Section Emergency Coordinator. Our thanks to Doug for an FB job over the past two years. Again, thank you for your fine cooperation and I hope to meet many of you in the future, either on the air or in person. Traffic: W3CUL 1843, TEJ 145, BFF 125, YAZ 27, EPL 24, PYF 23, OGD 22, EPL 21, AXA 17, DJL 14, AMC 12, NQB 10, KN3AFW 6, W3WQL 6, PVY 4, UNQ 4, KFI 3, BNR 2, EMH 2, NF 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, Louis T. Croneberger, W3UCR—SEC: PKC. Section Nets: MDD 3650 kc. M-S 1915 EDT, MEPN 3820 kc. MWF 1830 SS 1300 EDT. New appointments: DQZ, Asst. SCM for Delaware; DXA, EC Baltimore County. The Foundation of Federated Radio Clubs was formed in Washington to be a perpetual organization with the 1958 ARRL National Convention the first task. New officers of the BARCS are PKC, pres.; MAZ, vice-pres.; BKT, secy.; and YZI, treas. The Kent County Amateur Radio Club elected WN3HZH, pres.; SPL, vice-pres.; ENN, secy.; and ZNF, treas. The Takoma Amateur Radio Club's new officers are TXC, pres.; SSB, vice-pres.; UYC, secy.-treas. The Areo ARC took to the West Virginia hills for the V.H.F. Contest, as did NRLARC and the National Capital V.H.F. Society. KLA advises that all those who worked PGA/8 will be sent a special QSL on request. YHI was guest speaker of the National V.H.F. Society on June 28 and he spoke on v.h.f. s.s.b. Jack is headed for DL-Land soon and s.s.b. on 144 Mc. is new over there. Field Day indications are that the MDD clubs were out in force. The RCARA had 10 operating positions at the Gaithersburg Fair Grounds. The OMN-designed 4-over-4 on 10 meters gave a good accounting of itself. The CSRC, operating from White Oak, worked Plymouth, Mass., on 2 meters using a Communicator and an eight-element beam. AARC, AFM, operated at the Pimlico Airfield. The furthest message (FD) was received from JHV/2, Scotch Plains, N. J. EAW, only 17, received first prize at the Baltimore Science Fair, earning a trip to the Fair held at San Francisco. 4EKO/3, Havre de Grace, now is in basic training at Ft. Knox and hopes to be a station at APG upon completion. 5RVI, one of the jr. operators at WV, is operating on the Great Lakes for the season while working as a radio officer. CDQ is traveling in EA2-, EA5-, EA6-, I1- and HB9-Land. VOS has moved the two-element 15-meter beam to the place of the three-element 20-meter beam that has done so well in recent contests. BUD is building a new home in St. Mary's County. TOM has left the Elkton Area for the West Coast. OJU now has 48 on 6 meters. KMV regularly skeds BQJ and BWU in Pittsburgh on 6 meters. GNQ sold the DX-100 and is joining the s.s.b. gang with a 20A. EHJ, operating on 2 meters from his summer place in lower St. Mary's County, worked AAY, VNF and UCR for his first contact with a beam (eight elements) only 10 feet off the ground and the Communicator operating in the car. IPO has moved into a new home in Riverdale and now has a 75-meter antenna, plus a two-element 10 over a two-element 15 in place. KDV is the new secretary of the MEPN. JNF is mobile on 6 meters. KN3ANF received his ticket in Baltimore and is operating 80- and 40-meter c.w. until the General Class license is earned. OTC added N.D. for 41 on 6 meters. WN3JJF is moving to Buffalo, N. Y. A new Baltimore net on 6 meters is the Peach Basket Net, which meets on 50.25 Mc. at 2000 Wed. and 1000 Sun. 4CTZ was winner of the Gonset 6-meter Linear and CXG and ALP tied for first mobiles at the MEPN picnic. Traffic: W3UE 303, TN 149, WV 140, PZW 115, PQ 105, K3WBJ 86, W3EUG 85, RV 65, UCR 48, AHQ 36, FAP 18, BUD 4, OYX 4.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: YRW. PAM: ZI. Field Day was a big success throughout the section, with a big increase in AREC-RACES operators participating. Field Day messages were received from Hamilton Twp. Radio Assn., DVRA, SJRA, Salem County Radio Club and IQ/2 in Moorestown. The Burlington Co. Radio Club also took part from the QTH of GOK. Sorry to hear that K2PTJ has had extensive damage to his tower and beam. Fred is OPS and OBS. The Jersey Phone and Traffic Net held its 2nd annual picnic at "Wireless Hill." RG has been appointed to represent New Jersey in the Region 1 C.D. Net. K2SOL, recently appointed OPS, is NC Tue. night on the J.J.. Phone Net. The Maple Shade C.D. Headquarters has a roster of ten operators, headed by KHW. The SJRA meets the 4th Thurs. in the Erlton Fire Hall. Gil Crossley, Atlantic Division Director, was the guest of SJRA at its June meeting. K2KTS is doing a fine job at the Delaware Twp. High School helping prospective operators get their licenses. PAU has written a fine article to help hidden transmitter hunters. Burlington Co. has a very active "ham" family in K2VDX Helen, KN2VDY Pat and their dad, KN2VDW. The Southern Co. Amateur Radio Assn. meets at the Atlantic City Naval Air Station. YRW is vacationing in Cape May Co. K2CPR is heard again this year from FP8AA, St. Pierre Island. OUY, Erlton, is ex-8RUM, 4FIQ and VP7NX. W2KHW, K2KPF and K2BG attended the Mercer Co. C.D. meeting in June. W2HX is Radio Officer and SYV is EC. Traffic: W2HDW 149, K2MUE 131, JGU 86, W2RG 54, ZI 33, K2SOL 26, PGC 20, W2BZJ 14, K2HPV 1.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: UTH/FRL. RMs: RUF and ZRC. PAMs: TEP and NAI. NYS C.W. meets on 3615 kc. at 1800, ESS on 3590 kc. at 1800, NSY Phone on 3925 kc. at 1800, TAR on 3570 kc. at 1700, NYS C.D. on 3509.5 and 3993 kc. at 0900 Sun., TCPN 2nd Call Area on 3970 kc. at 1900, SRPN on 3980 kc. at 1000, LSN on 3970 kc. at 1600. Erie County really came alive on 2 meters after forty Gonset Communicators were passed around to the gang in civil defense. At least ninety stations have crystals for the calling frequency at 145.410 Mc. and the frequency is almost continuously monitored. K2HUK has a fifteen-element long Yagi on 2 meters and is looking for contacts. K2DXV has a new receiver and a 40-meter Zepp. He worked 43 countries in June. UTH spent his vacation with 9HDV. K2s SZT and TLP lost the big "N." EMW is building a new receiver with better selectivity to pick out the rare DX. K2LJU is building a 2E26 rig for 2 meters, also a ten-

(Continued on page 96)

W/VE Contest

September 28-29

It's going to be Canada *vs.* U. S. A. again in this on-the-air funfest which comes about annually via the good graces of the Montreal Amateur Radio Club. W/K amateurs will swap contest exchanges with Canadians in all the provinces and territories, while the VE/VO contingent goes after U. S. A. hamdom with no holds barred. Call CQ W or CQ VE, depending on whether you're north or south of the border. When contact results, send this information: a QSO serial number, your call, an RST report, your ARRL Section. Obtain the same data from the station worked and then move on for more contacts.

Gordy Webster, VE2BB, MARC Contest Chairman, advises that the Contest Committee is ready and eager to be deluged by logs. Activity from Prince Edward Island — that rare nugget required for WAVE — is anticipated. And what better time to meet new friends across the border and give the equipment a dry run before the SS and other fall activities. Look over the simple rules below and get set for a week end loaded with operating fun.

Rules

1) Any single-operator station located in the ARRL Sections as listed on page 6 is eligible to participate.

2) All contacts must be made during the contest period from 6:00 P.M. EST, Sept. 28 to 11:59 P.M. EST, Sept. 29, with a total of no more than 20 hours operating time for each entry. Times on and off the air must be clearly shown in the contest log.

3) Messages containing the following information must be exchanged and be fully recorded in the contest log: (1) number of contact, (2) your call, (3) RST report, (4) ARRL Section. *Example*: NR 1 W1ZZZ 579 Vermont.

4) *Scoring*: Count one point for each exchange sent and acknowledged, and one point for each exchange received. A station may be worked once on c.w. and once on phone in each band. VE/VO stations will multiply their total points by the number of U. S. A. ARRL Sections worked, and by the appropriate power multiplier listed below. W/K stations will multiply their total points by the number of Canadian areas (maximum of nine; VE through 18 plus VO), then by 7.22 (65 U. S. A. Sections, 9 Canadian), then by the appropriate power multiplier, and then by a 2.5 provisional multiplier (based on the ratio of W/K to VE/VO logs received last year). All stations using power inputs of 30 watts or less will receive a power multiplier of 2, and stations using from 30 to 100 watts will receive one of 1.5.

5) Multioperator stations are not eligible to compete.

6) Each entry must be accompanied by the following declaration: "I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental radio regulations, and I agree that the decision of the Contest Committee of the Montreal Amateur Radio Club, Inc., shall be final in all cases of dispute."

7) All entries, postmarked no later than midnight, October 13, 1957, are to be sent to Gordy Webster, VE2BB, Contest Chairman, 69 Pine Beach Blvd., Dorval, Quebec, Canada. Entries become the property of the Montreal Amateur Radio Club.

FEEDBACK

In the article on the Alert Alarm in the August issue, an error appears in the circuit diagram of Fig. 1, page 19. The arm of R_2 should be connected to the bottom end of R_2 instead of to the switch. The stationary contact of S_1 should then be connected to the top end of R_2.

V.H.F. QSO Party

September 21-22

The month of September marks open season for v.h.f. contacts in another ARRL V.H.F. QSO Party, scheduled from 2:00 P.M. local standard time Saturday, September 21, until 11:00 P.M. local standard time Sunday, September 22. All amateurs able to work any band or bands above 50 Mc. are invited to try out new antennas and equipment and make new v.h.f. acquaintances in the contest.

Call "CQ V.H.F. QSO Party" or "CQ Contest" to raise under participants, and then exchange names of ARRL Sections (as shown on page 6). Rules 4 and 5 explain details on how to figure your score.

A certificate will be awarded to the top scorer in each ARRL Section, and special certificate recognition will also go to Novice, Technician, and multioperator stations (see rule 7).

After the contest, send a copy of your log, in the form shown on page 48 of last June *QST*, to ARRL, or write now for free log forms, available upon request.

Rules

1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, September 21, and ends at 11:00 P.M. Local Standard Time, Sunday, September 22. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2- or 3-point units.

3) Fixed-, portable- or mobile-station operation *under one call*, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under more than one other call during the contest period.

4) Scoring: *1 point* for completed two-way section exchanges on 50 or 144 Mc.; *2 points* for such exchanges on 220 or 420 Mc.; *3 points* for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of *different* ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.

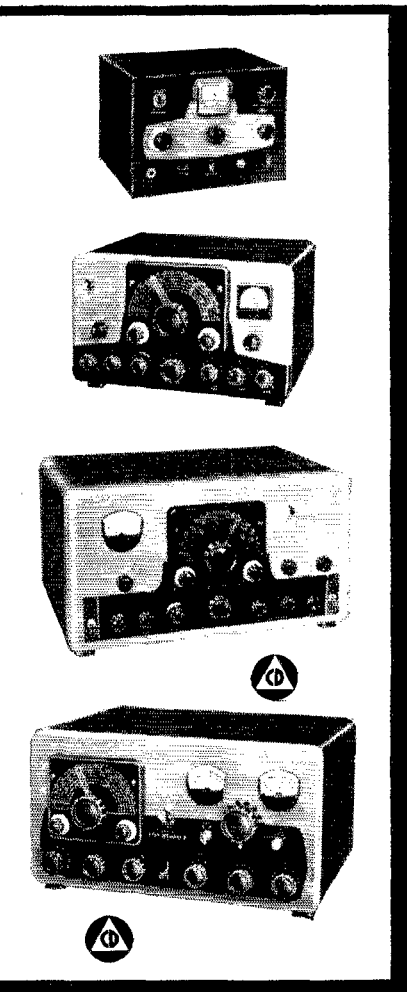
5) A contact *per band* may be counted for each station worked. Example: W2TBD (S.N.J.) works W1PHR (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2TBD 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W2TBD contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

6) Each section multiplier requires completed exchanges with *at least* one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multiple-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice and Technician in each section where three or more such licensees submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than October 9, 1957, to be eligible for awards. See the sample log on page 48, last June *QST* for correct form, or a message to Headquarters will bring printed blanks for your convenience.

CHOOSE YOUR POWER...



VIKING "ADVENTURER"—Compact, completely self-contained 50 watt CW transmitter. Bandswitching 80 through 10 meters—operates by crystal or external VFO. With tubes, less crystals and key.

Cat. No. 240-181-1 Kit.....**$54.95** Amateur Net

VIKING "RANGER"—75 watts CW input, 65 watts phone. May be used as an RF and audio exciter. Bandswitching 160 through 10 meters. Built in VFO or crystal control. With tubes, less crystals, key and microphone.

Cat. No. 240-161-1 Kit.....**$229.50** Amateur Net
Cat. No. 240-161-2 Wired .**$329.50** Amateur Net

VIKING "VALIANT"—275 watts input CW and SSB (P.E.P. input with auxiliary SSB exciter) ... 200 watts phone. Bandswitching 160 through 10 meters—operates by built-in VFO or crystal control. With tubes, less crystals, key and microphone.

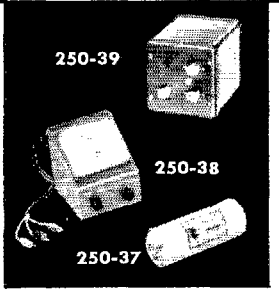
Cat. No. 240-104-1 Kit....**$349.50** Amateur Net
Cat. No. 240-104-2 Wired **$439.50** Amateur Net

VIKING "FIVE HUNDRED"—600 watts CW ... 500 watts phone and SSB. (P.E.P. input with auxiliary SSB exciter.) Compact RF unit designed for desk-top operation—power supply/modulator unit fits most anywhere. Bandswitching 80 through 10 meters. All exciter stages ganged to VFO tuning—also may be operated by crystal control. With tubes, less crystals, key and microphone.

Cat. No. 240-500-1 Kit....**$749.50** Amateur Net
Cat. No. 240-500-2 Wired .**$949.50** Amateur Net

The above units identified with the CD emblem have been certified as meeting FCDA requirements and will qualify under the matching funds program. For complete information and official copies of the certification—write to E. F. Johnson Company.

NEW!



T-R SWITCH—Instantaneous, high efficiency electronic antenna switching. Gain: 0 db at 30 mcs.; 6 db at 3.5 mcs. Rated at 4,000 watts peak power. Will not affect transmission line SWR—provides effective impedance match to most receivers through 3 to 30 mc. range. Complete.

Cat. No. 250-39.....**$25.00** Amateur Net*

DIRECTIONAL COUPLER AND INDICATOR—Provides continuous reading of SWR and relative power in transmission line. Coupler may be permanently installed in 52 ohm coaxial line. Switch on meter lets you read either incident or reflected power—a second control permits easy adjustment and calibration of meter.

Cat. No. 250-37 Directional Coupler.....**$11.75** Amateur Net
Cat. No. 250-38 Indicator.....**$25.00** Amateur Net*

**Prices subject to revision.*

See your authorized Johnson distributor for easy payment terms!

E. F. Johnson Company

2932 SECOND AVENUE S.W. • WASECA, MINNESOTA

THE VIKING "THUNDERBOLT" 2000

It's new! More "talk-power" to smash through QRM! A dominant signal on all popular amateur bands!

Introducing the Viking "Thunderbolt"—the hottest linear amplifier on the market today! Here's solid communication power—over 2000 watts P.E.P.* input; 1000 watts CW; 750 watts AM linear; in a completely self-contained desk-top package. Continuous coverage 3.5 through 30 megacycles—instant bandswitching. The "Thunderbolt" may be driven by the Viking "Navigator," "Ranger," "Pacemaker," or other unit of comparable output. Drive requirements are approximately 10 watts in Class AB_2 linear, 20 watts Class C continuous wave. When used with the "Pacemaker" or similar exciter, the non-inductive input circuit requires no grid tuning. Wide range pi-network will match transmission line impedances from 40 to 600 ohms. Two meters provide constant visual check—plate current meter also reads watts input, and a second meter reads grid current or plate voltage. Completely self-contained with all power supplies. 115 VAC-230 VAC, 50-60 cycle single phase.

Cat. No. 240-353-1 Viking "Thunderbolt" Kit with tubes . . . .Amateur Net† **$450.00**

Cat. No. 240-353-2 Viking "Thunderbolt" wired and tested, with tubes . . . . **$525.00** Amateur Net†

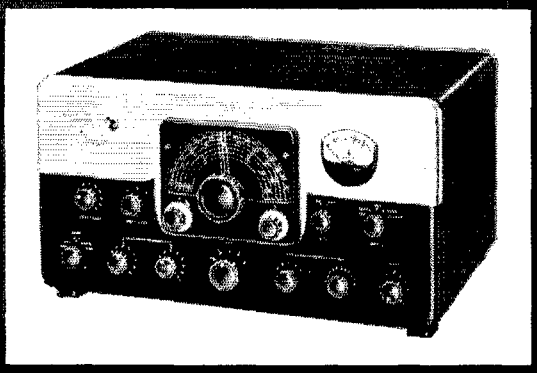
TUBE COMPLEMENT: (2) 4-400A tetrode—Final Amplifier, (2) 866A—High Voltage Rectifier, (1) 6BY5—Bias Rectifier, (1) 5U4—Screen Voltage Rectifier, (1) VR90—Bias Regulator, (2) VR105 and (2) VR150—Screen Voltage Regulator.

†Prices subject to revision. November 1957 delivery anticipated.

See it in operation —You are invited to drop into Room 2346 at the Palmer House during the National ARRL Convention in Chicago (August 30, 31, September 1st) to operate this remarkable power package. Listen for W9ZSO/9 on the air from convention headquarters.

WATTS P.E.P.*

**The F.C.C. permits a maximum one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics. The Johnson Viking "Thunderbolt" Linear Amplifier produces these higher powers and is the only equipment available to amateurs which can reach the maximum legal limit of "Talk-Power".*



DRIVE IT WITH THE "PACEMAKER"

More than an exciter—a self-contained sideband transmitter with VOX—anti-trip —built-in power supplies!

Here to stay! The "Pacemaker" is an outstanding power bargain when used alone or as an exciter for the "Thunderbolt" linear amplifier. 90 watts input CW and SSB (P.E.P.) . . . 35 watts AM! Bandswitching 80, 40, 20, 15 and 10 meters.

YOUR BEST BUY—AND HERE'S WHY!

1. **EXCLUSIVE**—Unique circuitry uses only 1 mixer for improved spurious signal rejection greater than 50 db. Eliminates great multiplicity of sum and difference spurious products inherent in systems utilizing 2 or 3 mixers.
2. **BALANCED RANGE AUDIO**—Does not sacrifice low frequency response as is usually necessary in filter-type equipment.
3. **BUILT-IN VFO**—Highly stable, temperature compensated and voltage regulated. Complete coverage of all bands without crystal switching or re-tuning.
4. **FRONT PANEL CARRIER BALANCE**—Provides optimum carrier rejection.
5. **NO FIXED IMPEDANCE OUTPUT CIRCUIT**—Wide range pi-network output assures proper load impedance to final amplifier.
6. **INDIVIDUAL CRYSTAL CONTROL**—of sideband generating frequency for each band.

Cat. No. 240-301 Viking "Pacemaker" wired and tested with tubes and crystals, less key and microphone . . . . . Amateur Net **$495.00**

See your authorized Johnson distributor for easy payment terms!

E. F. Johnson Company

2932 SECOND AVENUE S. W. • WASECA, MINNESOTA

More Gain than Many Reduced Size 3-Element Beams

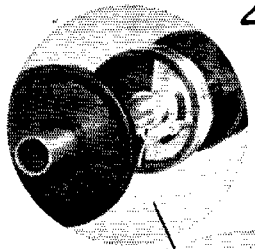
YET SMALL ENOUGH TO BE ROTATED BY A TV ROTOR . . .

the hy-gain 2-Element Tri-Bander

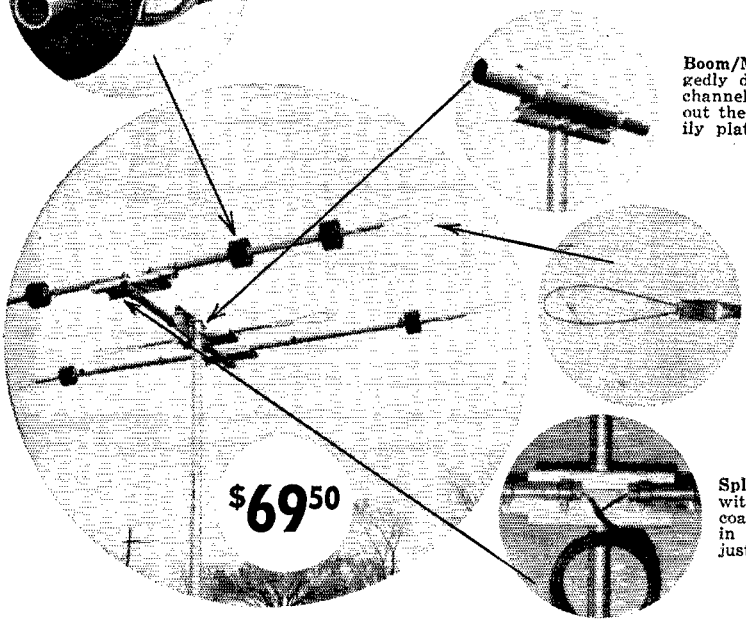
ONE FEEDLINE - THREE BANDS (10, 15 & 20M)

There Are More hy-gain Tri-Banders In Use Than All Other 3-Band Beams Combined!

2 Active Elements on Each Band!



Exclusive New Insu-Trap;- a new concept in parallel resonant trap circuits obsoletes old fashioned open-type coils. The only adjustable, completely weatherproof trap. Adjustable capacitor color coded for Fone or CW. Hi-Q coils wound on high impact styron forms which also act as low power factor dielectric for adjustable capacitors. No air dielectric involved. Trap assembly completely enclosed in weatherproof polyethylene cover with 2 grams of silica gel to absorb condensation.



Boom/Mast and Element Clamp;- ruggedly designed 12 Ga. galvanized steel channel for positive grip. Used throughout the entire Tri-Bander Series. Heavily plated and serrated 5/16" U-Bolts.

The "Carpet Beater" Ends;- employed on all Tri-Banders, specially designed of aluminum wire to reduce fatigue caused by vibration, increase the broad band characters of the beam, and to reduce element sag to a minimum.

Split Insulated Dipole;- fed directly with RG-8U ohm coaxial cable and coaxial line balancing choke results in low SWR on all bands. No adjustment necessary.

All specifications furnished from experimentally derived data. These figures will maintain in most installations if antenna is relatively in the clear.

	Model No.	Gain in DB Over Dipole	F/B Ratio In DB	SWR	Max. Power	Horizontal Beam Width	Boom Length	Boom Diameter	Element Diameter	Element Wall	Element Alloy	Longest Element	Approx. Net Wt.
2 Element	152T-2	5.8 Aver.	18 Aver.	Less Than 1.5:1	1 Kw	68°	72"	1½" Hot Dip Galv. Steel	1⅛", 1", ⅞", ¾"	.058, .049, .035	6061ST6 Ant. 41	29'	36#

The standard of comparison for three band antenna systems, the hy-gain Tri-Bander is factory pre-tuned, pre-matched and pre-adjusted and may be erected in an extremely short time with no test equipment and no further adjustment necessary. Guaranteed to outperform stacked arrays, because interaction and detuning effects have been eliminated. All hardware hot dip galvanized steel for maximum weather ability. Injection molded polyethylene, styron and cycolac plastic used throughout. Complete assembly and installation instructions furnished.

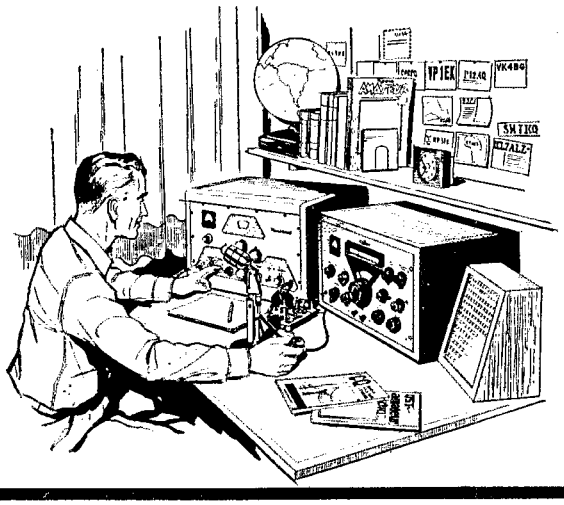
IN STOCK AT ALL LEADING AMATEUR RADIO DISTRIBUTORS!

Send for Detailed Brochure!

hy-gain antenna products

1828 N STREET LINCOLN, NEBRASKA

HEATHKITS®



Top quality ham equipment in kit form . . . designed especially to meet your requirements!

Heath amateur radio gear is designed *by* hams—*for* hams, to insure maximum "on the air" enjoyment. Good design and top-quality components guarantee reliability. Heathkits are easy to build and are easy on your budget! You save by dealing direct, and you may use the Heath Time Payment Plan on orders totaling $90.00 or more. Write for complete details.

HEATHKIT DX-100 TRANSMITTER KIT

PHONE AND CW

- *Phone or CW—160 through 10 meters.*
- *100 watts RF on phone—120 watts CW —parallel 6146 final.*
- *Built-in VFO—pi network output circuit.*
- *Easy to build—TVI suppressed*

MODEL DX-100

$189.50

$18.95 dwn., $15.92 mo.

Shpg. Wt. 107 Lbs.

Shipped motor freight unless otherwise specified. $50.00 deposit required on c.o.d. orders.

The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is TVI suppressed, and uses pi network interstage coupling and output coupling. Matches antenna impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Completely bandswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and meter face are illuminated. High-quality components throughout! The DX-100 is very easy to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of enjoyment in your ham shack.

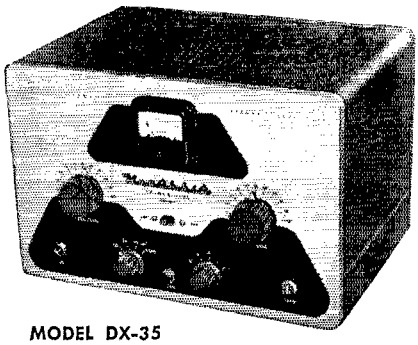
HEATH COMPANY BENTON HARBOR 9, MICHIGAN

A Subsidiary of Daystrom, Inc.

HEATHKIT DX-35
TRANSMITTER KIT

PHONE AND CW

This transmitter features a 6146 final amplifier to provide 65 watt plate power input on CW, with controlled-carrier modulation peaks up to 50 watts on phone. Modulater and power supplies are built in, and the rig covers 80, 40, 20, 15, 11 and 10 meters with a single band-change switch. Pi network output coupling provides for matching various antenna impedances. Employs 12BY7 oscillator, 12BY7 buffer and 6146 final. Speech amplifier is a 12AX7, and a 12AU7 is employed as modulater. Panel control provides switch selection of three different crystals, reached through access door at rear. Panel meter indicates final grid current or final plate current. A perfect low-power transmitter both for the novice or the more experienced amateur. A remarkable power package for the price. The price includes tubes, and all other parts necessary for construction. Comprehensive instruction manual insures successful assembly.



MODEL DX-35

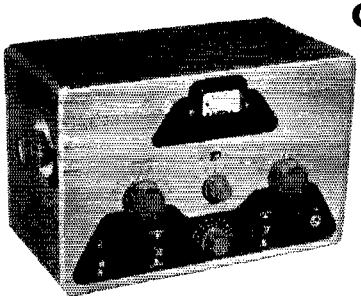
$56.95 Shpg. Wt. 24 Lbs.

$5.70 dwn., $4.78 mo.

- *Phone or CW—80 through 10 meters.*
- *65 watts CW—50 watts peak on phone—6146 final amplifier.*
- *Pi network output to match various antenna impedances.*
- *Tremendous dollar value—easy to build.*

BRAND NEW

HEATHKIT DX-20
CW TRANSMITTER KIT



MODEL DX-20

$35.95

$3.60 dwn., $3.02 mo.

Shpg. Wt. 18 Lbs.

- *Designed exclusively for CW work.*
- *50 watts plate power input—80 through 10 meters.*
- *Pi network output circuit to match various antenna impedances.*
- *Attractive and functional styling—easy to build.*

Here is a straight-CW transmitter that is one of the most efficient rigs available today. It is ideal for the novice, and even for the advanced-class CW operator. This 50 watt transmitter employs a 6DQ6A final amplifier, a 6CL6 oscillator, a 5U4GB rectifier and features one-knob bandswitching to cover 80, 40, 20, 15, 11 and 10 meters. It is designed for crystal excitation, but may be excited by an external VFO. A pi network output circuit is employed to match antenna impedances between 50 and 1000 ohms. Employs top-quality parts throughout, including "potted" transformers, etc. If you appreciate a good signal on the CW bands, this is the transmitter for you!

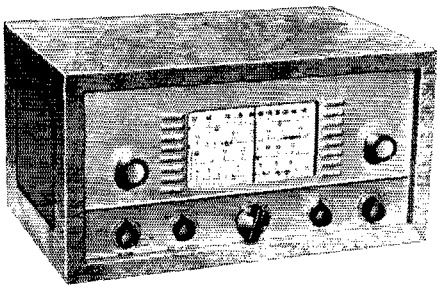
HEATH COMPANY BENTON HARBOR 9, MICHIGAN

A Subsidiary of Daystrom, Inc.

HEATHKIT

COMMUNICATIONS-TYPE, ALL BAND

RECEIVER KIT



This receiver covers 550 kc to 30 mc in four bands, and is ideal for the short wave listener or beginning amateur. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer-type power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—headphone jack—and AGC. Has built-in BFO for CW reception. Shpg. Wt. 12 Lbs.

MODEL AR-3

$29.95

incl. excise tax (less cabinet)

$3.00 dwn., $2.52 mo.

CABINET: Fabric covered cabinet with aluminum panel as shown. Part 91-15A. Shipping Wt. 5 Lbs. $.50 dwn., $.42 mo. $4.95

Ⓐ HEATHKIT VFO KIT MODEL VF-1

Covers 160, 80, 40, 20, 15, 11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 VDC at 15 to 20 ma, and 6.3 VAC at 0.45A. Incorporates regulator tube for stability and illuminated frequency dial. Shpg. wt. 7 lbs. $1.95 dwn., $1.64 mo. **$19.50**

Ⓑ HEATHKIT GRID DIP METER KIT MODEL GD-1B

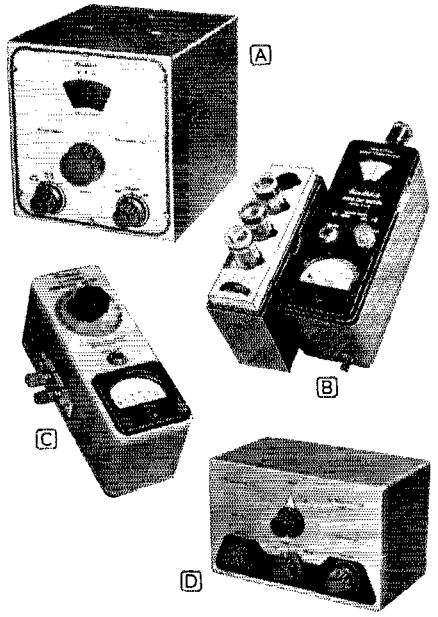
Continuous coverage from 2 mc to 250 mc with prewound coils. 500 ua panel meter for indication. Use to locate parasitics, for neutralizing, determining resonant frequencies, etc. Will double as absorption-type wavemeter. Shpg. wt. 4 lbs. $2.00 dwn., $1.68 mo. **$19.95**

Ⓒ HEATHKIT ANTENNA IMPEDANCE METER KIT MODEL AM-1

The AM-1 covers 0 to 600 ohms for RF tests. Functions up to 150 mc. Used in conjunction with a signal source, will determine antenna resistance and resonance, match transmission lines for minimum SWR, determine input impedance, etc. Shpg. wt. 2 lbs. $1.45 dwn., $1.22 mo. **$14.50**

Ⓓ HEATHKIT "Q" MULTIPLIER KIT MODEL QF-1

Functions with any receiver having IF frequency between 450 and 460 kc that is not AC DC type. Operates from receiver power supply, requiring only 6.3 volts AC at 300 ma (or 12.6 vac at 150 ma), and 150 to 250 vdc at 2 ma. Simple to connect with cable and plugs supplied. Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of approximately 4000. Shpg. wt. 3 lbs. $1.00 dwn., $.84 mo. **$9.95**



HOW TO ORDER...

It's simple—just identify the kit you desire by its model number and send your order to the address listed below. Or, if you would rather budget your purchase, send for details of the Heath Time Payment Plan for orders totaling $90.00 or more.

HEATH COMPANY BENTON HARBOR 9, MICHIGAN

A Subsidiary of Daystrom, Inc.

"I am now using the Gotham V80 vertical antenna with only 55 watts, and I am getting fantastic reports from all over the world". VP1SD

ALL-BAND VERTICAL ANTENNAS

GOTHAM'S sensational new vertical antennas give unsurpassed multi-band performance. Each antenna can be assembled in less than two minutes, and requires no special tools or electronic equipment. In the V160, resonance in the 160, 80, 75, and 40 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate on 20, 15, 10 and 6 meters! The same idea applies to our V80 and V40 multi-band verticals. No guy wires needed: rugged, occupies little space, proven and tested.

●

Simple design and superior materials give all-band operation, and effective, omni-directional radiation. Gotham verticals are rugged, with low initial cost and no maintenance. Guaranteed Gotham quality at low Gotham prices. Perfect for the novice with five watts or the expert with a kilowatt.

QUALITY MATERIAL

Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION

Switch from one band to another. Operate anywhere from 6 to 160 meters. Work the DX on whatever band is open.

EASY ASSEMBLY

Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION

Goes almost anywhere. On the ground, on the roof, or outside your window. No trick fittings or castings needed.

AMAZING PERFORMANCE

Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

NO GUY WIRES

Our design eliminates unsightly guy wires. You save time, trouble, space and money by avoiding guy wires.

PROVEN DESIGN

Over a thousand Gotham verticals are on the air — working the world and proving the superiority of Gotham design.

AND THE PRICE IS RIGHT!

"I worked LU3ZS on Half Moon Island in Antarctica on Dec. 26 at 21150 Kc. I was using my Gotham V80 vertical antenna and only 35 watts." KN5GLI

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

V40 vertical for 40, 20, 15, 10, 6 meters.....$14.95 ☐
V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters.....$16.95 ☐
V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters.....$18.95 ☐

Name.....

Address.....

City.....Zone.....State.....

How to order
Send check or money order directly to *Gotham* or visit your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

GOTHAM 1805 PURDY AVENUE MIAMI BEACH 39, FLA.

YOU COULD WORK WONDERS IF YOU HAD A GOTHAM BEAM!

Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

MORE DX CONTACTS

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

THE DESIGN IS PROVEN

FRONT-TO-BACK RATIO. We guarantee a minimum F/B Ratio of 19 db. for any of our 2-element beams; 29 db. for any of our 3-element beams; 35 db. for 4-element beams.

THOUSANDS IN DAILY USE

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. No electronic equipment or measuring devices are required.

ALCOA QUALITY ALUMINUM

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

CONSISTENT PERFORMANCE

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between ¾" and 1⅝".

YOU WILL WORK THE WORLD

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use ⅝" and ¾" tubing elements; the deluxe models for these bands use ⅞" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

TRIBANDER BEAMS

6–10–15 TRIBANDER.....$39.95
10–15–20 TRIBANDER..... 49.95

Do not confuse these full-size tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is not frequency sensitive, nor does it have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get terrific gain is to use a Gotham Tribander Beam.

TECHNICAL CHARACTERISTICS

S.W.R. On Each Band	1:1
Total Number of Elements	3
Diameter of Elements	⅞" & 1"
Number of Booms	2
Diameter of Booms	1"
Boom Length	12'

6-10-15 Tribander

GAIN	F/B RATIO
6.5db on 6 mtrs	23db on 6 mtrs
7.8db on 10 mtrs	27db on 10 mtrs
6.5db on 15 mtrs	23db on 15 mtrs

10-15-20 Tribander

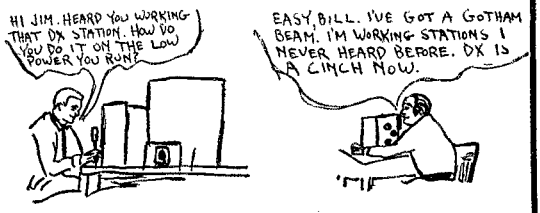
GAIN	F/B RATIO
6.5db on 10 mtrs	23db on 10 mtrs
7.8db on 15 mtrs	27db on 15 mtrs
6.5db on 20 mtrs	23db on 20 mtrs

You could work KC4USA in the Antarctica with only 90 watts on 15 meters, as W4SK did.

You could work over 100 countries with a three element 10 meter beam, and be a top man on the frequency, like WØDEI.

You could work terrific skip and DX with reports of 20 over 9, with as little as 36 watts input on 20 meters, as W. E. Woods did.

You could work 29 states in three months on six meters, with low power, as K2LHP did.



Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST

1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

TRIBANDER

☐ 6-10-15	$39.95	☐ 10-15-20	$49.95

6 METER BEAMS

☐ Std. 3-El Gamma match	12.95	☐ T match	14.95
☐ Deluxe 3-El Gamma match	21.95	☐ T match	24.95
☐ Std. 4-El Gamma match	16.95	☐ T match	19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match	28.95

10 METER BEAMS

☐ Std. 2-El Gamma match	11.95	☐ T match	14.95
☐ Deluxe 2-El Gamma match	18.95	☐ T match	21.95
☐ Std. 3-El Gamma match	16.95	☐ T match	18.95
☐ Deluxe 3-El Gamma match	22.95	☐ T match	25.95
☐ Std. 4-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 4-El Gamma match	27.95	☐ T match	30.95

15 METER BEAMS

☐ Std. 2-El Gamma match	19.95	☐ T match	22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match	32.95
☐ Std. 3-El Gamma match	26.95	☐ T match	29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match	39.95

20 METER BEAMS

☐ Std. 2-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match	34.95
☐ Std. 3-El Gamma match	34.95	☐ T match	37.95
☐ Deluxe 3-El Gamma match	46.95	☐ T match	49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

☐ Beam #R6 (6 Meters, 4-El).....$38.95
☐ Beam #R10 (10 Meters, 4-El)..... 40.95
☐ Beam #R15 (15 Meters, 3-El)..... 49.95

Name.....

Address.....

City.....Zone....State.....

Quist Quiz

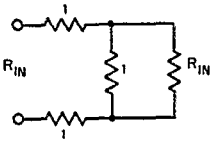
If you have been batting 1.000 in the Quist Quiz league, here's a real test of your ability, submitted by Mark Moynahan, W2ALJ:

You are given four unmarked resistors, one marked precision resistor, a battery of known polarity and a zero-center milliammeter. All but one of the unmarked resistors have the same value as the precision resistor. This one unmarked resistor may have a higher or lower resistance than the precision resistor, or it may have the same value. Using the equipment at hand, you are allowed two measurements to determine which one, if any, of the resistors is different than the precision resistor and, if so, whether it is higher or lower than the rest. A measurement is defined as connecting the components as you chose and noting the reading of the meter.

(If you work this out in less than an hour or so, you are invited to expand the problem to one involving 13 unmarked resistors, one precision resistor, the battery and milliammeter and *three* measurements.)

— • • • —

Last month's problem boils down to this equivalent circuit. Solving for R_{in},



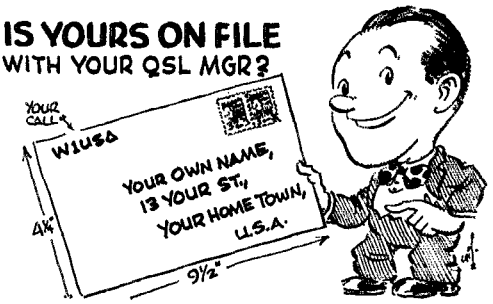
$$R_{in} = 1 + 1 + \frac{(1)(R_{in})}{1 + R_{in}}$$

$$R^2_{in} - 2R_{in} - 2 = 0$$

$$R_{in} = \frac{2 \pm \sqrt{4+8}}{2} = \frac{2 + 2\sqrt{3}}{2} = 2.732 \text{ ohms}$$

A.R.R.L. QSL BUREAU

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

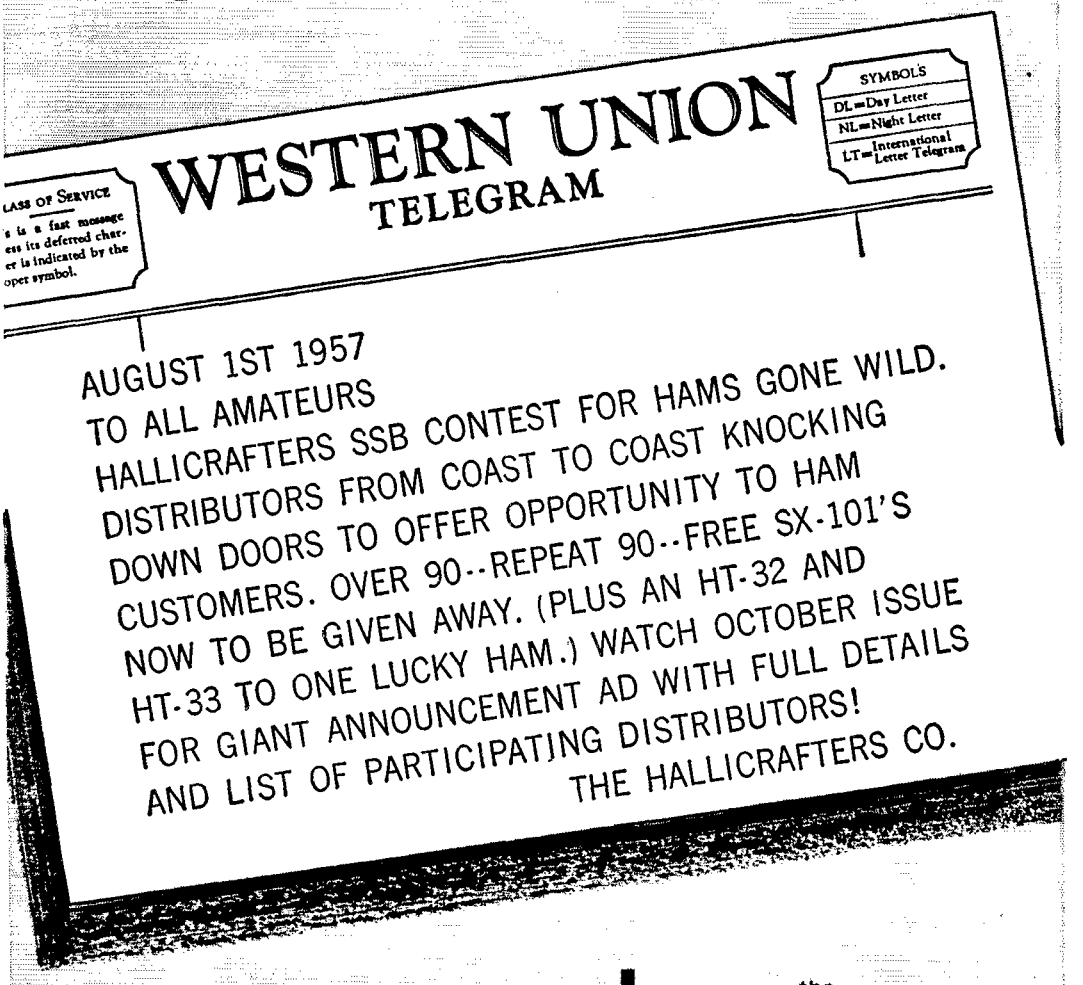


W1, K1 — D. W. Waterman, W1IPQ, 99 Flat Rock Rd., Easton, Conn.
W2, K2 — E. F. Huberman, W2JIL, Box 746, GPO Brooklyn 1, New York.
W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — Robert Stark, W5OLG, P.O. Box 261, Grapevine, Texas.
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Joseph P. Vogt, W7ASG, P.O. Box 88, John Day, Oregon.
W8, K8 — Walter E. Musgrave, W8NGW, 1215 E. 187th St., Cleveland 10, Ohio.
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.
VE1 — L. F. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — George C. Goode, VE2YA, 188 Lakeview Ave., Pointe Claire, Montreal 33, Que.
VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 883 10th St. N., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.
VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.
VO — Ernest Ash, VO1AA, P.O. Box 8, St. John's, Newfoundland.
KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
KL7 — KL7CP, 310—10th Ave., Anchorage, Alaska.
KZ5 — Catherine Howe, KZ5KA, Box 407, Balboa C. Z.

Strays

W8SLR discovered that one of the teachers in his high school was Clarence Tuska's cousin and had helped to publish early issues of *QST* in her mother's attic!

hallicrafters giant SSB contest now set for October. More than 90 SX-101's to be given away to hams!



The best ideas in communications are born at

the **hallicrafters** company

4401 W. FIFTH AVE., CHICAGO 24, ILL.

Station Activities

(Continued from page 82)

element beam. K2PVN is building an 829B rig for 2 meters. RQF has a 10B and is going s.s.b. K2s KDT and GUG finished an 813 linear just in time for Field Day at W2PE. The Syracuse V.H.F. Club really went all out in the V.H.F. QSO Party. VE3FT/W2 is on RTTY, 2, 15, 20 and 40 meters. SSC, BLP, K2CUQ and QYT all qualified for Class 1 Observer in the May E.M.T. in that order. 5RWH/2, 5ZER/2, K2IXN, N2YAT, JHK, N2TZK, ASP, GVI, K2OAZ, MSM and SWN, from the Rome RC provided communications for the local Loyalty Day Parade. BKC is building a new 4-250A final now that he's off the sick list. YTY has a 6-meter beam. K2OAR is working on a d.s.b. rig. K2KIJ edits a nice paper called *QRJI* for the Corning ARA. YGW is building a new final for s.s.b. and c.w. using p.p. HK-354Es. REA got a 75A-4 and an HT-30. OWF has a Valiant kit. Quite a gang turned out for the Lockport V.H.F. "do." Lighthouse Larry was the main speaker and ZOC was the host. ALL gave a talk on 432 Mc. and also displayed some 432-Mc. gear to the Rochester v.h.f. group. ELX was elected chairman, CTA, vice-chairman, and K2HIT, secy. at the same meeting. DPV is building a new rig for both 6 and 2 meters. The Rochester DX Assn. elected QJM, chairman; MG asst. chairman; and TQR secy.-treas. AFQ is building a GG final. REF now has 200 countries confirmed on c.w. SAW worked 3 new ones for a total of 214. K2HWI has been appointed OES. RJY is back in business on 10 and 2 meters after some of the gang had an "antenna party." Traffic: (June) K2DXV 277, IYP 161, GQU 32, GWN 13, LJU 11, HUK 10, W2RQF 7, EM1W 4. (May) K2KNV 138.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewica, W3GJY—SEC: OMA. RMs: UHN, NUG, GEG, NRE. PAMs: AER, TOC. The WPA Tfc. Net operates daily except Sat. and Sun. on 3585 kc. at 7 P.M. ORS appointees are urged to check in whenever possible. HGT passed his "General." FGS has donned Army khaki. DAH is wearing "civvies" after a four of duty in the Navy. BEX is QRL getting Novices on the air. EPM is now "beaming" his signal. JIZ runs 100 watts. CUI and EGJ are QRL on 6 meters. ERJ, his XYL, ERK, and their harmonic, GCB, issue a nice certificate for working the "Saddler" family on 50 Mc. Several members of the Western Penna. DX Society, namely, BSF, OEW, CXX and RTB, along with KP4AIO, were ready to embark on a journey to KC4-Land when the Haitian uprising put a QRT to their plans. RSB is on 75, 40 and 10 meters with the new antennas. OEZ is back on the air after an operation and hospitalization. LSS is QRL with various CD nets. UHN carries on with the WPA Tfc. Net. KUN is now comfortably situated at his new QTH in Emporium. WIQ, the section's top trafficker, reports. We welcome, KL7CBN (located at Coraopolis) to the section. He is now active on 20 and 75 meters and MARS nets. NRR and WGS have new QTHs. The Etna Radio Club took part in its first Field Day activity using the club call, EXW. PWN works 6 meters. ERJ reports that a Tornado Alert was sounded by c.d. officials in Wilkinsburg July 24 and the following were "standing by" on 50.4 Mc. although not needed: ERJ, ERK, GCB, GXL, BQG and EBH. RACES and AREC members are a useful asset to their country, their community and to their chosen hobby, ham radio. OMA, our SEC, reports that reorganization within the AREC field in the section is about completed. It is suggested that you contact OMA if you are not registered in the AREC at the earliest possible date. UJP, the Breeze Shooters secretary, reports "BSN" was the only club to turn out en masse for the 11-meter contest held June 8-9 with the following stations taking part: OPF, HME, LKZ, LOR, SIW, PII, LWT, JT, KTW, UJP, ZDR, YIT, EUL, SUJ, ZWZ, AZO, NVS and DZP. PII was top scorer for the tracas and UJP garnered six new states. Newly-elected officers of the Erie Radio Club are BFB, pres.; JTF, vice-pres.; BPB, secy.; and JOQ, treas. The ERC was well represented during the past Field Day activity with operation on 80 through 2 meters. NMP received two SWL cards from JA/KA-Land, which pleased him no end. TOC's DX-100 broke down. BZR reports Field Day was enjoyed by all concerned at the Coke Center Radio Club. YA says things are at a standstill at his QTH. Are you taking advantage of traffic-handling as well as other various phases of activities offered by our common hobby? Ham radio is not only useful as a means for personal pleasure but much can also be accomplished by serving the general public by being an appointee in one of the many fields available. Traffic: (June) W3WIQ 2174, BZR 67, GJY 34, YA 17, LSS 7, SWV 2, UHN 2. (May) W3LSS 17.

CENTRAL DIVISION

ILLINOIS—SCM, George T. Schreiber, W9YIX—Asst. SCM: Grace V. Ryden, 9GME. SEC: HOA. RM: MAK. Asst. RM: K9GJR. Cook County EC: HPG. Section nets: ILN, 3515 kc. Mon. through Sat. 7 P.M.; IEN, 3940 kc. Field Day apparently was a great success in the section. We received more messages this year than ever before. There were 27 confirmed, not including three on which we could not read the call letters. Confirmed are (all portable) AB, AML, AW, AVE, BNH, K9BPK BSA, CAF, ERU, EXL, GDF, GNA, GXU, MAK, NZ, OEY, OFR, OJI, OUS, QFH, RK, SW, UKY, UPN, UVI, VT and ZAB. BPL certificates go to Route Manager MAK and DO. ILN had 25 sessions in June with 268 messages cleared. CSW reports the North Central Phone Net handled 370. UQT, former director, who has been ill, is back on his feet again. Wonder why no one bothers to report the traffic for IEN, or even give us the time of the sessions. Deepest sympathy to BHT, of Mt. Pulaski, who lost his nine-year-old son. The St. Clair Amateur Radio Club moved into its new clubroom at the civil defense center, reports BA. A new call heard in the section is K9EYI, of Rockford, who already is chasing the rare ones, right behind NN. New calls in the Bloomington Area are KN9s IMX, IKH, IKG, IUK, IKX, IBJ, ILP, IKS, IMV and K9ISY. SXL now is McLean County Radio Officer. LNQ, the editor of *Ham Gab*, spends his "spare time" chasing DX, with ten more to confirm for DXCC. Official Observer GDI went fishing, of all things, instead of giving his new three-band quad a good workout. LI has been on the sick list, but now is reported well enough to get back on the air. He was missed. SKR regrets the slump on 15 meters. K9GJR, the Assistant Route Manager, is a railroad telegrapher for a living and has the following hobbies: tropical fish, motorcycles and repairing two "jalopies." He's trying to recruit stations for the c.w. net in the southern part of the section. K9AXS now has her General Class license. The new chief operator at K9USA, Great Lakes, is 6ULL, who is planning a new antenna. The Ninth Regional Net is partly held together with an excellent news letter, edited by 4KKW, which keeps the members informed of the latest. A new radio club in the section in the Alton Senior High School Radio Club, sponsored by ONU. Officers, reports HIX, are HIM and KN9HJC. The station is well equipped. Well, by the time you read this you all should have ordered your reservations for the National Convention in Chicago Labor Day week end. If you have not, General Manager QKE says you had better rush them in. See you there. Traffic: (June) W9MAK 760, DO 712, K9USN 347, GJR 331, W9IDA 274, PCQ 124, FAW 109, JZK 95, YYG 64, YIX 34, SXK 28, VBV 22, CTZ 19, BA 11, K9AMD 8, W9SKR 4. (May) W9YYG 409, OYL 51.

INDIANA—SCM, Seth Lew Baker, W9NTA—Asst. SCM: George H. Graue, 9BKJ. SEC: QYQ. RMs: DGA, TQC and TT. PAMs: CMT, KOY, SWD and UXK. New appointments: AYD and HTF as OOs. Field Day messages were received from AB/9, PQZ, DUK/9, DKR/9, ZSK/9, REG/9, WLY/9, JP/9, LJ/9, ONB/9, EEO/9, LIT/9, K9AVO, CQA, GQP and BJU. Field Day activity in the State was at an all-time high. The After-The-Net Net picnic held at the home of WHL and his XYL at Bedford was a fine one with about 60 present. Carole, K9AMD, the NCS, received several gifts, among them a copy of Riley's poems. Those making BPL were JYO and NZZ, who reports Arctic signals very poor lately. New calls: KN9IQI, the son of DZC, at Greenfield; KN9IUR at South Bend; KN9IKL at Kokomo and K9ISD at Rochester. K9IEU, IEW and HYS are new Tech. Class licensees in Marion. Look for them on 6 meters. CYC is back on 20-meter phone and 40-meter c.w. FYM is using a WE 701-A in the final at 350 watts. K9CFG reports the North Central Indiana 6-Meter Net, which meets on 50.5 Mc. at 2030 EST Mon. and Fri., handled 5 messages in June. SWD reports IFN Evening traffic as 187 and morning as 164, total 351. QIN, as reported by TQC had 246 and TT gives RFN as 79. EHZ lists CAEN traffic as 70 and KOY reports the Interstate S.S.B. Net handled 481. We have a serious problem in the State which is getting worse and unless everyone will cooperate it will get entirely out of hand. That is the case of the unmodulated carrier. Carriers are thrown on not only on our nets but can be heard anytime of the day or night. This is a plea for more care in operating. You will be doing yourself a favor also by more careful listening and, above all, always identify your station. K9AQM has a new Gonset two-element 15-meter short beam on a 50-ft. pole and DX is coming in nicely on the high end of 15 meters. He is WAC on 15-meter s.s.b. running 65 watts. KN9GSV is a new call with a DX-20 and an AR-3. Don't forget to fill in your AREC application blank and send it to either your County EC or QYQ, our SEC. Traffic: (June) W9JOZ 414, K9BBO 408, W9JYO 301, TT 296, EQO 257, NZZ 251, EHZ 170, DHJ 146, KOY 146, ZYK 145,

(Continued on page 98)

Mary Burke, W3CUL, 1956 Edison Award winner, is honored at the banquet ceremony held February 28, 1957, at Washington's Mayflower Hotel, with Rear Admiral H. C. Bruton, chief of naval communications, the principal speaker. Left to right: Admiral Bruton, Mrs. Burke, and L. B. Davis, general manager of the G-E electronic components division. (*Official U. S. Navy photograph*)

NOMINATIONS NOW OPEN FOR 1957 EDISON AWARD

The 1957 Edison Award once more will honor an amateur who has rendered outstanding public service—will be a tribute to the assistance which all radio amateurs offer their communities and the nation when need arises.

A committee of distinguished and impartial judges will select the Edison Award winner. He will be chosen from candidates who are nominated in letters from you and others.

Since only names submitted by letter will be considered for the Award, your participation and support are essential. Start now to choose a suitable candidate! The rules at right will help you in preparing your nominating letter. Mail it to *Edison Award Committee, General Electric Company, Electronic Components Div., Owensboro, Ky.*

RULES OF THE AWARD

WHO IS ELIGIBLE. Any man or woman holding a radio amateur's license issued by the F.C.C., Washington, D.C.. who in 1957 performed a meritorious public service in behalf of an individual or group. The service must have been performed while the candidate was pursuing his hobby as an amateur within the continental limits of the U. S.

WINNER OF THE AWARD will receive the Edison trophy in a public ceremony in Washington, D.C. Expenses of his trip to that city will be paid.

$500 GIFT. Winner will be presented with a check for this amount in recognition of the public service he has rendered as a radio amateur.

WHO CAN NOMINATE. Any individual, club, or association familiar with the public service performed.

HOW TO NOMINATE. Include in a letter a full description of the service performed, as well as the candidate's name, address, and call letters. Your letter of nomination must be postmarked not later than January 3, 1958.

BASIS FOR JUDGING. All entries will be reviewed by a group of distinguished and impartial judges. Their decisions will be based on (1) the greatest benefit to an individual or group, (2) the amount of ingenuity and sacrifice displayed in performing the service. The judges will be:

E. ROLAND HARRIMAN, Chairman, The American National Red Cross.

ROSEL H. HYDE, Commissioner, Federal Communications Commission.

GOODWIN L. DOSLAND, President, American Radio Relay League.

Winner of the Award will be announced on or before Thomas A. Edison's birthday, February 11, 1958.

Employees of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the Award.

GENERAL ELECTRIC

166-181

SVL 140, TQC 128, VAY 119, NTA 81, HXR 74, KTX 65, BKJ 63, SWD 54, AB 48, EJW 48, CC 47, VNV 44, LDB 39, RTH 38, QYQ 34, WUH 31, UQP 24, ENU 23, WHL 22, UXK 19, VPJ 19, PQZ 18, WBA 15, DGA 14, DOK 14, GJS 12, IMU 12, JBQ 11, DWK 10, BDP 9, HRW 9, EJC 8, YYX 8, CDW 7, DZC 7, ELE 7, SNQ 7, DDT 6, EZW 6, FYM 6, STC 6, HUF 5, GDL 4, LGD 4, SVZ 4, WLY 3, CMT 1, FJI 1, PPS 1, QR 1, WAU 1. (May) W9AZF 5.

WISCONSIN—SCM, George Woida, W9KQB—SEC: EIZ. PAMs: NRP and AJU. RMs: KJJ and K9AEQ. Nets: WIN, 3535 kc, 7 P.M. CDT daily; BEN, 3950 kc, 6 P.M. CDT daily. New officers of the Oshkosh Amateur Radio Club include DQE, pres.; KKK, vice-pres.; 1DTM/9, secy.-treas.; ELY, chairman of the executive board. High activity prevails as the club's real fine bulletin, the *QRMer*, indicates. The MRAC was busy with its mobile unit in the Armed Forces Day Parade in Milwaukee and in furnishing communications on the same day for the sports car races at Williams Bay. JEF made contact with NSS, AIR and WAR on Armed Forces Day. The Mancorad Club has a new RME-4300 and holds net meetings Sun. at 11 A.M. on 3965 kc. VHA, Marathon County EC, held a real emergency drill when 20 stations furnished all communications for the sports car climb of Rib Mt. when the sound-powered phone system failed to operate. CCO is the proud Daddy of a baby daughter born while he was on duty aboard the U.S.S. *Kidd* in the Pacific. Look for Butch as /6 in September. MYU desires word from anyone who was radio operator in the CCC back in '41. NRP is busy fixing rigs for other operators. K9GDF now is an RCC member and has a 25-w.p.m. sticker. There is a new Novice net on 7152 kc. at 7:30 A.M. EST. PJT made WAS and sked's his brother, KNØJOS. New in Manitowoc: K9DUZ, KN9HXI, KN9AIZ. In Lake Mills: KN9IAY. In Eau Claire: KN9IBH. IZD is making room in the shack for new 2- and 6-meter s.s.b. gear. GXD has a new G66 and HPC a new Valiant. JAW's 50-watter aboard his good ship *Wilkins* sounds like a good water ground pays off. SZR is over the 100 mark with DX worked. KN9IBB is on with a Viking II and a 75A-3. KZZ is real satisfied with his new SX-101. Check with EIZ for an EC appointment. Most western counties are without an EC. Traffic: (June) W9CXY 615, KQB 109, KJJ 60, K9AEQ 56, W9OT 11, PJT 6, RTP 5, FZC 4. (May) W9KJJ 89, FZC 15, K9BBT 13, W9SQM 12, JEF 10, SIZ 3.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Elmer J. Gabel, WØKTZ—I met the following North Dakota boys at the St. Paul Convention: FVG, GNS, HVA, KØCNC, OMX and GRM. ILO, the Fargo Club station, reports a successful Field Day week end making 160 contacts. Operators and visitors included UTT, chief op., JNP, WIA, NGL, KØDXT, CXJ, KNØICS and ICT. KØATK spent three weeks at home in Michigan and returned via South Dakota with a new Johnson 500. KØCNC is building a 2E26 rig for 6 meters. KØCMX has a new HQ-110. KØCNC's July *QST* listing should have been in the 1-operator column; our error. Traffic: KØCNC 71, WØNPR 18.

SOUTH DAKOTA—SCM, Les Price, WØFLP—Asst. SCM: Gerald F. Lee, ØYKY. SCM assistants: HOH, FKE, APL, GQH, NEO, TI, MZU and GDE. SECs: YOB and GDE. PAM: ULU. RM: SMV. The 75-Meter S.D. Phone Net had 27 sessions with OII 3 (resigned), GQH 3, SCT 19, EXX 1 (fill-in); QNI 468, high 31, low 7, average 17.3; traffic 32, high 6, low 0 (14 times), average 1.15; informals 54, high 8, low 0 (twice), average 2. The S.D. 40-Meter Net had 25 sessions with FEJ (QHX operator) 4, YKY 5, EXX 9, SCT 1, LXP 6; QNI 285, high 21, low 6, average 11.4; traffic 67, high 8, low 0 (6 times), average 2.6; informals 30, high 4, low 0 (8 times), average 1.2. The Signal Hill Amateur Radio Club met at the home of CTD June 3. Our Field Day station was set up on Strawberry Hill. We made 40 contacts during the short time we were on. KJZ, was the guest operator and her OM, Cliff, arrived late in the afternoon. We had 15 or more licensed operators plus several others. We operated one club station under 30 watts for the 3-power multiplier. Redfield reports good success and ascribed to the 150-watt power limit raise, permitting full output of that Viking II used. The new EMF club (Ipswitch, etc.) reports being on from 3 P.M. to 7 A.M. with two transmitters on some part of a member's farm. The call used was KØJOK. OLB, formerly of Glenham, visited Selby and other parts on June 16. KØASQ visited DVB and FLP in mid-June. CAS packed up the last day of June to go to Custer and continue building on his retirement home there. *Error:* The 2 children I reported as being at KØIAW last month should have been listed as being at KØGGB. Traffic: WØSCT 226, SIR 24, FLP 10, AIE 4, OFP 4.

(Continued on page 100)

WANTED

The Hammarlund HQ-110 is the most wanted amateur receiver in the world. The unprecedented demand for this receiver has resulted in a record backlog of orders. You may have to wait for your HQ-110, but you can be sure of one thing – its quality will not be sacrificed for the sake of speedy delivery.

REWARD

If your Hammarlund distributor has an HQ-110 for immediate delivery – grab it. Dollar-for-dollar, it's the "buy of the year."

In the meantime, if you want to read all about it, send for complete literature . . .

Established 1910

HAMMARLUND

HAMMARLUND MANUFACTURING COMPANY, INC.
460 West 34th Street, New York 1, New York

Export: Rocke International, 13 E 40th St., N Y. 16, N. Y.
Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Can.

MINNESOTA—SCM, Robert M. Nelson, WØKLG—Asst. SCM: Robert W. Schoening, ØTKX. SEC: WVO. RMs: DQL and RQJ. PAMs: JIE and LUX. Two new leadership appointments were made this month. Our new SEC is WVO, who is one of the mainstays on the Evening Phone Net and who took a very active part in the Emergency Net a few months ago. He replaces GTX, who resigned because of a too crowded schedule of activities, including RACES and MARS nets. The AREC organization has grown considerably during GTX's term. Let's continue to give it, and our new SEC, our full support. RQJ is the new RM and manager of MSN (3595 kc., 1830 local time daily). He replaces RLQ, who resigned because of his many activities in high school (senior year) and also an after-school job. RQJ is a former president of the Minneapolis Radio Club, and has many fine leadership qualities. IYP has been awarded a scholarship and will be attending the U. of Michigan this fall, and studying a new subject, "Radiation and Health." KJZ, URQ and the jr. operator vacationed in Colorado and attended the ARRL Rocky Mountain Convention. QDZ operated /Ø this summer at Mankato. RGR has completed a new 6BQ6 mobile rig. QDP spent part of the summer operating /7 on his uncle's ranch near Darby, Mont. IRJ's ORS appointment was endorsed. The Dakota Convention held in St. Paul was a big success with over 600 amateurs registering. VBD again operated /Ø at their cottage on Lake Washington, northeast of Mankato. The Worthington hams provided communications for the Model Air Show held there. KØEPT was mobile at Marshall during the flood handling emergency messages. PBI visited IIW, OJP and KØEKR in Alexandria. New EC appointments this month are FKT for Mower County, GER for Koochiching County, PHD for Red Lake, Pennington, Polk and Marshall Counties. If you are not an AREC member, become one and register with your local EC. If he is unknown to you, send your application to our SEC, WVO. *Traffic:* KØCVD 235, WØDQL 208, KJZ 137, KLG 115, WVO 72, ALW 44, QXF 25, TQQ 25, WMA 25, RLQ 24, NNG 23, OJG 22, UMX 18, QVR 16, IRJ 14, LIG 13, KØAEE 12, WØEMZ 12, KXW 12, QVQ 10, KØGUJ 8, WØRQJ 8, BUO 7, KØEPT 7, WØQZD 6, NGA 4, UCV 1.

DELTA DIVISION

ARKANSAS—SCM, Ulmon M. Goings, W5ZZY—SEC: DAG. PAM: DYL. RM: CAF. The hamfest held at Piggott was quite a success. It was a real pleasure to meet so many hams and their families there. Our congratulations to CAF on his appointment as RM. He has a c.w. net going on 3790 kc. daily at 1900. Eleven pieces of traffic were handled during the first two weeks; the average turnout has been about 10 stations. DAG has been appointed as SEC to replace VKE, whose term has expired. We wish Mac much success in this very important office. The amateurs of Russellville have formed a club known as the Arkansas Valley Amateur Radio Club. The officers are WSM, pres.; SXM, vice-pres.; KBH, secy.-treas. The club meets every Fri. night for theory and code practice for the newcomer to amateur radio. KRO has a new mobile rig. We were very happy to work and hear so many of the Arkansas hams working portable during Field Day. It assures us we have enough portable stations that could be in operation should an emergency arise. GWB and KAN have returned to operation after a long absence. We wish to welcome them both back on the air. A new ham in Osceola is KN5KQD. Traffic: W5DAG 52, KRO 13, CAF 8, ENG 6, WSM 6.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Shortly after Hurricane Audrey hit Cameron, La., on May 28, K5CTQ and K5BQT had two rigs working on 40 and 75 meters at the Cameron Courthouse handling vital lifesaving traffic. Completely isolated by power, and telephone line failure, they were the only means of communications with the outside world. In the meantime, hams all around them stood by to take and relay their traffic so that rescue work, medical supplies, food, clothing and other help could be dispatched. All news, weather reports and other pertinent information came by amateur radio. Lots of help came from the neighboring Texas hams. Participating in Louisiana, although not a complete list, were KSI who, after three days of handling traffic offered his services and equipment by going to Cameron, K5BTG, EAW, CXB, W5BSR, IYG, CCD, JTW, APH, KHC, BWZ, VTU, KQT, ZJS, ZJT, JBW, ZAK and QJT. CCD handled 405 messages, not including innumerable phone patches. C.d. communications under K5BES did an outstanding job. A hamfest is scheduled for Oct. 13 at New Orleans. K5AGJ has a good traffic count because of "Audrey." The Natchitoches ARC had a picnic July 4. KN5KAA and KN5KRR are new Novices. JGI is home for the summer and running a kw. on 75 meters. K5HXY is getting the 6-meter mobile rig ready, which will run about 100 watts. FYZ installed c.d. rigs, assisted by BMD

(Continued on page 102)

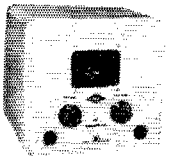
new

completely... brilliantly new!

GONSET

COMMUNICATOR III

Introducing a new series of complete VHF station "packages" . . . for 2 and 6 meters . . . for ground-to-air and other VHF applications.



New Linear Amplifier

These modern successors to the highly regarded Communicator family combine, in a single unit, all the features found previously only in several different models. Communicator III offers you these advantages as well as many more important, wholly new features for improved performance and operating convenience.

Now . . . for even better performance . . . .

for every model in every frequency range . . . the following:

- Modern inside and out. Finished in attractive Alpine White enamel with knobs in Gun Metal Blue. Cabinet size is approximately the same.
- 6V DC and 12V DC and 115V AC. All three. One vibrator. Simple inside strapping changes voltages.
- Full, press-to-talk operation. (Actuated by button on microphone) Transmit-receive switch on panel can be used if desired.
- Receiver: New low-noise X155 RF tube in sensitive "Cascode" with AVC to avoid blocking tendency from very strong locals. Special gang-tuned circuits provide new high order of image rejection. Improved I-F selectivity. Gonset noise limiter. Adjustable squelch. Earphone provisions.
- Full-vision slide-rule-type tuning dial.
- Squelch for silent standby. Control on panel.
- Transmitter: All tunable circuits now have panel knobs. New gang-tuned circuits reduce spurious responses to negligible values. New 6L6GB modulator tube gives heavier modulation.
- Panel meter replaces "Green eye." Meter switches to exciter or RF output or to receiver for indication of relative signal level.
- Provision for 6 crystals with panel selector switch. (Also operation with external VFO.)
- Silicon diodes eliminate rectifier tubes.
- New line includes Linear Amplifiers in all frequency ranges and entirely new VFO which has ranges for both 2 and 6 meters.

less microphone and crystals. **269.50**

Deliveries start in September. Better get your order in now

GONSET
BURBANK, CALIFORNIA

DIVISION OF L. A. YOUNG SPRING & WIRE CORPORATION

GONSET

and IYT, who did all the tree- and tower-climbing. BMD operated K3BSA at the National Boy Scout Jamboree July 10-19. JAW is on the air with a new rig. K5CME will be portable from Oak Ridge for the next two months. Send reports on time. Traffic: (June) W5CCD 405, K5AGJ 278, W5UXE 174, HNS 88, MXQ 31, 1HI 20, JAW 11, K5HXY 6, W5BMD 4, EA 4. (May) W5UXE 526, K5AGJ 187, W5NDV 120, MXQ 84, 1HI 35, K5HXY 12, W5JAW 8, BMD 6, EA 4.

MISSISSIPPI—SCM, John Adrian Houston, sr., W5EHH—The Cleveland Amateur Radio Club's Fourth Annual Picnic held June 9 was well attended, amateurs from five states being present. K5BKK is home for the summer vacation from school in Virginia and is very active on 75- and 15-meter phone and 20-meter c.w. K5DLN may be heard on week ends fixed portable from his cabin on Lake Beulah. K5EEC and EXG both recently purchased Globe King transmitters. The Cleveland Club meets every other Fri. night in its recently-completed clubhouse. K5HPV, HPX and IEW may now be heard on 75-meter phone instead of 40-meter c.w. Traffic: W5JHS 136, RIM 32, EHH 20, GG 10, K5BKK 6.

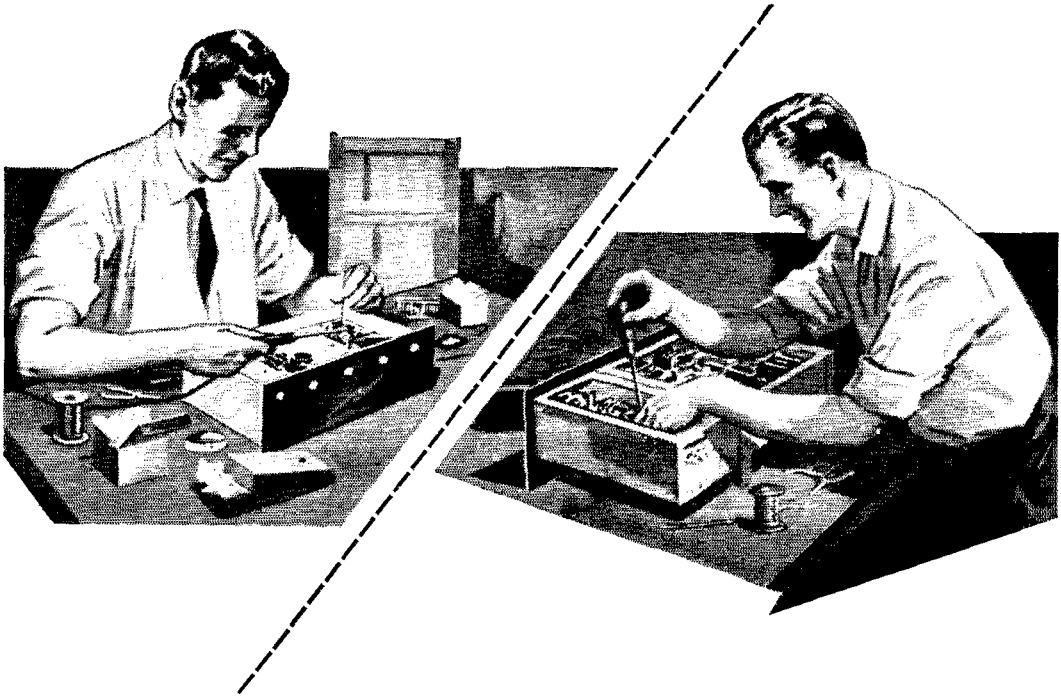
TENNESSEE—SCM, Harry C. Simpson, W4SCF—SEC: RRV. PAM: PQP. RM: IV. Congratulations to PFP, who is the proud new owner of an NC-300, compliments of the Memphis Hamfest. It matches his Valiant very nicely. PL, with another fine total, reports his XYL is in a Chattanooga hospital. Very nice bulletins were received from the Alabama Section, Kingsport and Memphis Clubs and Alabama MARS. WQT, making like Times Square, visited NGO, CZE, BQG, BMI and GEN, in addition to attending four hamfests. In turn he was visited by GGM, PQP, WTP, KPP, AGC, VKE, ACG, MYD, CVM and GEN. FLW monitors 50.1 Mc. 10 hours daily. ZBQ and TDZ both report fine auroral openings on 6 meters June 30. ZBQ says c.w. conditions were particularly good. K4DJO profited from the same openings by working three new states, bringing his total to 45. EWC has *two* accomplishments this month—working a UA2 on 75-meter phone and teaching SCF how to renew engraved letters on receiver panels. He can be contacted for details on the latter. PAH invited all old members of ETPN to renew their activity on this fine net. K5CME 4 is now active from Oak Ridge on 40-meter s.s.b. 5A4TC ex-K4WCL, is looking for friends on 20 meters. Field Day messages were received from /4s WQT, COY, EM, KTD, SKH, TRC, DYE and the Harpeths Valley ARC. IGW introduces new Humboldt hams K4LMH and ex-KL7BIV, K4POI. The Humboldt ARC station made 318 contacts during Field Day. ZJY, now awaiting an "F" call, would like to hear from his friends, who may write him at 1272-1 AACS Det., APO 84, N. Y. Traffic: W4PL 1451, W5RCF 736, W5IGW 84, VJ 63, OGG 52, IV 46, SCF 34, EWC 29, UVL 29, DCH 26, YRM 26, K4BMC 18, GFL 17, W4SRK 11, MKQ 9, FLW 8, HUT 6, PAH 6, HSX 5, TDZ 4, WQT 4, ZBQ 2, CME 1, K4HSN 1, W4IFN 1, KN4LSP 1, PLC 1, W4PVD 1, TRC 1, TYV 1, WQW 1, ZIA 1, ZJY 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Albert M. Barnes, W4KKW—SEC: JSH. PAMs: VJV and SCD. RM: QCD, JUI and HTO a father-and-son combination, both OES, turned in a very interesting and comprehensive report on temperature inversion and Sporadic E skip on 6 meters. JUI walked away unhurt from a car accident that completely demolished his car. K4KIN is going back to college. Meantime K4KIO will operate the rig. K4GAG has a new home-brew 813 rig running 260 watts on 20-meter DX. K4ICN also is building a new high-power rig. It is with great regret that we announce the passing of BZT, of Southgate. Earl was an old-timer active on 10 and 15 meters and helped in Field Day contests, too! New OPS: SZL. New ORSs: K4KIN and K4KIO. RM QCD reports that KYN handled 253 messages in 30 sessions with an average of 8.4. A new station checking in KYN is K4JPP, Ft. Campbell. QCD also delivered 19 messages from a homesick soldier in Germany with lots of relatives around Corbin. KKG made a vacation trip to the West Coast and saw lots of his W6 friends. W4KWR, secy.-treas. of the ARTS, visited Ye Old SCM and we had a nice ragchew. PAM SCD helped out in Cameron and Lake Charles after Hurricane Audrey struck. The Amateur Radio Emergency Corps (AREC) assisted Northern Ky. Auxiliary Police in handling auto parking July 4. Participants were AUD, RHZ, BZY, K4KFO and TZT. SEC JSH reports the total number of AREC members is 163 with 151 full members and 12 supporting. There are 27 official mobile units in the section with 12 local emergency nets in operation. PAM VJV reports KPN held 26 sessions with a total QNI of 502. Traffic was 96. DAF is going to college. Traffic: (June) W4ZDB 390, KKW 141, QCD 126, K4KIN 105,

(Continued on page 104)

Dependability



for building.... or rebuilding

Mallory has been a respected brand name in electronics for years. Long recognition and widespread acceptance are not easily earned—they come from continuous engineering and proof of performance.

Mallory vibrators, for example, offer up to twice as much life—from a completely new concept in contact design. This innovation also reduced driving power requirements and virtually eliminates mechanical noise.

Mallory research and development gave the industry Mallory FP capacitors. Featuring etched cathodes and fabricated plates, these long-lived units hold their rated capacity longer—even under severe service.

Good designs like these are part of Mallory's unceasing efforts toward complete dependability—toward making the best possible components for new circuitry or for rebuilding.

That's why you, as an amateur—as a hobbyist—as a service technician—or a professional engineer, can rely on Mallory components for any service. See your Mallory Distributor today—for all your component needs.

P. R. MALLORY & CO. Inc.
P.O. Box 1558
INDIANAPOLIS 6, INDIANA

P.R. MALLORY & CO. Inc.
MALLORY

W4JSH 74, RPF 45, BAZ 42, K4KIO 41, HBF 34, W4RHZ 28, CDA 14, MWX 14, K4IMW 11, W4KKG 11, SZL 8, BZY 2, JUI 2.

MICHIGAN—SCM, Thomas G. Mitchell, W8RAE—Asst. SCM (e.w.) Joe Beljan, 8SCW; Asst. SCM (phone) Bob Cooper, 8AQA. SEC (acting): RAE. Since my vacation schedule dictates that this report be filed before the traffic reports arrive, the next report will contain traffic totals for both June and July. This is an opportune time to report to all members of this section on the results of the RACES meeting held in Lansing on June 15. That meeting was called by RDN, who is the new State RACES Radio Officer as reported last month. The purpose of this meeting was to determine the status of AREC and RACES in Michigan. Persons in attendance included about half of the Area Radio Officers, representatives of the Michigan office of Civil Defense, and guests interested in the subject of RACES. It was most gratifying to witness the sincere interest in amateur radio facilities, as expressed by MOCD representatives, and to hear first-hand the plans that they have to integrate our service. Mr. Hemmye (RDN) is very well qualified for the new appointment and we are most fortunate to have such a person in that position to represent our interests. The agenda included topics presented by MOCD officials, SOX reporting on "RACES and State Communications," WFA reporting on "Area Organization Methods" and RAE reporting on "AREC and RACES". It was agreed that the present AREC and RACES organizations would remain the same except for changes in a few appointments that may be deemed necessary because of inactivity or lack of interest. Until such time as the existing RACES plan can be modified, we will use the facilities of the existing MEN and QMN nets to handle state traffic during drills and tests. Plans were submitted for approval to hold several similar meetings during the late summer and early fall to revise the present RACES plan and to make such changes in the organizations as will stimulate both AREC and RACES to the necessary level of efficiency and dependability. At the close of this meeting all present felt a sincere unified effort on the part of all toward the common goal. It is very evident that the MOCD needs and wants our help. Let's all assist our AREC and RACES officials in every way possible.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCMs: J. C. Erickson, 8DAE, and E. F. Bonnet, 8OVG. SEC: UPB. RMs: DAE and FYO. PAMs: HPP, HUX and HZJ. K8EKG has a new 40-meter Zepp. VZ received Worked All Ohio Counties certificate No. 5. K8DHU received his General Class ticket. The Belmont County C.D. RACES plan has been approved and the call is K8EEM, with YCM as Radio Officer and HZJ as Director of Communications. CGF has a new Viking II. CSK and BAI graduated from high school. The Denison U. RC has put out a bulletin and it tells us they have KN8DNE, DON, EKI and EKJ as new hams. DNE and EKI are father and son. On June 8 the Fulton County ARC put on a three-hour show with talks, exhibits of modern and old spark gear, mobiles and demonstrations for a Boy Scout Camparee near Defiance with DFN, UPR, ZHQ, VAQ, SXU, SMW, JR, K8s BJL, CSX, CLI and KN8BNP taking part. PBX has a new 6-meter beam 65 feet high. 4OMW was forced to give up the editorship of the Ohio Valley ARA's *Ether Waves* because of a heart condition. KVX was appointed to fill his shoes. JJW received a painful arm injury while helping JIN to erect his new 97-foot steel tower. K8CAG and K8DEY received their General Class tickets and CAG has a new WRL-300. AJW and TZO are now RSGB members. The Toledo CARMAR Club is being reactivated and will use WSX during Field Day. K8BNR had a close call with the grim reaper while working around 13,000 volts at work and spent a long period in the hospital with a badly-burned face, arm and chest. TND also spent many weeks in bed at home with gangrene in both feet. ZS2HX visited nine days in Toledo with local hams. On Father's Day OPU, his XYL OPV and VTP visited your SCM. Canton hams had a rash of babies, OJW and PZG each a son and OJZ a daughter. SWB left on a hitch in the Navy. SP2DG, on 14,050 kc., is trying to work all of the Ohio counties, so try to give him your county and get a country at the same time. Forgot to mention in last month's report that NBK was the high 14-Mc. c.w. scorer in the 8th District in *CQ*'s DX Contest. JND has finished boot camp and will be going to an electronic school soon. The stork brought a baby boy to VFI's XYL. ZYU received a QSL from UC2KAB. GKB worked VS6DV on 21-Mc. c.w. The Cuyahoga County AREC had a busy month. First it furnished communications needed to control Cleveland's Flag Day parade, with AEU, BDZ, LHX, PZR, VM and K8ABA taking part. Second, Cleveland had a tornado alert and 45 stations in 27 surrounding communities

(Continued on page 106)

Printed Circuit OSCILLATORS

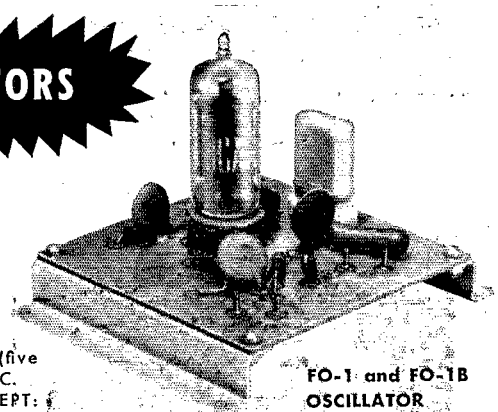
The operating tolerance of a crystal is greatly affected by the associated operating circuit. Because of our precision printed circuits and quality components, the use of the FO-1 oscillator in conjunction with the FX-1 crystal will guarantee close tolerance operation—up to .001% if desired.

FO-1

Fundamental Operation, 200 KC to 15,000 KC.
Available in kit form, or wired and tested. Tolerances of .01% and .005% with appropriate FX-1 crystal.
Tolerances of .0025% and .001% available only in wired and tested form, together with appropriate FX-1 crystal.

FO-1B

Overtone operation (five bands) 15 MC to 60 MC.
Same as FO-1, EXCEPT: please specify which band coil you desire in these five ranges:
15-20 MC, 20-30 MC, 30-40 MC, 40-50 MC, 50-60 MC.



FO-1 and FO-1B OSCILLATOR

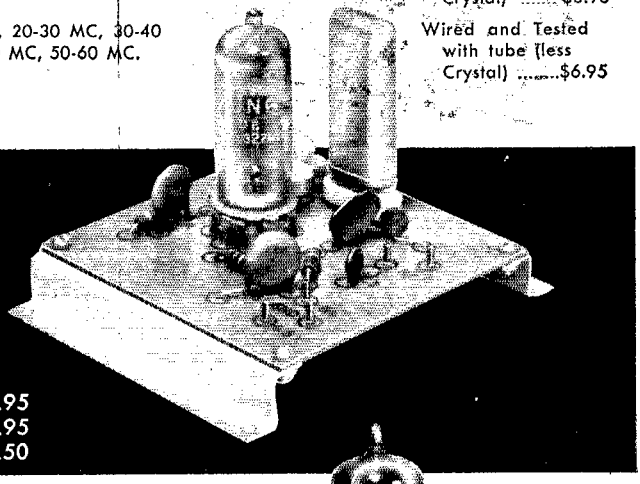
Kit (less Tube and Crystal) $3.95

Wired and Tested with tube (less Crystal) $6.95

FO-1L OSCILLATOR

Printed circuit oscillator for band-edge calibrator and frequency standard use.
(Additional requirements:
Power 6.3 volts AC @ 150 ma
150 volts DC @ 8 ma)

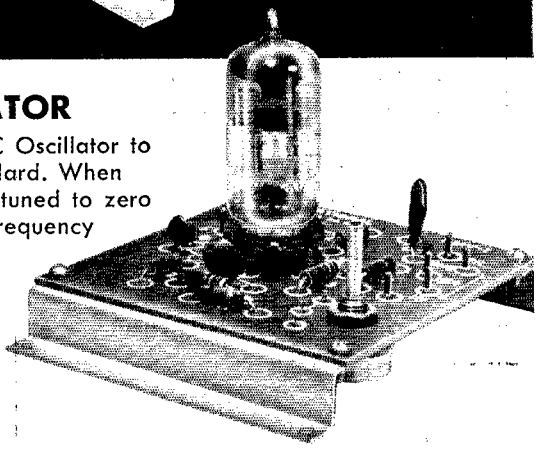
Kit Complete with
Tube and Crystal.....$12.95
Wired and Tested.....$15.95
100 KC Crystal Only.....$ 8.50



FMV-1 10 KC MULTIVIBRATOR

Used in conjunction with the FO-1L 100 KC Oscillator to form a complete secondary frequency standard. When the FO-1L 100 KC Oscillator is accurately tuned to zero beat with WWV transmissions, precise frequency measurements to 30 MC can be made. (Additional requirements: Tube—12AT7; Power—6.3 volts AC @ 300 ma; 150 volts DC @ 15 ma).

Kit, less tube.....$5.95
Wired and Tested, with tube.....$8.95



HOW TO ORDER

For fastest possible service, International Units and/or Crystals are sold direct. When cash accompanies order, International pre-pays postage. Otherwise, shipments are made C.O.D.

FREE CATALOG
For future reference, send for FREE Catalog showing International's complete line. Crystals available from 60 KC to 100 MC.

International
CRYSTAL MFG. CO., INC.
18 N. LEE OKLAHOMA CITY, OKLA. PHONE FO 5-1165

checked into the 10- and 6-meter nets. Those in the 6-meter net were TFW, TXC, CTP, NRI, CWW, LHX, QLS, UDL, UKC, FFA, HZY and K8BXY. Those in the 10-meter net were AEU, OPX, BDZ, NZC, OHJ, VBN, OPC, SKG, MWE, BUQ, UEM, OED, ZJQ, MAE, QXS, OJR, INW, FKB, OKI, SGO, FFK, WLM, CYT, RDP, LVM, BMX, OYS, JFD, PVC, K8s CFH, EDJ and AET. The stork brought SZU's XYL a baby boy. The South East ARC of Cleveland had 14 pass their Novice Class examinations and receive their tickets, so the club's code class was a big success. Those licensed are KN8s GEK, GGU, GGV, GGW, GGX, GGY, GHR, GIH, GJE, GJI, GJJ, GJK, GKC and GKD. K8BPX received WAC as a Novice. TCT is mobile on 6 meters. Toledo ARC's hams of the month are those on the TVI committee, namely, BZD, HSW, RZQ and TQY, for their untiring work. AMW has a twelve-element beam on 2 meters. The stork brought a baby girl to BTW and his XYL LGY. SUP won the Bishop's gold cross for religion when he graduated from high school. STF is now mobile. CSK made BPL in June. A new appointee is UPH as OPS. Traffic: (June) W8UPH 488, K8BPX 319, W8CSK 310, DAE 96, HXB 56, VYU 44, GKB 43, SZU 43, K8DDG 27, W8AL 26, CGF 12, GQD 9, QIE 8, SVL 6, FFK 4, MGC 4, MXO 4, STR 4, LMB 1. (May) W8MXO 9, K8BPX 8, W8SVL 4.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: KGC. RM: BXP. PAMs: IJG and NOC. Section nets: NYS on 3615 kc. at 1900 EDST, NYSPTEN on 3925 kc. at 1800 EDST, Civil Defense Command Nets, 3993 and 3509.5 kc. Sun. at 0900 EDST, MHT on 3716 kc. Sat. at 1300 EDST. From all reports Field Day 1957 was very successful, as evidenced by six reports received by the SCM. PHX says the new vertical for 80 meters has low SWR but little radiated signal. K2EDH is off the air until September. An overloaded generator caused trouble on Field Day for the Harmonic Hill Club. They'll do better next year, reports WQL, new editor of their *Zero Beat*. K2RUU is teaching RTTY to his Naval Reserve Unit. The June 16 communications drill proved our State C.D. Command Nets can move traffic when a clear channel is available. Fifty messages were handled in three hours at State Control Center, according to BGO. Their three channel RTTY system can handle upwards of 700 words per minute with two transmitters and seven receivers at the main station of the system. 15 meters enabled a serviceman at KZ5JS to obtain leave to visit his critically-ill mother in Troy through K2HPQ. Nice work, Dave. New appointment: K2TCD as OO. NYSPTEN reports 10 call-ins over a period of two months qualifies new members for net certificates. K2HNW, professor of physics at Union College, spent the summer teaching in California. Traffic: (June) W2BXP 170, EFU 127, K2HPQ 78, W2PHX 74, K2QVA 68, W2LKI 38, GCH 18.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannals, W2TUK—SEC: ADO. PAM: OBW. RM: WFL. Section nets: NLI, 3630 kc. nightly at 1930 EDST and Sat. at 1915 EDST; NYC-LIPN, 3908 kc. Mon. through Sat. from 1730 to 1830 EDST; NYC-LI AREC, 3908 kc. Sun. at 1400 EDST. The traffic nets are a little short-handed during the summer season, but all nets continued their fine performance. Credit goes to the stalwarts who keep the traffic moving. BPL cards go to W2s KEB and KFV and K2PHF. Field Day enthusiasts enjoyed one of the most successful FD week ends in postwar history, with excellent weather and radio conditions providing high scores. K2ECY has a new NC-300. K2DEM operated portable from camp at Peekskill. New officers of the Bronx HS of Science RC are K2IYC, pres.; K2YMZ vice-pres.; and K2QDD, secy. TUK installed a new Gonset Bantam beam on 20 meters to keep skeds with his Dad, 2GG/4, in Florida. K2SEK increased power to 60 watts and reports into both the Phone and C.W. Section Nets. The Larkfield ARC is a newly-formed club in the Northport Area. CEV, Staten Island, has returned to the NLI Net after a long absence. K2TGW is the first YL to get a ticket at BVH, the Thomas Jefferson HS. HQL received his DXCC-180 sticker. Joe has a wonderful set of color pictures of Navassa Island, where he and IWC worked more than 300 stations in less than ten hours of DXing. K2CMV added a Q-multiplier to his HQ-129X. K2IDD has a new NC-300 to go with his DX-100. K2KRJ joined the 10-meter mobile ranks. BXS and his XYL, K2ESO, welcomed their fourth addition—a fourth daughter! New officers of the Nassau RC are K2HEA, pres.; M. Levine, vice-pres.; NYN, secy.; and KN2YAL, treas. K2s PFA and RTE are at camp in Port Jervis. K2RNV made WAS on 7 Mc. KN2VGV is operating on 40 meters and is planning 6-meter fixed and mobile work. New officers of the

(Continued on page 108)

Columbia University ARC are 5YHV, pres.; K2CUI, vice-pres.; K2ABA, secy.; K2VXX, treas.; ZTD, comm. mgr.; ITTV, tech. dir.; K2JYD, c.d. dir.; and 1SDO, trustee. K2RKL added an HRO-50TA1 to his station plus crystal converters for 220 and 420 Mc. LPC is mobile with a G66-B and G77. ONF moved to Suffolk County. KN2YJC sports a new beam on 15 meters. OTC has a new 75A-4. BTP spends time on 75 meters with a B&W s.s.b. rig. HAE is enjoying his newly-acquired 75A-3. MGG and LHH are radio-controlling model airplanes. K2JYH chases DX with his fine DX-100, NC-300 and WRL tri-band beams.

NYC-LI SECTION QSO PARTY SEPT. 7-8, 1957

The New York Radio Club announces a New York City-Long Island Section QSO Party in which all amateurs are invited to participate. Details follow:

1. *Times:* 24-hour week-end contest starting 1800 EST Saturday, Sept. 7, and ending 1800 EST Sunday, Sept. 8. 2. *Frequencies:* Use all bands, phone and c.w. The following frequencies are suggested: 3630, 3910, 7060, 7265, 14,060, 14,240, 21,080, 21,350, 28,890 kc.; 50.1 and 144.5 Mc. 3. *General call:* Outside stations call "CQ New York-Long Island," or "CQ NLI" on c.w. Stations in the section call "CQ from New York-Long Island" on phone and "CQ de NLI" on c.w. 4. *Exchange:* NYC-LI stations send QSO number, RS or RST, and county — Bronx, Brooklyn, Nassau, New York (Manhattan), Queens, Richmond (Staten Island), Suffolk. Outside stations send QSO number, RS or RST, and state, province, or country. Use log form similar to that for SS. 5. *Scoring:* Count 2 points per completed QSO, multiplied by the number of counties or states, provinces, or countries. Multiply this total by 1.25 if input power is under 150 watts at all times. Only one QSO per station will be counted regardless of bands used. 6. *Awards:* A certificate will be issued to all those working the 7 NYC-LI counties during the party. The highest scorer in each NYC-LI county will earn a certificate. Also the highest scorer in each outside state, from which more than 2 entries are received, will earn an award. Finally, first, second, and third place stations, both in and out of the section, will receive a certificate. Multioperator stations are ineligible for awards. 7. *Logs:* Send logs to M. M. Freedman, W2ASI, President, New York Radio Club, 3 Channel Drive, Kings Point, L. I., New York. Logs postmarked later than October 1 will be disqualified. The decisions of the contest committee will be final.

BCNU September 7 and 8!

K2PHC is using verticals on 15- and 20-meter phone. New officers of the Bell Labs ARC are K2AMT, chairman; DAC, vice-chairman; K2OXV, secy.-treas.; and KN2ZBI, librarian. K2SEK wishes to announce the beginning of the Long Island Novice Net (LINN) on 3745 kc. Mon. through Sat. from 1800 to 1845 EDST. All interested Novices and others are invited to participate and report their traffic totals to the SCM. K2MEM runs 100 watts and receivers on an ARR-7. 9FDI 2 at Mitchel AFB runs a Viking Ranger as a mobile rig. The New York RC sponsors the first NYC-LI Seticon QSO Party. Details appear in this issue. Hope to see the section well represented. Traffic: (June) W2KEB 1904, K2PHF 514, W2KFV 509, K2ECY 243, W2BO 128, K2DEM 121, LUM 75, W2DRD 65, AEE 61, JGV 36, K2RJO 32, W2TUK 30, K2PSE 25, KSP 20, SEK 19, W2YKQ/2 17, K2AAW 14, W2EC 14, PF 14, K2MEM 10, W2CEV 8, K2LEP 6, TSE 6, W2IVS 5, OME 5, K2DQD 2. (May) W2HAC 18, UGF 15, OME 6, K2ITZ 3, RKL 1.

NORTHERN NEW JERSEY—SCM, Lloyd H. Manamon, W2VQR—SEC: IIN. PAM: VDE. RMs: BRC, NKD and CGG. K2AJV passed the Extra Class exam. The GSARA has completed its first code instruction class under the supervision of Don Marx. Fifty signed up for the course, eleven have taken the final exam with nine passing. K2IRC is mobile on 6 meters. The Lakeland Amateur Radio Assn. held its second annual hamfest on Aug. 4. PWX is spending some time in New Mexico. While there he keeps in contact with K2MGO, his son, who keeps the home fires burning. JCU and IMU are active in NJN after a long absence. IMU will be operating from the schooner *Lively Lady* en route to Bermuda. BRC vacationed in Upper New York State where the fishing is good. The IRAC en-

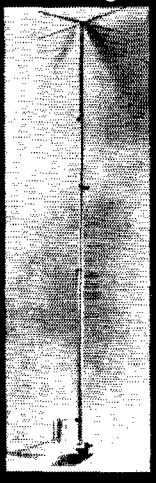
(Continued on page 110)

Beware of Imitations!

INSIST ON HY-GAIN'S ORIGINAL INSU-TRAP VERTICALS,
TESTED & PROVEN IN THE WORLD'S HAM SHACKS!

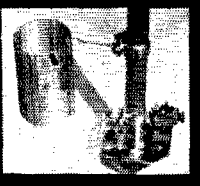
the Only Low-Cost BANDSWITCHING VERTICAL ANTENNAS that Really Work!

the hy-gain Economy Toppers

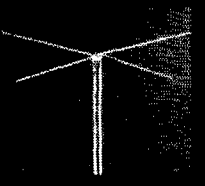


Economy Toppers offer multi-band vertical operation with manual bandswitching at the lowest possible cost, allowing the ham to save money while saving space. Proper operation on all bands is maintained by the correct tapping of a base loading coil furnished with each system. Antenna comes complete with vertical aluminum mast sections, loading coil, polystyrene base insulator, coil tapping clip, base mounting plate and universal guy rope or side mount bracket and bracket insulator, all necessary hardware and complete instructions.

Sensational new Insu-Trap, the only tunable, weatherproof trap circuit, maintaining low SWR on the 10-40M bands. Allows for automatic bandswitching and isolates the various sections of the Auto-Toppers.



Hi-Q base loading coil for maximum efficiency on 80 and 160 meter bands. Positive connection through pressure tapping clip.



New "capacity hat" electrically lengthens the vertical and increases radiation efficiency. Included with all Toppers.

40-V (for 40-10M) ONLY $18.95

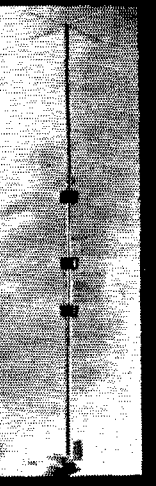
80-V (for 80-10M) Only $19.95

40-AV (for 40-10M) ONLY $27.95

80-AV (for 80-10M) Only $29.95

To include the 160M band, add $3.00 for the 160-V or 160-AV

the hy-gain Auto Toppers



Similar in general design and appearance to the Economy Toppers with the exception of the three revolutionary Insu-Traps, the Auto-Toppers offer automatic bandswitching 40 through 10 meters, and maintain exceptionally low SWR on all bands through use of three sensational weatherproof Insu-Traps, and a base loading coil on 80 and 160 meters. All Toppers are calibrated for fone and CW on all bands. Comes complete with all parts listed for the Economy Toppers, plus the three Insu-Trap sections.

and the complete line of hy-gain ANTENNA PRODUCTS!

IN STOCK AT LEADING AMATEUR RADIO DISTRIBUTORS EVERYWHERE

Write for Complete Brochure!

hy-gain antenna products

1828 N STREET LINCOLN, NEBRASKA

joyed a talk given by K2GQ on RTTY. IMM was elected vice-pres. of IRAC. K2GIF went on vacation to Cape Cod. K2TWK has a new v.f.o. K2OAM is interested in establishing a 2-meter net for traffi-handling. K2SKK reports RTTY installation at his home QTH, 1ZXA, now is complete. K2PLF is getting started in traffic work and likes it a lot. His dad, K2TEO, has just received his General Class license. K2JTV is active in the NJFN. RXL occasionally shoots for 20-meter DX. KFR operated 10-meter mobile while on vacation on Cape Cod. K2RIC is a regular member of the FNJ. Bob has a new all-band rig in the planning stage. The NJFN's annual picnic was a huge success with 45 net members attending. VDE has started an AREC net on 3900 k. Sun. at 1400. The New Jersey Phone Net members now have call letter lapel pins. K2CHI has joined the Air Force and is stationed in Texas. WN2FEQ is a new Novice licensee in N.N.J. K2EFA graduated as E.E. from Rutgers and will do post-graduate work at M.I.T. IAT is getting back on the air with a new 811 rig. EKU should be back on the air soon. K2PSX is building a new 150-watt rig. K2OAM is active in Fairlawn RACES organization. The Forty New Jersey Net has issued its second in a series of net bulletins. K2AJV is the extraordinary editor-in-chief of this excellent net bulletin. K2MFF had the rig with him at Boy Scout camp. K2RKH has a new 20-A exciter. On June 15 FNJ conducted a field trip and the following shacks were visited: K2OIY, PYL, RKH, QYI, MMM, RIC, TNJ and AJV. A new ham in Belleville is WN2LIL. GVU is back from a trip to California. K2UQY lost his antenna during a storm. New Jersey amateurs and the entire state RACES organization did a tremendous job during "Operation Alert '57." The State Director of Civil Defense has asked that his sincere thanks and appreciation for a job well done be expressed through this column. State RACES control has added a new 150-ft. tower with 144-Mc. antenna atop the new tower.

Preliminary tests show that most of the State can be covered with ease on the 2-meter channel. The new installation is one in a series of improvements that are planned for all-band operation at state control. The new tower is a ham's dream, self-supported 150 feet straight up with the new type 4X "Station Master" antenna on 144 Mc. extending up another twenty feet above the tower apex, total 4X-gain omnidirectional with Styroflex feedline and Gonset final on the station end. Traffic: (June) K2GIF 222, BHQ 188, MMM 119, OAM 101, W2BRC 98, K2MFF 65, RIC 61, MLW 71, W2VDE 57, MLW 71, RXL 56, KFR 44, K2BHQ 42, MFX 42, OAM 36, AJV 34, TNJ 27, QYI 23, PLF 18, W2CYW 17, K2BWQ 16, W2WOJ 14, OXL 12, K2PCO 10, W2VMX 8, NIY 6, K2SKK 2. (May) W2VMX 15.

MIDWEST DIVISION

IOWA—SCM, Russell Marquis, WØBDR—1NJM, National EC, was guest speaker at the Des Moines Club meeting on June 12. NWX, LGG and BDR also were present. The 160-Meter Net held its annual picnic near Grand Junction. Seventy-seven hams and their families were present. NWX and BDR gave brief talks. JAD and KØEXN received EC appointments. MG renewed his SEC appointment. Also the following were renewals: LGG and QVA as RMs, UTD, NYX and QVA as ORSs and JDV as OBS. Section Net certificates were issued to the following TLCN members: KØCLS, CYF, GBD, GXC, WØCOD and SLC. KSF is on the air with a new DX-100. GXQ and FMX were on vacation. YDV has a new 75A-4 and Tri-Band beam. Several clubs and groups were active in the Field Day exercise. NWX visited the Sioux City Club. KØGBD has a new RME-4300, SCA has a new de luxe shack complete with TV and rocking chair. YUA and DPT, father and son, went on a fishing trip to Minnesota. LCX missed his first BPL in several months because of remodeling the shack but promises to be back hard at it next month. EHH, mobile, originated traffic from a church conference near Fairfield. Traffic: (June) WØBDR 1469, SCA 1149, PZO 1075, LGG 807, CZ 402, BJP 392, LCX 250, GXQ 204, QVA 143, KØCLS 79, WØBLH 72, LJW 65, NYX 35, KØBRE 34, WØKVJ 34, KØCYF 29, WØNGS 28, FMZ 25, UTD 20, KØCFB 16, WØVWF 14, KØEXN/Ø 10, GBD 9, GXC 9, WØSLC 7, HNE 4, FDM 1. (May) WØBLH 149, KØDON 16. (Mar.) KØAHZ 15. (Feb.) WØAHZ 7.

KANSAS—SCM, Earl N. Johnston, WØICV—SEC: PAH. RM: QGG. PAM: IEW. Did you note our new PAM? Yes, FNS decided to let someone else take the helm as PAM. Bake has done an outstanding job in looking after the KPN so conscientiously and although his work will be missed we know he surely deserves a long rest. We wish to welcome LEW, of Yates Center, to the post. Bob has an outstanding signal that is heard all over the State and we feel sure he will do a good job with the KPN. All of us deeply mourn the

(Continued on page 112).

Morrow
MBR-5

GREATER SELECTIVITY

"13 tubes, and what do you get? The power and performance of a 20-tube set!"

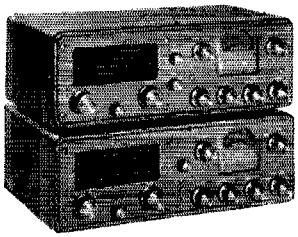
Advanced Morrow circuitry gives the MBR-5 amazing performance in a rugged, compact unit offering more features and more value for your money.

HIGHLY SENSITIVE (½ microvolt on all bands) 100 kc. Crystal Standard built in.

EXCLUSIVE SQUELCH CIRCUIT eliminates interstation noise, but opens on the weakest signal.

SSB, CW, AM RECEPTION. Separate AVC switch.

ILLUMINATED "S" METER measures incoming signals, doubles as field strength meter for tuning transmitter.



COMPACT AND HANDSOME. 4" high, 11¾" long, 6½" deep. Hammertone case matches MB-560.

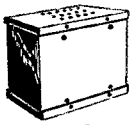
MBR-5 Amateur net, $224.50

less power supply

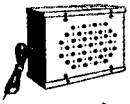
FOR CONVENIENT TERMS, SEE YOUR NEAREST JOBBER

Matched Accessory Equipment

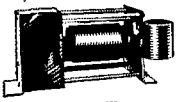
MB-560 TRANSMITTER
"More talk power" on all bands.
90-watt CW, 60-watt Phone.
Amateur net **$214.50**



RVP-250 POWER SUPPLY
Mobile vibrator pack for MBR-5 and exciter of MB-560.
Amateur net **$39.50**



SH-7 SPEAKER
5"x7" speaker in sturdy hammertone case. Amateur net. **$11.50**



MLV-50 INDUCTOR
Motor driven for remote control tuning of whip. Amateur net. . . . **$24.95**

FS-1 FIELD STRENGTH METER
Measures field intensity.
Amateur net **$19.50**

FREE DATA SHEETS — WRITE TODAY!

QUALITY M AND PERFORMANCE

MORROW
radio manufacturing co.

2794 MARKET STREET • SALEM, OREGON
801 Dominion Bldg., Vancouver, B. C.
Prices and specifications subject to change without notice.

passing of FLZ June 19. It was a shock felt by all of us. NIY has received his seventh Armed Forces Day c.w. certificate. From the messages received it appears that more than ten radio clubs participated in Field Day. UWN, of Waterville, has put the finishing touches on 6 Novices who have taken their exams and he is starting a new class this winter. KNØKOH is a new call in Waterville. TOL, of Manhattan, likes his new Matchstick antenna that works so well. ICV (yours truly) is off the air temporarily because lightning hit the grounded tower. The juice followed the rotator cable in the shack—everything else was grounded. Traffic: (June) WØBLI 638, NIY 267, QGG 203, TOL 199, FNS 153, KØBXF 127, KNØHSF 85, WØIFR 79, UOL 63, ABJ 44, ONF 31, TNA 13, ICV 10, SAF 10, ASY 9, WWR 9, VZM 7, LEW 5, TEZ 5, VGE 4, KØAOQ 2, BVX 1, WØLOW 1. (May) WØUTO 7, LOW 3.

MISSOURI—SCM, James W. Hoover, WØGEP—SEC: BUL. RMs: OUD and QNO. PAM: BVL. The St. Louis RACES group has had several workouts handling communications for the C.D. Auxiliary Police during the flooding of the Mermac River. The June and July issue of *Midwest CLIXS*, published by KXL/NIY, described amateur emergency communications following the recent devastating tornado in the Kansas City Area. KØHQQ reports that the Ozark Emergency Storm Net has been organized on 29.1 Mc. KØDEX has a new 6-KVA gasoline-driven generator. CPI reports that hurricane traffic boosted his traffic this month. Several reports indicated very successful hamfests held in Sedalia and Moberly during June. CIA, ICW and KØBRA are operating s.s.b. in Springfield. GCL has returned after several months of work out of the State with the CAA. Two new ARRL Affiliated Clubs are the Missouri School of Mines Radio Club and the Trico Ham Radio Club. The 6-Meter Activity Club Net, Kansas City, meets on 50.4 Mc. at 2100 each Tue. The Midwest Teenage Phone Net has moved from 75 meters and is now operating Tue. and Thurs. on 7273 kc. at 1500 CST. KNØHQN reports working two Puerto Rico Novices on 40 meters. UXT and MHS have qualified for Traffikers 1000 Certificates. The SCM and SEC received only five messages from Field Day stations, but a much greater number were known to be operating. Traffic: (June) WØCPI 1031, GAR 584, GBJ 217, VPQ 102, OUD 96, OMM 78, KIK 71, IIR 56, EBE 21, KØHQQ 19, WØHUI 19, WFF 19, YVM 18, KØHBT 16, WØWYJ 14, BVL 11, BUL 10, CKQ 10, LQC 10, RTW 10, EPI 9, OVV 9, KØDEX 4, IFL 4, IHY 3. (May) WØVPQ 135, EBE 43, LQC 7, WAP 7.

NEBRASKA—SCM, Charles E. McNeel, WØEXP—Field Day activity was very good in Nebraska with the following reports: Norfolk, UNI reporting, had 10 operators 5 miles west and 10 AREC members, Omaha, EQU/Ø reporting, had 31 operators 4 miles northwest of Omaha. FFN reported six operators and one transmitter 3 miles northwest of Omaha. UJK reported 4 operators 5 miles south of Fairbury. ONH reported 6 operators and 2 transmitters at the air port in Hastings. VEY reported 9 operators 3 miles east of Gresham. VQN reported 16 operators at the air port in Scottsbluffs. RTC/Ø reported 4 operators at Point of Rocks near Potter. New members of the 75-Meter Phone Net are KØHKI and KØDCU, making a total of 39 for June with QNI 432 and QTC 48, as reported by MAO. SPK reports the 75-Meter Morning Net has added KØHKI and had QNI 369, traffic 87. The Western Nebraska Net is going strong, as reported by NIK, with QNI 372. There were about 65 amateurs in attendance at the Rocky Mountain Convention in Estes Park. KØEVY was all set as a relay station for the Powder Puff Derby which made a scheduled stop in North Platte this year. DDT keeps three net affiliations, Nebraska, TEN and CAN, and turns in an FB traffic report. The Lincoln Amateur Radio Club held a picnic June 30 at Bethany Park with a good attendance. PAM MAO reports very poor conditions at noon for the Nebraska Phone Net but is doing an FB job keeping it going. Traffic: KØDGW 229, WØMAO 110, ZJF 76, DDT 63, ZWG 62, NIK 38, UJK 38, SKK 34, DQN 29, EGQ 16, ZWF 15, KØDFO 11, WØTIP 11, OCU 8, PDJ 8, ZOU 7, KØELU 5, WØRCU 5, VGH 5, SWQ 3, VSJ 2, KØHKI 1, WØRMS 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Victor L. Crawford, W1TYQ—SEC: EOR. RM: KYQ. PAM: YBH. Traffic nets: MCN, Mon.-Fri. 0645 on 3640 kc.; CPN, Mon.-Sat. 1800, Sun. 1000 on 3880 kc.; CN, Mon.-Sat. 1845 and 2200 on 3640 kc.; CTN, Sun. 0900 on 3640 kc. Fifty-four amateurs enjoyed a joint meeting of the Southington, Meriden, Bristol and Newington Amateur Radio Clubs June 4. The program consisted of remarks by New England Division Director EFW, an auction, Field Day movies and prizes. VLH gave an interesting lecture on

(Continued on page 114)

NOW, get your NC-300 for little or NO MONEY DOWN

it's National "old receiver round-up time"

How many times have you wished your old receiver was a bright new National NC-300? Now, make this dream come true, and save money too!

HIGHEST TRADE-IN ALLOWANCES IN HISTORY!

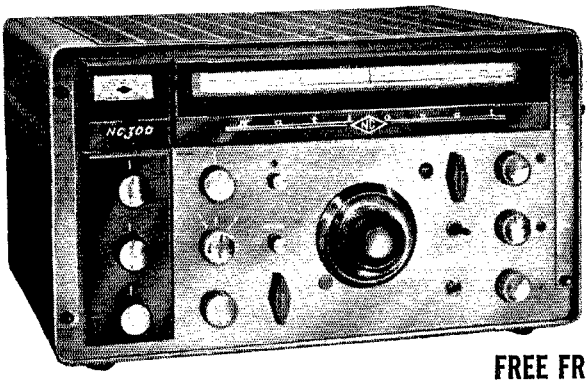
Most National distributors are offering top deals for your old receiver—regardless of age—toward National's famous NC-300.

NO CASH DOWN in most instances where old receiver covers down payment, up to 20 months to pay balance.

You may win a FREE NC-300 if your old receiver is the nation's oldest one traded for an NC-300 during the contest period. Get official entry form from your local National Company Distributor.

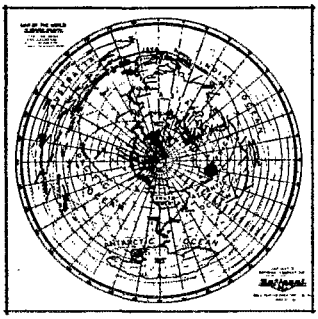
Final decision will rest with National Co.'s appointed board of judges. Contest period. August 1—Dec. 31, 1957

BURTON BROWNE/New York



World famous National NC-300—thousands now in use. Suggested price, without trade-in—only $39.90* down. Cash price $399.00 at most National distributors.

* Slightly higher west of the Rockies.



FREE FROM NATIONAL: MAIL COUPON NOW

This is what you get: Free 19" x 20" 360° world Azimuthal map. (Use it to aim your beam), and full information on National's "Old Receiver Round-Up" plus detailed facts on the NC-300 and why it is your best value.

National Company, Inc.
Dept. 300, Malden 48, Massachusetts

Please send me my FREE Azimuthal map and full information on National's "Old Receiver Round-Up" plus detailed facts on the NC-300.

Name_____ Call_____

Address_____

City_____ Zone____ State_____

tuned to tomorrow

since 1914 **National** Company, Inc.
Malden 48, Mass.

8 out of 10 U.S. Navy ships use National receivers

ARRL IGY-PRP. FYF worked 9 new countries in two days on 15 meters. FGF is mobile on 10 meters. YBH advises CPN met 30 times handling 178 messages and had a daily attendance of 27 stations. High QNI: HID and YBH 29, DHP 27. AOI was selected as Connecticut station for Region I Civil Defense Amateur Radio Alliance. LV is spending all the time possible with his daughter and grandsons before they leave for Maine. AMY is a regular on the Morning Watch and Eastern State Nets. BDI spent part of his vacation in HB-Land where his son, RZP, got married. WGJ has organized an informal monthly luncheon meeting for hams working in Newington at 1200 on the third Wed. of each month at the Nutmegger House in Newington. JSQ, OKY, OLG, WGJ, WGR and ZJJ attended the June meeting. KYQ reports the first session of CN met 25 times during June handling 171 messages. Attendance average was 9.1 per session. The second session of CN handled 8 messages in 25 sessions. From EFW we learn that MCN met 19 times, had a total QNI of 93 and handled 43 messages. High QNI went to IBE 18, EFW and RFJ 16. Public Act 450, recently passed by the Connecticut Legislature eliminating the ten dollar extra fee for call letter license plates, becomes effective Oct. 1. TYQ vacationed in Michigan. New Novices in Winsted are KN1CEC and CAV. ECH needs a Nevada QSL for WAS. OO reports were received from AMY and DHP. OES reports from FVV and CUT. New appointments: CDD as OO, YLZ as EC. Appointments renewed: BIH and YNC as ORS, DHP as OPS. Why not take a few moments the first of each month to drop your SCM a card with all the details. Traffic: W1TYQ 326, EFW 235, YBH 216, AW 205, HID 90, AMY 89, BDI 71, DHP 59, FYF 58, ULY 51, CUH 38, RFJ 37, GVK 27, EKJ 25, EBW 18, EZM 16, ECH 15, VIY 13, LV 7, FHP 6, GEA 4, WN1MDB 3, W1ZHM/1 1.

MAINE—Acting SCM, Charles L. Chapman, W1WTG—The Sea Gull, Barnyard and Pine Tree Nets still are in operation. BBS and BDP have flown to England for a visit with some of Myron's old war buddies. The UXU, UYA, WTG exchange trips are coming to a close with the starting of school. Are the fellows in Northern Maine always away from home? Our game warden, AYX, is housing some small wild ducks. The Augusta Hamfest was a huge success, with DTK and PCD finding the hidden transmitter. Stevey put on another fine time at the Dexter Hamfest. It is with the deepest regret that we place NVF, NAQ and WN1KBT on the Silent Keys list. TWR and parents are moving to the Sunny South for the winter. PTZ and NTV still are eating all those "enormous" trout. ZEN is moving to Maine. I hope by the time this article comes out, the section will have an SCM! All it takes is a little imagination and time. So, come on, fellows. Let's keep Maine on the map! Traffic: (June) W1LKP 133, CEV 32, UDD 30, WTG 21, K2DVT/1 14, W1KFY 5. (May) W1WTG 255, LKP 193, CEV 64, FZK 35, EPN 33, BCD 30, BDP 27, UDD 27, GYJ 20, FLV 17, OTQ 10, HYD 8, JMN 6.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, jr., W1ALP—New appointments: TZ as EC, Alternate R.O. for Sector IB. Appointments endorsed: TVD Andover, JSM Waltham, SS Lincoln, as ECs; AYG as OO; JSM as OES; UKO and SS as OPSs; SS as ORS; CTR as OBS; DFS as PAM for 75-meter phone; AWA North Reading as EC and OBS. Heard on 2 meters: DA, KN1s BSM, BGJ, 6SEU/1. K1BXA is on 6 meters with a Lettine. CQ had a serious operation but is home again. Our sympathy to WK on the death of his father. Heard on 75 meters: KRL, ZHG, TOL, NO, OG, BIA, OTN. GYZ now is mobile. Hams in Bellingham: BDW, DUU, HGN, HGO, IRQ, ZAO, KN1s AFK, AUL, BIR, BYV. They are working on RACES down there. The following took part in ARRL's F.M.T. in May: BGW, TZ, WK TVZ. WU bought a new place in the country and will have a real antenna farm. KHV is taking a trip to California and will take in the National Convention at Chicago. DIY is on 75 meters. The So. Eastern Mass. ARA had a very fine Field Day. All of the clubs in this section were out on this event. The 2-meter band opened up wide and W2s and W3s were coming in fine. NF worked EA6AW and VS1GL, taking a 2-meter Gonset to N.Y.C. with him on vacation. EUJ reports that the Merrimac Valley ARC was on Field Day in Chelmsford. NBN/1. The QRA held its annual banquet. AVY/6 writes from Los Angeles and says he is feeling pretty good. HZR has gone s.s.b. with B&W 5100 and 51SB. LEO is on in Methuen. FJJ is NCS of the Eastern States Net on Thurs. and has a 10-meter ground plane up. K1BRH is new in Weymouth and is on our Eastern Mass. Net. ETH/1, in Hull, will be on 75 meters. IBE has a new antenna on 40 meters and a "Tapetone." KN1BYV helped YAA on Field Day, has a trap antenna, and is an emergency service ham in the B.S.A. K1BRE is on the air in Franklin, helped by TZ. BGW says a lot of the Novices are working outside on the 21-Mc. band.

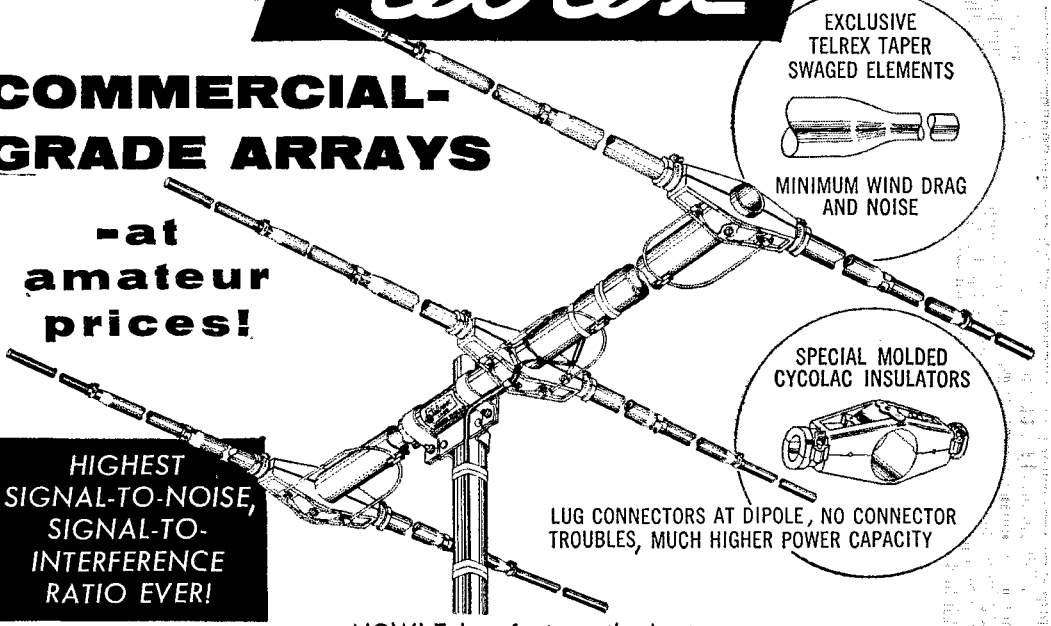
(Continued on page 116)

PRE-TUNED FOR OPTIMUM PERFORMANCE

FAMOUS **telrex**

COMMERCIAL-GRADE ARRAYS

-at amateur prices!



HIGHEST SIGNAL-TO-NOISE, SIGNAL-TO-INTERFERENCE RATIO EVER!

- **Gusset plate mounting**
- **Hair-pin resonated**
- **Wind drag reduced 55%**
- **Rugged, lightweight aluminum construction**
- **All stainless steel hardware**

ASK THE AMATEUR WHO OWNS ONE!

Whether you are limited for space or money, or whether money is no problem, Telrex has the best suitable array for you. Every Telrex array is fully integrated mechanically and electrically to provide outstanding performance per element. The unsurpassed superiority of Telrex arrays is why the most outstanding radio amateurs, including the world's champion DX'er, use Telrex.

NOW! Telrex features the best arrays ever produced, and new lower cost models designed to do the job.

All Telrex arrays are precision tuned and matched for optimum results per element at your site without experimentation or cut and try.

All models supplied with a coaxial halfwave "balun" for balanced pattern and minimum TVI and BCI.

Super De-Luxe models employ all stainless steel hardware, lower cost models employ heavy cadmium plated hardware. A heavy-duty gusset plate mast fastener supplied with every array.

A model to fit every purse or requirement from ¾ thru 40 meters.

Write our engineering department for assistance in laying out an antenna system whether you intend to be represented on the frequency or whether you intend to dominate the frequency!

In service in all 48 states, on every continent and 78 foreign countries! Call or write for new illustrated bulletins

THE STANDARD OF COMPARISON

telrex LABS.
TV & COMMUNICATION ANTENNAS

ASBURY PARK 44
NEW JERSEY, U.S.A.
Telephone: PRospect 5-7252

ORIGINATORS AND MANUFACTURERS OF THE WORLD'S FINEST TV AND COMMUNICATION ANTENNAS.

SMO has a 75A-3 receiver. The Braintree Radio Club held a meeting. KN1AIQ is new in Winthrop. The South Shore Club held a banquet at the Winfield House. KN1ACJ, 15 years old, is new in Brookline and is on all bands with a DX-35 and AR-3. The Cape Cod and Islands ARC, HQH/1, was out on Field Day at West Dennis Beach on all bands with PSS, BCN, HBQ, MKW, EUE, NPR, FEA, UUM, JMS, EGZ, K1s BKZ, KN1s BID, BGX, BGY, BIF, BGU. VYZ East Bridgewater and VY1 Topsfield were endorsed as EC's. BPW has WAC, WASM and WHXS awards and 1RN Certificate. DOM has a new receiver. Active on 6 meters: K1s AZO, BPM, BPQ/m, BZB, CAR, W1s DBH, DDF, EBQ, EL, ETB, IDP, KCO/m, KSB/m, LVF, LVK, MKO, SEA, VOL, WMO, ZGO, mobiles DNO, DBH, DZH, EFL, IAA, IKO, ION, GGI, KSB, MEU, QFE, SSG, YZC, ZOC. LXR has new equipment in his shack including a 6N2. K1CAR has a 6N2. Those using s.s.s.c. are CLS, RMF, FOS and LTC. K1BFK has a halo on the roof 38 feet up. Active in a.m. on the way to work: CEI, DNO, ENS, EQW, HIS, JBA, KCO, KKN, NRW, RMF, YZC. Fixed stations on at this time: CRV, EZZ, GKE, LXR, K1APW. Traffic: (June) W1EMG 367, FJJ 45, TY 24, AUQ 20, UKO 19, ZEN 18, TZ 14, AKN 4, KN1BYV 2, W1ETH 2, BPW 1. (May) W1BPW 13, BGW 9, SMO 2. (Apr.) W1BPW 27. (Dec.) W1IBE 133.

WESTERN MASSACHUSETTS—SCM, Osborne R. McKeraghan. W1HRV—SEC: RRX. RM: BVR. PAM: MNG. The WMCW Net on 3560 kc. daily at 1900 and the WM Phone Net on 3870 kc. Wed. at 1800 needs your support. How about it, fellows. BVR, our RM, is taking a well-deserved vacation from the traffic nets for two months. DVW has assumed the RM duties for July and August. Attention: There are about 65 stations in the section that hold close to 100 official appointments. About 40 of these have not been endorsed recently, some not for several years. To be valid, an appointee's certificate should be endorsed each year. Please check and send them in for my signature to avoid cancellation. Field Day activity in the section was at an all-time high this year. The HCARA had six rigs in operation on Wilbraham Mountain with plenty of operators and eats. Over 800 contacts were made. The Pioneer Valley Club was set up on Anniversary Hill in Holyoke with 5 rigs. The club's first Field Day was a huge success. The Pittsfield Radio Club was very active and made many contacts. DGL, DZV, KGJ and FZY made a Field Day trip into Vermont and did an FB job with two rigs. Many small groups were active in different locations and I believe this was one of the best Field Days the section ever had. SPF reports a storm-tracking drill was held by the AREC group in the Worcester Area in preparation for tornado emergencies. LSZ has a daily sked on 10 meters with ZS5MP and so far they have made 267 contacts in a little over a year. Les has 124 countries confirmed on 10-meter phone also. ZEO reports a summer Novice class is being held at the North Adams YMCA with 16 hopefuls attending. DZV is rebuilding and will install a break-in system for more efficient traffic-handling. HRV enjoyed some nice mobile contacts while vacationing in Eastern Massachusetts. Traffic: W1UEQ 397, BVR 101, FZY 37, TAY 25, DGL 22, AGM 8, HRV 4, DZV 2, ZEO 2.

NEW HAMPSHIRE—SCM, John A. Knapp, W1AIJ —SEC: BXU. RMs: CRW and COC. PAM: CDX. NHN, traffic net, is on 3685 kc. Mon. through Sat. at 1900. RACES Net, NHEN, meets Sun. at 1300 on 3850 kc. GSPN meeting time is 1900 on 3842 kc. Mon. through Fri., and on Sun. at 0900. YJC, Nashua Mike and Key Club secretary, reports increased activity with code classes, v.h.f. work and club auctions. NPY/JTB, on Mt. Washington, sent in an FB report on his 2- and 6-meter activity. TNF was a recent visitor at ZHO, Whitefield. KN1BCS advises that KN1APQ now has his General Class license and a new Valiant I. PZI and AIJ have acquired a commercial radiotelephone 2nd-class license. The Granite State Phone Net held a picnic at Belknap Recreation Area on June 30. Approximately 30 members, with their XYLs, YLs and jr. operators were present. IIQ presided over a short business meeting, following which a general get-together and rag-chew added up to a most enjoyable event. Another such event is tentatively scheduled for September at which time WBM, following return from his European sojourn, is expected to give a color-slide report of his trip. BPL cards to to SAL, FUA and KN1BCS. Memo to new hams: Please send me your QTH. Welcome to K1CLD in Piermont. Traffic: (June) W1FUA 311, KN1BCS 112, WIQGU 45, IIQ 28, GDX 6, BYS 2, EVN 2. (May) WIQGU 14.

RHODE ISLAND—SCM, Mrs. June R. Burkett, W1VXC—SEC: PAZ. PAM: YNE. RMs: BBN and BTV. AUT, of BVARC, is instructing potential Tech. and Gen. Class licensees. KDS has a MARS call. New

(Continued on page 118)

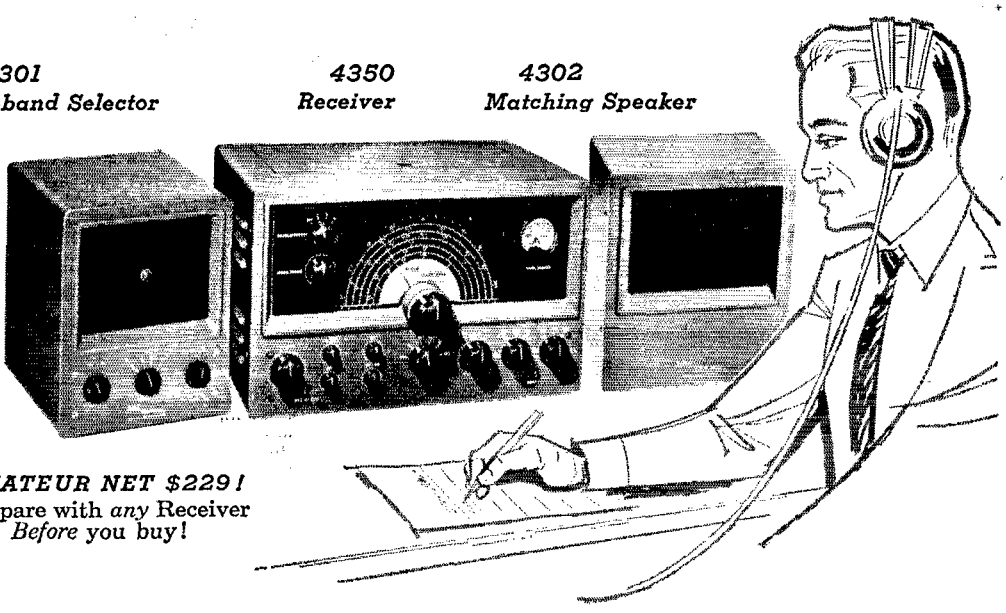
A Ham's Best Friend...

The New RME 4350 Receiver

4301
Sideband Selector

4350
Receiver

4302
Matching Speaker



AMATEUR NET $229!
Compare with *any* Receiver
Before you buy!

Dual Conversion for all Amateur Bands

At last, your long-standing desire for better controls to complement your judgment and skill has been achieved in a receiver that sells at a sensible price. Yes, all the design features you want and need for present conditions in amateur bands, and usually found only in expensive receivers, are available to you in the RME 4350. It's laboratory-engineered to give maximum performance for SSB, CW, phone DX, Traffic and contests.

Superior Design Features Cost Less . . . with the RME 4350

- **Dual Conversion.** Maximum performance results through the use of crystal-controlled dual conversion; images on all amateur bands are down 54 db or more.
- **High Selectivity and Rejectivity.** Even at high frequencies, you can precisely tune the signal you want.
- **Easy, Pinpoint-Precision Tuning . . . Velvet-Smooth Operation** with the E-V exclusive, new two-speed tuning control. With it, you can tune to any part of the band and then micro-scan the area or the whole dial range by means of a 75 to 1 differential planetary reduction mechanism. This mechanism is an integral part of the tuning knob.
- **A High Degree of Mechanical and Thermal Stability** has been achieved by a 6-pound, die-cast panel, welded chassis and case, widely-spaced tuning condenser plates, voltage regulation and temperature compensation of thermal-sensitive elements. As a result, there is negligible frequency shift or drift.
- **Sensitivity** is between 1 and 2 microvolts throughout the tuning range.
- **Low Noise Factor**—between 3.5 and 6, formerly unheard of in communications receivers.

Meet "Your Best Friend" at Your EV-RME Distributor! Write for complete details, Dept. Q79.

RME DIVISION OF Electro-Voice®

RME RADIO MFG. ENGINEERS, INC.
DIVISION OF **ELECTRO-VOICE, INC.** BUCHANAN, MICHIGAN

calls on 50 Mc. are K1s BWX, BDN, W1s CKH, WRC and MUZ. QWU is working on a new half-gallon rig for 80 through 10 meters. CDH is mobile on 6 meters. Your SCM enjoyed a visit at the July 2 club meeting of the BCRA. FGF, from ARRL, was guest speaker. ZXA's mother and father now have calls—KN1BTY and KN1BTZ, respectively. HKN reports contacts with Ohio and Virginia on 160 meters. Results of recent club elections: CRA—BTV, pres.; YKQ, vice-pres.; K1ABR, secy.; and OOX, treas. BCRA—1SE, pres.; WN1NQH, vice-pres.; CBS, treas.; Gerard Laroche, secy.; IJM, act. mgr.; and FVZ, pub. inf. YNE was married on July 6. HFC (ex-2VZN) operates mainly on 40-meter c.w. with a new home-built rig, between cruises while on sea duty with the Navy. GXW is in the Air Force and stationed in Lackland, Tex. CVF is home from R.P.I. for the summer. URA is now on 2 meters with a Gonset. ZVF has worked 80 countries with the rig at the BVARC. CKM, here on vacation from Washington, D. C., enjoyed many contacts on 2 meters. New appointments: FVZ and MUZ as OESs. CMH needs one state for WAS and has worked 44 countries. Field Day activity in this section appears to have been very successful, with at least eight clubs, plus many individuals, participating. The Rhode Island Intercity Net (Mon. through Fri. 1930 on 29.260 kc.) will be resumed Sept. 16. Traffic: W1VXC 24, JJW 18, YRC 10, HLY 9, TGD 9, HKN 7, MUL 6, KDS 3, ZXA 3.

VERMONT—SCM, Mrs. Ann L. Chandler, W1OAK—SEC: SIO. RM: BNV. PAM: SEO. Nets: VTN, Mon.-Sat. at 6:30 P.M. on 3520 kc.; VTPN, Sun. mornings at 9 on 3860 kc.; GMN, Mon.-Sat. at 5 P.M. on 3860 kc. NCS was shared on VTPN by VSA, TJ, SEO, VVP and EDM. 60 different stations reported in five sessions. New calls heard were AD, DAQ, EXZ, FN, GVX, HFN, IVJ, TFB and K1AUE. 69 different stations checked in GMN handling 67 messages. VTN remains on regular schedule through the summer. New appointee: DAQ as Windham County EC. NDL submitted a fine report in the May F.M.T. A RACES meeting was held June 30 in Montpelier. Vermont MARS Net meets Thurs. at 6 P.M. on 4025 kc. with TJ as NCS and SP as ANCS, while other Northern N.E. MARS nets meet the same time and frequency Tue., Wed. and Fri. AVP received a C.D. Commendation Award and write-up in the *Rutland Herald*. The very fine Roster of Vermont nets is in circulation by WOA. The Tri-County Amateur Radio club announces Vt. QSO Party results as follows: BNS (Mass.) and DYE (N. H.) tied for first with K2ECL (N. Y.) in second place. In Vermont AF/1 (Windsor County) was first and RWP (Windham County) second. W-VT certificates went to AQE, YHI, W2RSV, K2ECL and W3EEB. The Sixth International Field Day at Mallets Bay was attended by more than 350. The 75-meter treasure hunt was won by VE2SC, the 10-meter hunt by W2N1Z and the 2-meter by K2HJC. KJG gave boat rides on Lake Champlain on his yacht. GAZ is operating double sideband. KN1BKH is new in East Calais. FDT acquired a new HRO-60. SOV is operating portable from Freedom, N. H., where he is instructing radio at a boys camp. YEL has a new Triumph sports car, known by ZJM as a "flying machine." SEO visited TJ. LMI has a brand-new harmonic and is working at WDEV with QNM. JVT and XYL conduct weekly barn dances at Calais. K1AXO is Lt. Col. Austin, Commandant of 764th AC and W. Sq., St. Albans, Vt. EDM and TJ enjoyed a week of "ham" visiting in Maine. VDX is on a European tour. JLZ and UNF are back in Brattleboro. EXZ is trying out a 2-meter mobile converter. ELJ is operating 20-meter phone mostly this summer. VZE is on 20 meters week ends. RCO has accepted a job with Bendix Aviation Corp. at South Bend, Ind. Catamount Key Clicks was organized this spring by K1AAW and BYO in Bennington and operated v.h.f. Field Day on Mt. Snow Ski Resort. DGL reported one AREC member and five operators on Field Day in Whitingham. ZPB worked all bands on emergency power on Mt. Equinox, while KKM and RFP handled lots of traffic via 2 meters on a N. H. mountain-top. TRZ operated from Mt. Hogback and CBW, VZE and PWB spent Field Day in the woods near Danville. After his Army discharge UGW will be employed in New Jersey. EAE, EIB, HYF, RCO, ZYZ and W2RG visited MMN and OAK. Traffic: W1AVP 88, OAK 79, VZE 42, ELJ 22.

NORTHWESTERN DIVISION

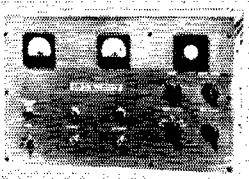
IDAHO—SCM, Rev. Francis A. Peterson, W7RKI—ACD is making final preparations for the 25th Anniversary Big Springs Hamfest. Idaho amateur car license plates are now being sent out. Many Field Day reports are in. CDA/7 Pocatello, PKA/7 Boise, VHO/7 Murtaugh and ZRC/7 Homedale were among the high scorers. BDL has just built a 16-tube super receiver. GMC was robbed of his mobile antenna. VQC has a

(Continued on page 120)

For your most exciting visit to a radio distributor, take a few hours and look over the new ELDICO line

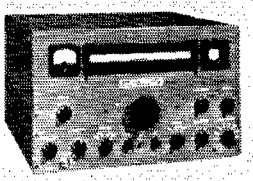
We were tempted to start this ad with an invitation to join the hams with outstanding signals who always seem to work them from the "top of the pile." But truly, this new ELDICO line is so full of features that the excitement will start when you first fondle the dials on your distributor's shelf . . . and it will be yours to enjoy every time you throw the switch to command your operating frequency.

Two superb transmitters offer features found nowhere else in comparable units. ELDICO's SSB-100F basic exciter/transmitter and SSB-1000 kw. power amplifier are designed for outstanding performance on *all modes* of transmission — SSB, CW, and AM — with every operating provision for amateurs concentrating in any of these phases of ham radio. With the basic SSB-100F, you have an ideal medium-power rig or exciter. At any time, you can add the kw linear SSB-1000 or any other PA. Military type construction . . . integral 1" oscilloscopes in exciter and PA . . . full break-in keying . . . just look over the specs, then drop in on your ELDICO distributor to examine for yourself why ELDICO is the fastest-growing name in transmitters for military and amateur service. And don't forget: this promises to be one of the hot operating seasons for all times . . . make it an ELDICO season!



ELDICO SSB-1000

Low Drive Requirement: 3 watts P.E.P. will drive to full kilowatt. Pi-network Output: Single knob bandswitch. High-efficiency silver-plated Pi-network output circuit. Matches wide range of antenna impedances.
High Harmonic Attenuation: High-Q plate and grid circuits and Pi-network output circuit provide maximum harmonic-attenuation.
Power Rating: DC Input C.W. 1000 watts, A.M. 700 watts
Peak Envelope Power:
Input SSB-1000 watts
Output SSB-625 watts
Frequency Range: 10 thru 80 meters.
Tube Lineup: 9 tubes; two 866, two OA2, one OB2, one 6AU6, one 1CP1, two 4 x 250B.



ELDICO SSB-100F

Type of Emission: C.W. — A.M. — SSB
Power Ratings: DC average input SSB-100 watts; A.M. input (two tone test)—60 watts. Peak envelope power input SSB-144 watts. Peak envelope power output SSB-100 watts.
Keying: Grid block, full break-in.
Harmonics and Spurious Responses: Spurious mixer products—50 db or more down. Third order distortion products—35 db or more down. TV interference suppression—40 db or more second harmonic, 60 db or more higher harmonics.
Unwanted Sideband and Carrier Suppression: 50 db minimum attenuation, through low frequency crystallattice filter.
Frequency Stability: Control Oscillator—(800 to 1300 kc) +- 100 cycles after two minute warm up period. Output frequency—within 300 cycles after five minutes warm up period. Dial accuracy +- 2 kc after calibration.
Tube Lineup: 22 tubes, including two rectifiers, two voltage regulators, one oscilloscope and one 5894 power amplifier.

ELDICO ELECTRONICS

Write W2BFY for additional details if your distributor can't assist you.

29-01 BORDEN AVENUE, LONG ISLAND CITY, NEW YORK

A Division of Dynamics Corporation of America

new car, new Morrow equipment and a new Viking 500. WBK and George have new Regency transistor converters. WARNING: Watch out for "no transmitting" signs near highway construction work. Your r.f. can set off dynamite caps! A mobile recently tried to blow up a mountain in Idaho that way, but fortunately no one was hurt. Send news reports to your SCM by the seventh of the month. Traffic: W7GMC 253, VQC 52, EMT 14.

MONTANA—SCM, Vernon L. Phillips, W7NPV/WXI—SEC: KUH. PAM: EOI. RM: KGJ. The Montana Phone Net meets Mon.-Wed.-Fri. at 1800 on 3910 kc. Field Day was a record-breaker on all counts with about 150 Montana amateurs participating. Ham picnics also held the spotlight with one in the Gallatin Canyon June 2, one at Scobey and one at Harlowton on June 9, and one at Fishtail on June 30. New calls in Billings: WN7HVS, K7AHU, and KN7s ABV, AER, AES, AET, AEU, AEY, AEZ and AFJ. BJV moved from Harlowton to Butte. MBV moved from Power to Big Coulee, near Ryegate. QEL moved from Coeur d'Alene, Idaho, to Missoula. BGX attended the National Boy Scout Jamboree. WIB is spending the summer at Ballantine. BMI visited in Minneapolis. DWJ and LBK attended National Guard Camp at Helena. QYA vacationed in California. AYG vacationed in Yellowstone Park. IWW vacationed in California. CPY has a new tri-band beam. Recent appointment: DWJ as OBS. Traffic: W7TRU 13, YPN 12, OIQ 10, MQI 9, NPV 9, CQC 6, UWY 5, OIP 4, YQZ 2.

OREGON—SCM, Hubert R. McNally, W7JDX—Your new SCM greets all of you with the hope we can all work together toward an efficient showing for our section. QYS will continue as SEC. We have no RM or PAM as yet but are looking for same. We need more OESs; any of you who are interested in v.h.f. just advise the SCM. His address is 11908 S.E. Madison St., Portland 16. Phone number is AL 4-3508. That includes Novices also. Your SCM hopes to be able to visit all of the clubs during the year, so be on the lookout for him as he is a traveling man. Any clubs desiring to nominate members for appointments can advise the SCM and he will handle. Field Day was a success in Oregon, the weather was generally good and reports indicate lots of fun. Reports are in from the Portland Radio Club with 23 operators, the Tualatin Valley RC with 15 operators, the Oregonian ARS with 21 operators, the McMinnville RC with 8 operators, the Salem ARC with 4 operators; the Tillamook RC with 6 operators, the Albany RC with 7 operators the Central Oregon RC with 22 operators and the Coos County RC with 15 operators. Also many individuals reported, such as OLC, SMR, WHE, KII, BJJ and EJO. The SCM is trying to get a line on OSN and RN7 for more c.w. information. The Portland Radio Club plans an installation on top of 11,200-ft. Mt. Hood for the V.H.F. Contest. OZL, HVX, UYT, ZHR and VLE are arranging the trip. They expect to be on 2 and 6 meters and 420 Mc. Traffic: W7APF 701, ENU 86, JDX 41, OLU 25.

WASHINGTON—SCM, Victor S. Gish, W7FIX—FAW is putting up a new 20-meter antenna. K7FAE has confirmations from KV4, GM3, GW3, VS1, PA9 and YU1—had a nice letter and picture from YU1UB, who is looking for W7s on 20-meter c.w. PGY is complaining of rotten band conditions. WAH is back on the nets full blast again. USO is mobiling on 2 meters while on vacation through Idaho, Utah and Colorado. AIB still is working on a super duper shack. BXH reports the "YL-to-be" problem looking good—otherwise things are quiet. AMC still is complaining of chores taking him away from hamming. JC says "QRL work." LVB reports the DX-35 is working FB. EVW is rebuilding mobile for use in the new car he recently drove back from Detroit. WN7IEU worked 13 states, KH6 and KL7. The best was KN3AFZ, in Pennsylvania. Will be glad to take Everett traffic if the boys will QSY to the Novice band. OCA resigned as EC of Pierce County. DWW now is Acting EC. DIT got his General Class license the day after Field Day. DJW got his the same day. PXA, out for Field Day with the Spokane Club, worked the 15-meter A3 position with WVA, USL, OPR, URZ and others. He now checks into the Montana Net Mon. and Fri. Response for Emergency Coordinators to represent each club in the section was nil with the exception of Walla Walla. WQD is busy on the MARS Traffic Net. QHI is signing /7 for a while. BA, K7FAE, PGY, VAZ, K7WAT and K7FBN made BPL. Traffic for June was just a little better than half of that for May. The WARTS Net held its annual picnic at Lake Wenatchee July 13 and 14. KN7AEJ is a new Novice in Vancouver—this is the first "KN7" call we have noted. Don will be on with a DX-35 and National receiver soon. Please get your reports in by the seventh of each month. Traffic: W7BA 2246, K7FAE 1322, W7PGY 889, VAZ 641, K7WAT 630, FBN 193, W7WAH 122, FRU 75,

(Continued on page 122)

You ma... nsidering this application or, if you wish, y... in this form which requires further explana...

EXCERPT FROM JOB APPLICATION FORM:

After two reasonably satisfying years with [redacted], I've accumulated quite a few reasons why I'd like to join Raytheon. I've seen a lot of your equipment and it has quality all through. During the War, while in the Navy, I worked on your SG-1 Radar. I know that your Company and your Field Engineers enjoy a fine reputation. It is my understanding that if I am accepted, I will be considered for assignment to one of your various High Speed Bombing Radar or Missile Programs. Several Raytheon Field Engineers I knew ~~knew~~ in the past now have very responsible positions with your Company. One of my friends, who recently joined your ~~comp~~ department, mentioned that the company now has over 24,000 employees, needs many more engineers and prepares its men for advancement. He ~~also~~ also said it was easy to talk to the people in charge and you answer person to person mail promptly. He liked your policy of moving household goods to keep men close to their families and the consideration you gave him regarding his choice of assignment and location. He also met some radio hams in your department with whom he had talked over the air. Last, but not least, he is pleased with his monthly pay check!

PLEASE DO NOT WRITE BELOW THIS LINE

Interviewer's Comments

Seems alert and intelligent. I was impressed with his electronic experience and his apparent technical competence. Pleasing personality. Recommend we hire him for assignment to the Hawk missile program and arrange for him to work in engineering or production for initial training. Note that he has an EE degree.

Date Hired	Start to work	Dept.	Job Code	Classification	Acct. Code
7/10/57	8/1/57	G.S.D.	776-mm9	Field Engineer	GSD-23-1

Reporting to G. E. Dodge Signature of person hiring O. L. Dewey

FIELD ENGINEERING with a FUTURE

Raytheon field engineering gives you a real chance to up-grade your future—many of our executives are former field engineers. Primarily, we need men with an E.E. degree and field experience but write if you have a good radar, fire control or missile background. Attractive salaries; assistance in relocating; insurance; really interesting work. Write E. K. Doherr in confidence, without obligation.

RAYTHEON MANUFACTURING COMPANY

RAYTHEON

Excellence in Electronics

Government Service Department
100 River Street, Waltham 54, Massachusetts

APS 62, USO 59, WQD 46, AIB 29, JEY 24, AMC 21, BXH 20, JC 16, GVV 15, LVB 7, EVW 2.

PACIFIC DIVISION

NEVADA—SCM, Albert R. Chin, W7JLV—SEC: JU. The NARA held its Field Day near Virginia City on Geiger Summit. Nineteen operators were present with nine AREC members. 6MAO, ex-7JTA, of Sparks and a few years back and his family were house guests of your SCM over the Fourth. Your SCM attended the APCO Conferenec in Florida, which also was attended by CX, of Reno. Herb passes his regards to the gang. CX now is operating a new HT-32. MAH has completed a new 6-meter converter and soon will be on 6 meters to join CX and JLV to take advantage of the openings. THH is on the air at Gabbs using a Viking II and Globe King 500B. The receiver is a TMC GPR-90. This report is short because of too much travel and not enough information. Keep it coming.

SANTA CLARA VALLEY—SCM, G. Donald Eberlein, W6YHM—Asst. SCM: Roy E. Pinkham, 6BPT. SEC: NVO. RM: ZRJ. PAMs: OFJ and WGO. K6DYX made the BPL. K6GZ made the BPL on originations for the second month. Bob is a member of the MATN, taking traffic from MARS and filing on the NTS nets. The Monterey Bay Radio Club installed the following new officers in June: K6DYX, pres.; UJA, vice-pres.; K6IEC, secy. MTN installed the following officers for the coming year on June 16 at its roundup in Watsonville: RHA, pres.; HUW, vice-pres. and traffic director. HC and YHM were visitors at the June meeting of the MBRC. Harry and Don gave the gang up-to-date information on happenings at Headquarters. QPQ is on with a new Valiant. MKD is heard on 144 Mc. HYX checks in on the MBRC Mon. Night Net. AOD expects to return soon from New York. SHT is operating on 144 Mc. K6JAW is planning on going to KL7-Land. K6CXT graduated from high school and soon may go into the service. K6DYX, MBRC pres., plans to start transmitter hunts as a part of the club meetings. K6BBD enjoys the transmitter hunts put on by the SCCARA before each club meeting. PLG reports a good time was had operating with the Field Day gang above Saratoga. HC is cleaning weeds and grass from his back yard getting ready to put up a tower for his antenna. KIN reports several openings on 56 Mc. during the last two months. There still is need for e.w. operators to take part in RN6 and NCN. These nets meet on 3615 and 3635 kc., respectively. If interested, contact HC. Traffic: (June) K6DYX 535, GZ 472, W6PLG 364, JCG 196, BPT 158, FON 48, K6HGV 25, W6YHM 23, OII 20, K6BBD 4, W6IIC 4. (May) W6FON 28.

EAST BAY—SCM, Roger L. Wixson, W6FDJ—First of all I would like to apologize for not getting the column out last month. My only excuse is that of being out of town on business and participating in a rebuilding program here at the home QTH. I am hoping that I can get down to business and do a better job as SCM. My term is up this fall so some of you eager beavers should be thinking it over. June meetings echoed with Field Day talk and from the activity reports it looked like everyone got in the act. Other meetings held in June included that of the East Bay Club with VE2AGE giving a talk on the Dew Line (Distant Early Warning). Tom showed colored slides illustrating his talk. The regular meeting of the SARO was held at the Bow and Bell Restaurant. The topic of discussion was Field Day. It turned out that some of the boys had arranged to get three cabooses on a siding near Newark for a Field Day spot. From what I heard over the air they seemed to be having a swell time. The Oakland Radio Club, Inc., held its Field Day in the Oakland Hills in the Sequoia Arena. MFZ did a fine job getting the group together. CAN, of Napa, is doing a splendid job as SEC. It seems that he isn't getting much help from the boys in the Bay Area. I know what a job it is to get this help but hope we can do something about it soon. Keep up the good work, Wayne. Thanks to Major Forbes for taking the time to send in his station activity report. For the month of May K6GK handled a total of 508 and for June 295. We would like to see more of this kind of traffic work. We hope to get back into the swing of things next month.

SAN FRANCISCO—SCM, Walter A. Buckley, W6GGC—Asst. SCMs: Fred H. Laubscher, 6OPL; William T. Nakahara, 6GHI. SEC: KZF. EC: HVN. The Far West Radio Club has been formed in Fortuna with BJO, pres.; K6RFE, vice-pres.; K6VGZ, secy.-treas. and K6EKC act. mgr. Club membership as of June 30 was 22 members. Meetings are held the 1st and 3rd Fri. nights of the month in the hall above the fire and police department. Approximately 100 contacts were made by the club station on Field Day. The Humboldt Radio Club lists a new call WN6FCO, and PYL is

(Continued on page 124)

NOW IN STOCK AT WORLD RADIO!

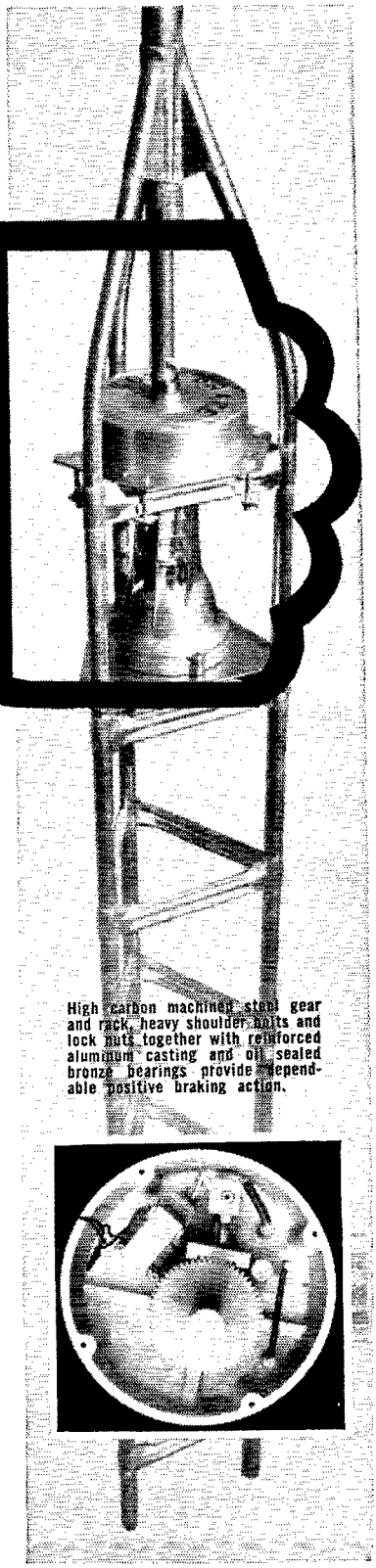
Guaranteed . . .

TO WITHSTAND 5000 IN. LBS. OF TORQUE!
TESTED TO 10,000 IN. LBS. WITHOUT FAILURE!

the iron fist . . .

hy-gain roto-brake

Patent Pending



High carbon machined steel gear and rack, heavy shoulder bolts and lock nuts together with reinforced aluminum casting and oil sealed bronze bearings provide dependable positive braking action.

safeguards all antenna rotating assemblies

- Will operate with any TV or other type rotator, offering the finest, yet lowest priced* antenna rotating assembly available.
- Roto-Brake makes possible rotation of large antenna arrays without damage to rotator or antenna system.
- Holds antenna with "iron grip" yet releases automatically when rotator is energized.
- Positive braking action prevents drift or loss of rotator indicator synchronization.
- Protects against winds up to 80 mph.
- All wiring connections are simple and externally made; rotator control system need not be opened or re-wired.
- Spring-actuated, solenoid-released braking unit; mounted between rotator and antenna.
- Adapter kits, cable and all accessories available for any type mountings.

Only $74.50

*Combined with most TV rotators — a complete ham rotating assembly under $100.

$6.04 PER MO.

at "the place to buy!"

In Stock! Send for Detailed Brochure . . .

"World's Largest Distributor of Amateur Radio Equipment!"

WORLD'S MOST PERSONALIZED ELECTRONIC SUPPLY HOUSE
World Radio LABORATORIES
PH. 2-0277
3415 W BROADWAY COUNCIL BLUFFS, IOWA

10% DOWN
Immediate Shipment!
Easy Terms on All Equipment

moving back to W7-Land. Condolences to BJO and RQX on the tragic death of their 17-month-old grandson and nephew. Sorry to report a Silent Key listing for LVW. Fred Newbaumer was one of the San Francisco Naval Shipyard Club charter members and an old-time member in HAMS and the San Francisco Radio Club. FEA says that WJF is now home from the hospital and although the doctor says he will not be able to return to work for some months to come, Gertie writes that Clare is showing improvement each day. Best wishes for a speedy return to the air, OM. The gang certainly misses you. The San Francisco Radio Club had its usual big turnout of fellows for Field Day as did the Band Spanner's Radio Club. GCW now has over 10,000 contacts on c.w. and has filled 19 log books in 8½ years. CXO reported the following stations were heard in "*CQ*'s Save 11 Contest" June 8 and 9: HRW, CXO, K6OHJ, OXL, K6OPI, K6UHE, ZBS and GGC. K6HWI reported for the Air Force 6/24 after putting in many hours to help on Field Day with the San Francisco Club. FYK was transferred to Chichi Jima in the Bonin Islands and will have full charge of all electronics plus the "ham shack." Congratulations to SDN on his new son. GGC's YL Rae was nurse in attendance at the birth. GCV was busily handling messages for the "Qantas Airline Pilots" when they were recently stranded in San Francisco because of a company strike. QMO reports the new dipole on 40 meters works very well. She and K6H1W were busy ladies on the air during Field Day. Another of the San Francisco Ladies' Club members, QPD, has been very busy with her assignment as chairman of the committee of ham radio operators acting as part of the radio network on the cross-country flight from San Carlos to Philadelphia of the "Powder Puff Derby." Traffic: W6QMO 189, GCV 32, JWF 16, GGC 16, GHI 14, BIP 12.

SACRAMENTO VALLEY—SCM, LeVaughn Shipley, K6CFF—The clubs of Sacramento County participated in local competition on Field Day with an engraved trophy being awarded to the winning club. The Radio Amateur Mobile Society took first place followed by MARS, Sacramento, Aerojet, and our new YL club, the Camellia Capital Chirps. HIR, president of the RAMS, says it was done with antennas. They used colinear arrays which were oriented N-S/E-W. Two feed lines and matching transformers enabled immediate switching. The RAMS will issue special commemorative QSL cards to all stations worked. Congratulations, fellows. The SCM received Field Day messages from most clubs. At this writing however no news of activities has been received from the northern part of our section. KN6SXA (now K6SXA) won first place nationally in the last Novice Roundup—see July *QST*. Jim also is a newly-appointed ORS. Two-meter activity in the section is terrific—e.d., RAMS, MARS and even W6TOL! Sacramento has about 12 stations on 6 meters. Anyone interested in 220 Mc., contact QAC. Pat, K6HOI, and Colleen, K6PWH, both of the CCC, contacted the *Flying Enterprise* on 15-meter phone. They plan to share the QSL card. Hi. Don't look for it in *QST* unless you have sent the information to your SCM. All reports must reach the SCM before the 4th of each month. Traffic: K6SXA 154, KN6YBV 33.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The Fresno Amateur Radio Club held its Field Day at Auberry, Calif., and had 20 operators and made over 500 contacts. The Turlock Amateur Radio Club held its Field Day on Mt. Elizabeth and made over 700 contacts. The Stockton Radio Club held its Field Day in the Stockton Stadium and had 8 amateurs participating. The Madera County Amateur Radio Club held its Field Day near Raymond, Calif., with 7 operators. While coming back from New York AOW wrecked his car in Tulsa. The family and rig came out in fine shape, but the car was a total wreck. NTV has a 100-ft. tower for his high-frequency antennas. HYZ is on all bands with a Viking at his new QTH. K6LTP has a new 6-meter rig with an 829 in the final. K6RYU has a 15-meter beam. NTV has a new HT-32 on 40-meter s.s.b. KN6ZCD was in charge of the Novices during Field Day. K6GOX has worked 37 states on 6 meters. DIY has a new SX-101. PXP has an ART-13 installed in his pickup. Summer and vacations have cut down activity but, fellows, please send in the reports. These reports are important to all of us. Hope all of you had a nice vacation and came back full of vim and vigor. Remember, the Fresno Radio Club meets the 2nd Fri. of each month in the PGE Building, 10th floor. Traffic: W6ADB 56, EBL 56, K6RPM 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—SEC: ZG. PAM: DRC. June was Field Day month with the amateurs. The following clubs par-

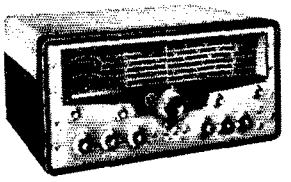
(Continued on page 126)

DEPEND ON ARROW FOR THE FINEST IN ALL HAM EQUIPMENT!

Hallicrafters Model HT-32

Cleanest signal on the air! Hallicrafters new HT-32 transmitter brings a new standard of clarity with two exclusive features: (1) 5.0 mc quartz crystal filter—cuts unwanted sideband 50 db. or more; (2) new bridged-tee modulator, temperature-stabilized and compensated network provides carrier suppression in excess of 50 db. SSB, AM or CW output on 80, 40, 20, 15, 11 & 10 meter bands. High-stability gear-driven V.F.O. 144 watts peak input. Ideal CW keying and break-in operation.

Amateur Net.....$675.00

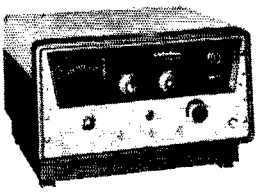


Hallicrafters Model SX-101

New heavyweight champion! Rugged is the word for the SX-101 receiver—and it's all amateur. Heaviest chassis in the industry. Full gear drive. Complete coverage of seven bands: 160, 80, 40, 20, 15, 11 & 10 meters. Special 10 mc. pos. for WWV. Tee-notch filter. S-meter functions with A.V.C. off. Selectable side band.

Amateur Net.....$395.00

Write For Complete Literature

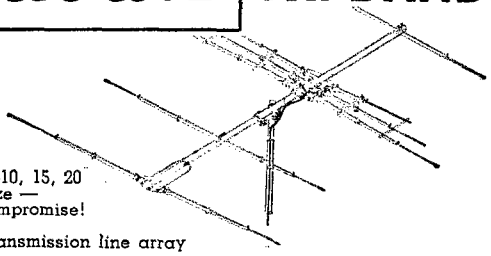


Hallicrafters Model HT-33

New ceramic tubes! Ultra-compact new HT-33 kilowatt amplifier accents performance and dependability with costlier ceramic tubes—another Hallicrafters first. 100 watts greater plate dissipation. Greater overload safety. Unsurpassed ruggedness. Six amateur bands: 80, 40, 20, 15, 11 & 10 meters; simplified tuning; low drive requirement; quieter operation from low speed blower. All control leads filtered.

Amateur Net.....$775.00

NEW *telrex* "TRI-BAND"



TB2E—10, 15, 20
Full-size —
No Compromise!
3-Band
One-transmission line array

Telrex tuned, matched and calibrated for easy assembly (without formulas or traps to break down) to provide *outstanding performance on 3-bands with a practical* long-lasting structure incorporating the finest of materials. Install a Telrex tri-band today for full size 2-element performance (gain 5.5 db) — F/B 18 db) and enjoy your hobby to the fullest!.....**Price: $158.00**

TELREX '56 Beam Antennas

Commercial grade arrays at amateur prices; superior in performance, design and construction. Hairpin resonated, precision tuned, matched and calibrated. Provide highest signal-to-noise ratio possible; 75% reduction in precipitation static.

"SERIES 56" SPECIFICATIONS AND PRICES

Telrex No.	Meter Band	Elements No.	Gain db	Shpg. Wt. Lbs.	Amateur Net Each
¾M-15C	¾	15	16.2	13	$ 29.00
1¼M-5C	1¼	5	11.9	3	6.95
1¼M-15C	1¼	15	16.2	16½	31.00
2M-3C	2	3	9.4	2¾	5.95
2M-5C	2	5	10.5	3	7.25
2M-6C	2	6	12.7	4	12.50
2M-8C	2	8	13.5	10	13.75
2M-808	2	16	10.5	15	33.50
2M-15C	2	15	16.2	28	39.25
6M-3D	6	3	9.4	7	16.25
6M-4C	6	4	9.7	10	19.75
6M-6C	6	6	12.7	20	57.50
6M-56-135	6	6	12.7	44	149.00
1030-S	10	3	7.0	9	36.50
10M-56-79	10	3	8.9	27	96.00
10M-56-120	10	4	10.1	33½	144.00
10M-56-185	10	5	11.2	77	220.00
10M-56-235	10	6	12.7	93	290.00
15M-56-67	15	2	4.8	22	80.00
15M-56-99	15	3	8.9	32	117.00
15M-56-118	15	4	9.7	37	140.00
15M-56-198	15	4	11.1	64	235.00
15M-56-245	15	5	11.9	94	285.00
20M-56-79	20	2	4.8	26	89.00
20M-56-112	20	3	8.7	33	130.00
20M-56-149	20	3	9.0	56	175.00
20M-56-168	20	3	9.4	63	198.00
20M-56-235	20	4	10.4	74	275.00
20M-56-265	20	4	11.2	90	305.00
40M-56-180	40	2	3.4	66	180.00
40M-56-365	40	3	8.3	130	365.00

Write For Complete Literature On The Telrex Line

Arrow's Export Dept. Ships To All Parts of the World.

ALL PRICES F.O.B. N.Y.C.

ARROW ELECTRONICS, INC.

65 Cortlandt St., New York 7, N. Y. • DIgby 9-3790
525 Jericho Turnpike, Mineola, N. Y. • Ploneer 6-8686

ticipated: Alamance, Asheville, Charlotte, Davidson, Catawba, Rutherford, Winston-Salem, Greensboro, Raleigh and Morganton. Possibly there are others that didn't bother to mention it to the SCM. AREC in the State still grows. We have a total of 576 registered amateurs, 30 ECs, 87 per cent of these drill regularly. Congratulations, fellows. With each passing day RACES is growing in the State. Thirty-eight counties have approved plans. The Six Area Control Stations have been designated: Area A, JZQ; Area B, TJA; Area C, VTP; Area D, NHW; Area E, ZAV and Area F, RRH. Each county with an approved plan has a repre/entative in the Radiological Net. State Civil Defense has let contract for $16,000.00 worth of equipment for the Area NCSs and their alternates. Some $11,000.00 worth of additional equipment is being let on bids for State NCS and alternate. Many counties are in the process of letting bids on the local level. Most of the equipment is v.h.f. Personnel and location of one high-power v.h.f. relay station has been selected. One more is to be selected. K4DNW and K4CDZ are now meeting the 4RN. BUW soon will begin meeting this net. Thanks, boys, for taking me off the hook. GXR continues to be the leading traffic-handler each month with a count of over 135 per month.

SOUTH CAROLINA—SCM, Bryson L. McGraw, W4HMG—K4BUF and the clothesline antenna are doing FB in Charleston with only 18 watts. 3CCE now is K4POP. 2BHS/4 now is 2-meter NCS for the Aiken Area. K4AIB has fine 2-meter s.s.b. signals. K4PJE gave a fine talk to the Georgetown Rotary Club on ham radio. K4EWC, with his 50-watter plus an all-band antenna, is doing a fine job. K4OGE is the proud owner of a new 5-kw. gas generator. Congrats to K4MWZ on his fine, unselfish, traffic-handling. K4CUH, with an 813 and cubical quad, is working ZLs by the dozens. TYS now has a full gallon s.s.b. via a pair of 4-125As. We are sorry to lose K4ANI and K4ALM. Bob and Lucy, who are moving to Texas. OAK still is in a cast with two broken legs but is active on 75-meter phone. Shaw-Sumter reports: CJD handles FB traffic on 80 meters and is active with the SCN C.W. gang. 361 contacts were made on Field Day. DWJ is off phone until he gets his c.w. speed to 20 w.p.m. GIF has a dandy custom mobile for 10 meters. The "Save Eleven" found EJR, GCB, GIE and EYV all getting in good licks. K4GHT and others are off to a nice start with a new club in the Conway Area. The Palmetto Club is minus its 20-meter beam because of high winds. Thanks to ZVY, CAL and many others on the WX Watch with regards to the Aiken, Edgefield incident. Many clubs report fine Field Day scores. GAT, EGI and AVU at Travis AFB were on SCNG maneuvers keeping daily skeds with home via HDR and others. ZRH and AII report approval of the State RACES plan. Congrats to K4BVX on the nice job as NCS for the S. Car. C.W. Net. AKC, our RM, reports 30 members now are active on the C.W. Net, most of them holders of ORS appointments. NOTICE: While being SCM has been one of the highest honors of my life, I think someone else should be given a chance in November. Traffic: W4AKC 109, K4EKG 94, GAT 86, W4YAA/8 65, K4JFN 52, HQK 22, IIE 16.

VIRGINIA—SCM, John Carl Morgan, W4KX—SEC: PAK. Virginia clubs and individual groups did their part in making this a real record Field Day. Field Day messages received by the SCM indicate all bands pitched in across the State. WWN will furnish Virginia Weather Bureau liaison with the East Coast Emergency Net. NPT, Norfolk NAS Club, now has 2- and 6-meter gear for Novice and Tech. Class operation. FLX reports the Bedford Armory MARS ham station received the call K4WFO. PVA and others in the Prince William Area operated at the County Fair in August. RM IA was gratified at the pick-up in attendance on VN despite poor summer conditions. Peripatetic 1RAN dropped in on the SCM after working Field Day with K4OQR at KFC's "plantation." BRF maintained a satisfactory sked with his XYL IKA while he visited his folks in Georgia. K4s BYS and EAS took a portable rig along on their vacation at Nags Head, N. C. CVO did his FDing with the Newport, R. I., Club and reports K4LPR also was up that way for Field Day. K4AET is rebuilding and wants a good 20-meter signal to work his son, ET2US (W3DAD). JUJ had better look to his certificate-collecting laurels. TFX reports recent additions to his wall include WGSA, WAV, WOSA and WASM. K4HQ gleefully tells of ideal conditions during Field Day when many non-ham onlookers were greatly impressed to hear West Coasters being worked with great abandon by the Halifax Club. A deadline report via VFN: The VFN/GYN Picnic at Holiday Lake, near Appomatox, was a big success. K4MC was elected to succeed K4AET as Net Mgr. K4ASU was reelected Asst. Net Mgr. and ONV as secy.-treas. Traffic: W4IA 314, K4EZL 295, W4QDY 174, K4AET 132, W4PVA 76, K4JLO 61, W4KX 53, SHJ

(Continued on page 128)

ELMAR ELECTRONICS

for complete large-quantity stocks . . .

RCA®

TUBES . TRANSISTORS . DIODES

Elmar, outstanding among the West's foremost electronic *distributors . . . supplies large quantities of RCA tubes, transistors* and diodes to a widely diversified market—amateur, industrial, research, government, radio and TV broadcasting, technician, service dealer and others.

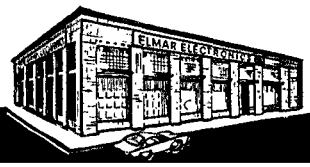
To meet such varied requirements fully, Elmar stocks are complete, constantly adjusted, fully maintained. Units, always several deep on the store service shelves, are each backed up by heavy reserve stock.

At Elmar, RCA stock is treated in this manner.

It ranges from the largest transmitting tube to the smallest transistor.

It will meet *your* requirements.

ELMAR ELECTRONICS



140 Eleventh Street, Oakland 7, California.

VIRGINIA FREE-FOR-ALL QSO PARTY

SEPTEMBER 14-15, 1957

Amateurs everywhere are invited to participate in a QSO Party, the purpose of which is to assist non-Virginia stations in earning the VA-JF Certificate (rules on page 52, July *QST*) and to help Virginians toward WAS, WAC and other awards.

Rules: (1) The party will begin at 6:00 P.M. EST, September 14, and continue until midnight EST, September 15. Outside stations will attempt to contact as many Virginia amateurs as possible using any band or mode, but a given station may be counted but once regardless of band or mode. (2) Out-of-state c.w. amateurs call "CQ VA." Virginia c.w. stations should identify themselves by signing "de (call) VA K." Phones say "CQ Virginia" or "Virginia calling." The calling procedure used should indicate whether a station is seeking a Virginia or an out-of-state contact. (3) Each contact must include a two-way exchange of QSO Number, RST or RS report, and state or country. *Examples:* "NR1 W1AW CONN" or "NR3 W4YHD VA." Virginia stations will send "Virginia" even though the fact be self-evident. (4) Score one point for each *complete* two-way exchange. No credit will be allowed for incomplete contacts. (5) Suggested rallying spots: 3680 and 3835 (the Virginia net frequencies), 7080, and points from 25 to 50 kc. inside each edge of the various bands and phone sub-bands. (6) Logs should reach the Virginia SCM, John Carl Morgan, W4KX, c/o Radio Station WFVA, Box 269, Fredericksburg, Va. no later than October 15, 1957.

52, K4ASU 32, W4FLX 32, K4DSD 31, JKK 27, W4AAD 23, BZE 23, FKP 23, K4BUI 21, ELG 20, W4KFC 18, K4EAS 13, EAQ 8, W4JUJ 8, ZMI 6, LW 4, YE 4, K4BYS 2, W4TFX 1.

WEST VIRGINIA—SCM, Albert H. HIX, W8PQQ —SEC: KXD, PAM: FGL. RMs: DFC, GBF, HZA and PBO. KXD would like all West Virginia amateurs who can possibly do so to sign up for registration in the AREC program. Please drop him a line at 524 Ninth St., Moundsville, or send a message via the c.w. or phone nets asking for an application form. He is eager to organize this State to take care of any type of communication emergency where the hams can help. Those who want their cards brought up to date also should contact him. ORD has a new 75A-4 and HT-32 s.s.b. rig and is working on a new kw. amplifier. West Virginia was well represented in the recent Field Day activities. IRN received DXCC membership. PQQ received phone WAZ, GBF and PZT did well in the recent QO Frequency Measuring Test. The Northern Panhandle Amateur Radio Club's new officers are KXD, pres.; YFX, vice-pres.; EIT, secy.-treas. Trustee for the club station, K8DYB, is BWK. The club meets monthly. GUL has a ½-kw. rig ready to go. I would appreciate receiving activities reports each month to help make up this column. K8CGS is a new QO and ORS. Bill has just completed WAS. He lacks only an Oceania QSL for Phone WAC. BYZ operated Field Day from Huntington. FNI was one of the operators. K8DDB has a new trap antenna which works very well. ESH worked several 6-meter out-of-State stations recently. Traffic: W4YAA/8 64, W8GWR 62, FNI 42, HZA 36, KXD 26, BWK 17, K8CSG 8, W8PQQ 3, K8CNB 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, B. Eugene Spoonemore, WØDML —SEC: NIT. RM: KQD. PAM: IUF. OBS: KØBTU QO: OTR. OES: KØCLJ. Another successful Rocky Mountain Division Convention was enjoyed by over three hundred in attendance, highlighted by the presence of 1NJM. Congratulations to the Denver boys on a job well done. The Colorado Springs gang turned out in force to handle the communications for the July 4 Pikes Peak Hill Climb, doing a swell job as usual. Those participating were TV, CVG, AVP, KØCEN, JAI and a number of others. Anyone wishing to improve his c.w. technique is invited to check into the Fishnet which meets at 6:30 P.M. Tue. and Thurs. on 7184 kc. KØDTK is the Kingfish. Stations in the Denver Area operating on 50 Mc. were WØs FCP, HXX, IC, IJR, IXF, RWD, TII, WIR, KØCLJ, DUZ, GKR and JIA. The Boulder Amateur Radio Club has re-

(Continued on page 130)

WE TRADE HIGHER!

Howdoody...

I'm Jack S., the new Vice-President in charge of eevaluatin' Trade-Ins. I haven't always been known as Jack S. ..... You see, the guy who made this name-plate for my desk said Vice-Presidents HAVE to have a middle initial. I said he could use the initial from my last name....then when he got to the last name I'd already used it and.....Like the sign fellow said, though, it's pretty darn effective!

I got this position because the old Vice-Pres. was "surprised" while making those famous "Surprise Trade-Ins"! They caught him making a profit! In the Trade-In Dept.! The Boss said this was unthinkable and what they needed was a real moron for the job. A few well-placed pulses through the eelectronic brain pointed to little old me from way down in the Ozarks as having superlative qualifications!

SOOoooooo .... just write me a letter tellin' me just what sorta store-bought stuff (made since 1945) you want to trade in.....and if you've been "Surprised" by an Ashe deal in the past....you'll flip your antenna at a Jack S. offer!

Jack S.

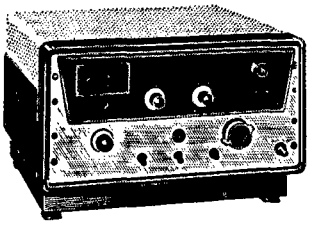
IT'S EASY TO DO BUSINESS WITH WALTER ASHE!

1. Just tell us what factory-built gear (made since 1945) you have to trade, and what new gear you wish to purchase. You'll get our top dollar quote by return mail.

2. When the deal is made, you ship your equipment to us by prepaid express or, if express is not available, by prepaid truck. We check it at once and, in most cases, your new gear is on its way to you within 24 hours after we receive your trade-in.

3. We will ship your new gear to you via express in most instances. Where express is not available, or not practical, we will ship by truck.

HALLICRAFTERS HT-32
TRANSMITTER. Net.....$675.00



HALLICRAFTERS HT-33
LINEAR AMPLIFIER. Net $775.00

HALLICRAFTERS SX-101
RECEIVER. Net.....$395.00

DO YOU HAVE OUR NEW CATALOG? IT'S FREE!

WRITE FOR FULL DETAILS ABOUT OUR TIME PAYMENT PLAN

All prices f. o. b. St. Louis . Phone CHestnut 1-1125

Walter Ashe
RADIO CO.
1125 PINE ST. • ST. LOUIS 1, MO.

WALTER ASHE RADIO COMPANY
1125 Pine Street, St. Louis, Mo.

OUR 35TH YEAR

☐ Rush "Surprise" Trade-In Offer on my.....
for.....
(show make and model of new equipment desired)

Q-9-57

☐ Send new FREE Walter Ashe catalog.

Name.....

Address.....

City.....Zone.....State.....

ceived its certificate of incorporation. KØCEZ, IA, RRV and others handled the procedure. The Pueblo Amateur Radio Club also received its certificate of incorporation. Officers are DLZ, pres.; and KØDZI, SECY. SHJ has a new Elmac mobile. Glad to hear from 7KFV/7, Trapper. KØHFB is working DX, along with KTX and KNØJSQ. The Colorado University Radio Club's officers are EHW, pres.; and KØGZU, secy. Field Day Clubs reporting were KØDTK, QPO, KØGEU, BSA, BYE and WØIA. FQK is contacting Sweden and Norway for exchange students. Traffic: WØKQD 278, KØDXF 77, WØNIT 69, QOT 69, KØDCC 64, WØYQ 35, KØCEN 12.

UTAH—Acting SCM, John H. Sampson, jr., W7OCX—SEC: GPN. PAM: DTB. Amateurs are invited to participate in the Ogden City-Weber County Emergency Net each Thurs. at 2000 MST on 29,510 Mc. Both the Ogden Amateur Radio Club and the v.h.f. section had new locations this Field Day. OCX has received a MARS Code Proficiency certificate for 30 w.p.m. QDJ spent July in W6-Land. CGW is planning 2-meter mobile operation. LRP is changing the power supply on his Morrow mobile rig to a 400-cycle, fan-belt-driven alternator along with a putt-putt engine for portable operation. His idea is to reduce wear and tear on his car engine. During Field Day CGW was elated to work ZL2MU on 10 meters with his low-power mobile rig. Also CGW worked an Arizona station early one morning while an atomic test was in progress at the AEC Nevada Test Site. He reports the blast had no effect on communications. SAZ is now on 10 meters. We expect to hear CGW on 2 meters. OCX has been in the hospital but is on his feet now. Traffic: W7OCX 2.

NEW MEXICO—SCM, Ray Birsch, W5OZ—SEC: K5DAA. PAM: DVA. Thanks for your vote which helped elect me your new SCM. Your interest and cooperation will help put the New Mexico section on the map. Now that we are part of the Rocky Mountain Division, let's dust off the cobwebs and really get going. IC, Claude Maer, Rocky Mountain Division Director, flew to Albuquerque June 12 to personally welcome us to our new division. Some 75 or more hams were present. CIN, POI and KN5JLU spent Field Day at the Four Corners (the only point in the U.S.A. common to Four State Corners). The Sante Fe Radio Club (K5EVO/5) had nine operators out on Field Day. Four AREC members were present. WNU has just put up a 10-meter vertical and is now working all bands 10 to 80 meters. DAA still is working hard for a better net for all New Mexico ECs. The net is called the Echo Charley Net and meets Sun. at 1730 MST on 7245 kc.

WYOMING—SCM, James A. Masterson, W7PSO—The Pony Express Net meets Sun. at 0830 on 3920 kc. with PSO and MWS alternating as NCS. The YO C.W. Net meets on Mon., Wed. and Fri. at 1830 on 3610 kc. with BHH, DXV and NMW alternating as NCS. DTD recently was appointed EC for Washaki County. PJX and HCA participated in the Powder Puff Derby Net relaying flight information across Wyoming from Salt Lake City, Utah, to North Platte, Nebr. The Sheridan gang handed out Wyoming QSOs on Field Day, operating the club station, GUX/7, in the Big Horn Mountains. Operators included UZR, JMM, TQT, IVL, NJI, IEC, IEG and ITW. NMW reports that heavy summer QRN slowed activity on the YO Net. Now that fall is approaching it is hoped there will be more check-ins on both the YO and Pony Express Nets. In addition to the stations reported last month MNW, YWW, KFV/6, HRM and KUB attended the Rocky Mountain Division Convention in Estes Park, Colo. Traffic: W7YWW 6, NMW 4, GUX 1.

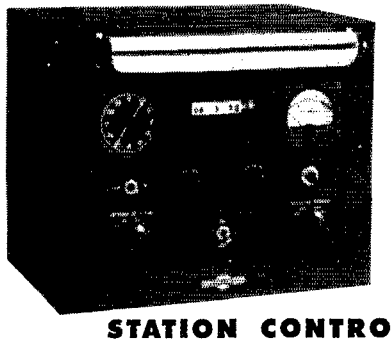
SOUTHEASTERN DIVISION

ALABAMA—SCM, Joe A. Shannon, W4MI—SEC: TKL. RM: KIX. PAM: K4AOZ. The coming of summer has brought increased activity license-wise. Welcome to the following: KN4PWD, the XYL of WHW. KN4PHU, the XYL of K4CFD. HOB passed the General Class exam. AWA's mother passed the General Class Exam. K4AJG got Extra Class, and 1st-Class phone commercial licenses. BTN moved from Kentucky and now is in Jasper. K4GLK has General Class license. I would appreciate a card from all newcomers with their calls. K4BFF has low-power linear for s.s.b. and DDH and CIU are working toward s.s.b. rigs. MI and RLG have 33 states on 6 meters while K4HQS reports 32. Six-meter activity is increasing in the section and Alabama is well represented in all the openings. K4EOG, net manager for AENT (Teenage Net) asks that all teenagers interested meet with them on 3905 kc. daily at 1630. TOI still is having a bushel of trouble with rigs. K4KJD is copying much better with a new HQ-100. HON and HKK made a deal and HKK got the fixed station and HON wound up with

(Continued on page 132)

HARVEY ALWAYS HAS IT...IN STOCK For IMMEDIATE DELIVERY

Collins SC-101



STATION CONTROL

For Smooth Coordination of Complete SSB Station

The SC-101 provides the necessary equipment to connect the Collins 75A4 and KWS1 with beam direction indicator and control, phone patch circuit, standing wave ratio meter and remote selection of any one of six antennas. *There are three units included in the system:*

SPEAKER/CONTROL UNIT . . . 312A-2

A desk-top unit that includes a 10" speaker, beam direction indicator, SWR meter, 24-hour numeral clock, lumiline operating lamp, phone patch unit, auxiliary power supply for control circuits, and terminal boards for interconnecting all units. There's also a synchro control unit supplied for tower mounting, as well as a directional coupler for use with the SWR unit.

ANTENNA SELECTOR . . . 68Y-1

The 68Y, which can be mounted on the wall near your desk, includes the antenna transfer relay, two coax relays for antenna selection, mounting bracket for directional coupler and necessary interconnecting coax cables.

WIRING DUCT & HARNESS . . . 534A-1

This metal duct mounts along back of desk or table and houses all interconnecting cables. Along the top of the duct are *ac* utility outlets. A cable harness, with wires necessary to connect the transmitter, receiver and extra control functions, is also included in this unit. $695 net

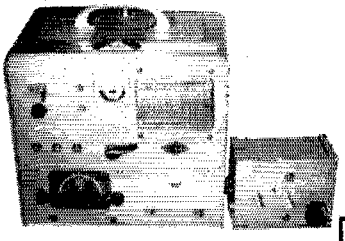
BARGAIN BUYS FROM HARVEY

CENTRAL ELECTRONICS 10A—Perfect..	$ 90.00
COLLINS 32V-3—Excellent	550.00
COLLINS 32V-2—Excellent	450.00
MORROW FTR–Complete–Display Model	89.50
MORROW 5BRF—Display Model	52.50
BARKER & WILLIAMSON 51SB—Display	224.00
BARKER & WILLIAMSON 51SB-B—Display	212.00
SONAR MB26—10-Meter Xmtr.—New ..	39.50
SONAR CFC VFO—New	24.50
SONAR SRT—120M-Xmtr.—100 Watt—New	120.00
SONAR SR-9—2-Meter Rcvr.—New	39.50
SONAR SR-9—10-Meter Rcvr.—New.....	39.50
ELDICO SSB—500½-KW Linear—Factory W. & T.—New	350.00
RME 4300 with Speaker—New	159.50
HARVEY WELLS R9A—Rcvr.—Display....	129.50
HARVEY WELLS CMA-50—New	14.50
HARVEY WELLS—Remote Control for TBS-50—New	14.50
JOHNSON VIKING II —Kit-Sealed Carton—New	219.50
JOHNSON VIKING II —Factory Wired—New	269.50
HALLICRAFTER S76—Rcvr.—Perfect	150.00

Every Month Watch This Box For HARVEY HAM SPECIALS!

IN STOCK — FOR YOUR HAM NEEDS

BELL CM-1—Mobile Carbon Mike. High Output—Rugged .....$ 9.95
CESCO-CM52 Reflectometer ..$29.95
M. C. JONES 261 and 262 ....$37.00
UNIVERSAL KW-4M Ratiometer . . . $45.00



COMMUNI-Q-BOOSTER

Here's a brand new device that utilizes the Q multiplier principle to increase the gain and selectivity of the GONSET Communicator. Designed to operate with the 6-mc if of the Communicator, the booster reduces interference between stations and improves the reception of weak signals. As a result, there's a quieter and more stable receiver. The rf capacitors in the booster are special ceramic units that are factory set for maximum Q. Inductors are of the miniductor type for high gain. Available for 6 or 12-volt. SPECIFY WHICH $25.95

HARVEY is known the world over, wherever Hams operate, as a reliable source for Ham Equipment. All orders shipped same day received.

We're Generous on Trade-Ins
If You Want to Talk SWAPS and DEALS write . . . or call **W2DIO**

NOTE: Prices Net, F.O.B., N.Y.C. Subject to change without notice.

hrc **Harvey** RADIO CO., INC.
103 W. 43rd St., New York 36, N.Y. • JUdson 2-1500
Established 1927

mobile. WOG has gone out of mobile business and wishes he hadn't. K4GOW desires to build a good receiver and would like suggestions and schematics. Can you help him? Traffic: (June) W4RLG 421, USM 94, K4BTO 92, AOZ 77, EOG 77, W4KIX 54, K4KZQ 37, ANB 21, W4RTQ 20, CNU 18, MI 18, TOI 18, YRO 17, K4BWR 15, W4CEF 15, K4KJD 15, W4WHW 14, CIU 13, ZSH 12, K4HJM 11, W4HON 11, WOG 10, DGH 8, BFX 6, TKL 6, K4KJZ 2, W4CRY 1. (May) W4CNU 73, ZSH 28, K4IPF 21, HJM 15, DDC 2, W4GJW 2, NIQ 1.

EASTERN FLORIDA—SCM, John F. Porter, W4KGJ—SEC: IYT. RM: LAP. PAMs: TAS and JQ. Section nets: FPTN, 3945 kc. 0700 Mon. through Sat.; FMTN 7230 kc. 12 noon Mon. through Sat.; TPTN, 3945 kc. 1730 daily; FEPN, 3910 kc. 1900 Tues. FSN and FN will resume operation Oct. 1. Let's all support our section nets. Their net managers will be glad to have you. The BARC assisted in handling traffic for the 8th All Woman's International Air Race. The Radiation Amateur Radio Club of Melbourne recently was organized with over 16 active members. A new phone Floridora YL's Net will be held each Sat. at 1400 EST at 7260 kc. K4CHC is the chairman of the Gainesville TVI Committee. The Manatee County AREC Net meets on 29,500 kc. every other Wed. EDH is the local RO for c.d. The Knights of the Kilocycle on 3910 kc. is maintaining an over-forty average, and meets every Sun. at 0700. Everyone is welcomed. AEP is the new Master Oscillator. The Bahamas Phone Net meets every Sun. at 0930 EST at 7210 kc. Some of the boys at Grand Bahama Island are interested in 2 and 6 meters. A couple of v.h.f. stations are known to exist there and they are looking for contacts. K4IFR has a new Viking 500. K4LQT has a new Globe Champion and SX-88. ARU is a new AREC member in Collier County. WDX is making concrete bones for the beach. Did you know that Jacksonville can work Winter Haven and others around Tampa regularly on 6 meters? TAS received a special award from the Manatee County Red Cross. K4MQC is a new ham at Okeechobee with a DX-35. NAK has a new GPR receiver. K4DHH has a new Ranger. K4DRO now has 82 countries to his credit. KL7AHD now is at Canova Beach. Your SCM and SEC enjoyed a meeting with the Key West Radio Club. Let's all continue our support of *Florida Skip*. Traffic: (June) W4EHW 223, PZT 179, TAS 82, IYT 81, K4ANJ 59, BNE 39, W1TRB/4 31, K4GOZ 19, W4GGQ 15, BWR 14, QCP 13, K4OYB 8, AHW 5, DRO 2, MTP 1. (May) K4KDN 137, GOZ 42, W4YFT 27, K4DRO 22, OYB 21, W4OVO 19, KGJ 12, BJI 4.

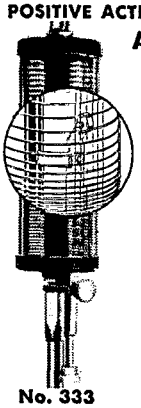
WESTERN FLORIDA—SCM, Edward J. Collins, W4MS/W4RE—SEC: HIZ. EC: MFY. RMs: AXP Escambia, BVE Okaloosa. HIZ was busy getting ready for the c.d. exercise. PIQ is enjoying 6-meter mobile operation. HBK raised the beam 10 more feet. GMS is planning a wide-spaced beam for better DX. SPP keeps 10 meters hot. OXB is planning a Yagi in place of the ground plane. K4KIF wants a kw. on 6 meters. UUF has deserted 2 for 6 meters. ODO is adding s.s.b. to the 5100. EQR is building a tower. K4ALF/4 worked all bands from 6 through 80 meters during Field Day. FHQ is awaiting delivery of a Johnson KW. K4HYL has a new RME receiver. PAA still is hunting DX. K4AH's son-in-law is K4PMP. New calls in the area are K4PRZ, K4PSB and K4PJC. DAO/DEF still helps out the newcomers. By the time this appears in *QST* the following hams will be at Fla. State in Tallahassee: GMS, K4AGM, HBK, ZFL and BGG. W4CCY still is after a crank-up mast. QK meets the Hurricane Net. PQW is heard on 75 meters. K4EHI has finally broken through with an FB signal on 6 meters from Milton. K4KYW keeps things hot on 6 meters from Ferry Pass. OKB and PJP are getting the Saufley Field Ham Club going again. AXP is rebuilding power supplies. K4IYQ is QRL TV repair work. W4UL is building a super-duper 6-meter converter. K4ECP/m is getting a DX-35 for the home 6-meter transmitter. RE has a new radio room nearly ready. VR still pounds out on 7 Mc. K4ADY is in the armed services. UYS is renewing his ticket. K4DDD did a fine job on Field Day. RDC is the new president of the Pensacola Amateur Radio Club. GRO is operating mobile. MUX sticks to 7 Mc. ZPN keeps skeds with his son. OOW is doing an FB job with low power. K4OWW is getting set for the big opening on 6 meters. K4AGM now has 32 states on 6 meters. JPD is putting up trap antennas. K1BRI is looking for the local gang on 15 meters. K4LQC operates 15 meters late at night. UCY stays loyal to 10 meters. K4IVD operates 6 meters fixed and mobile. JLW is building a new home on Santa Rosa Island. We hear rumors that NOX is moving to town. DHP is QRL 16mm. movies. YRF operates when work and school permit. ZUN is letting dust gather on the rig. RKH is heard on 75 meters. Ex-FWY has returned to Pensy after 16 years and is

(Continued on page 134)

go mobile with Master Mobile

NEW! . . SILVER-PLATED ROLLER WITH POSITIVE ACTION, STAY-PUT CONTACT

ANTENNA COILS

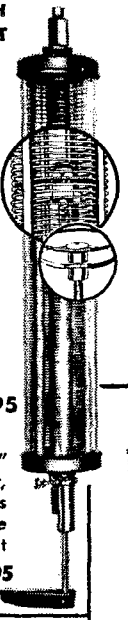


MASTER DELUXE ALL-BANDER
No. 750

HY "Q" construction with wider spacing of turns for high frequency bands. Use as center or base loaded antenna with 60" whip.

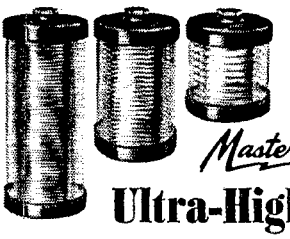
- Covers 10 thru 75 and all intermediate frequencies.
- Silverplated single turn contact, positive spring.
- Eccentric cam contact, easy selection of turn.
- Automatic lock prevents damage to coil.

Amateur net. **$14.95**



No. 333
MASTER MIGHTY MIDGET

. . . engineered to provide the highest "Q" consistent with good design. Compact, extremely rugged, yet lightweight, its operation assures precision tuning with the new adjustable silver-plated roller that stays put! Perfect for 40-20-15-11-10 meters. "Get 5 Bands Plus on 1 Coil." **$9.95**



- Ruggedized construction
- Greater efficiency
- Precision made
- 2¾" Diameter

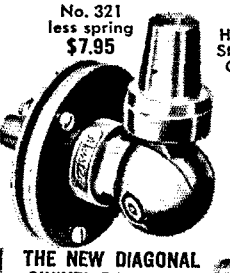
Master

Ultra-High "Q" COILS

For 80-40-20 & 15 Meters

After many years of experimentation, here is the coil with the highest "Q" ever obtained. Tested and found to have a "Q" of well over 515. Use with 36" base section, 60" whip. **$5.25 ea.**

BODY MOUNT
No. 321
less spring
$7.95



BODY MOUNT
Heavy duty Stainless Steel Coax. Conn.
$15.95

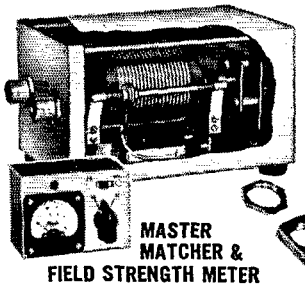
Other Mounts from **$8.75 up**

THE NEW DIAGONAL SWIVEL BALL-JOINT LOCKS IN ALL POSITIONS

W6EFX—Says!

"I would not be without a Master Matcher on my mobile rig . . . I can QSY on any band at the same time peak my antenna to the operating frequency for *maximum output.* It makes a mobile like a home station!"

W. B.



MICRO-Z-MATCH
Matches Trans. Line

MASTER MATCHER & FIELD STRENGTH METER
Automatically tunes the entire band from the driver's seat! 6 or 12 volt models **$24.95**

Complete with Kit **$7.95**

Leaders in the Design and Manufacturing of

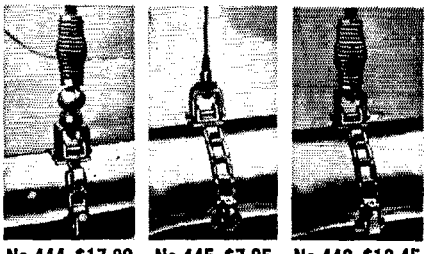
mobile equipment

AT LEADING RADIO JOBBERS EVERYWHERE

Master Mobile Mounts, Inc.

1306 BOND STREET · LOS ANGELES 36, CALIFORNIA

BUMPER MOUNTS
WITH NEW X-HEAVY DUTY CHAINS



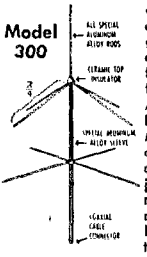
No.444 $17.80 **No.445 $7.95** **No.446 $13.45**

Adjustable to any bumper. No holes to drill, easy to attach. High-polished Chrome Plated ⅜"-24 thread, to fit all antennas. Precision engineered.

GROUND PLANE ANTENNA

Outperforms any type mobile vertical dipole, "Drooping" type. Gives a low angle of radiation for general coverage. Ideal for CD, defense nets, Amateur, Broad Band. Matches 52 ohm coax cable. Adjustable radials. For medium or low-powered trans.

Model 300



Net $12.95

NEW NOISE-FREE

E-Z-OFF
ANTENNA CONNECTOR

Connect or remove your loading coils, whips or mounts in a jiffy. No wrenches, pliers or screwdrivers needed. High-grade stainless steel throughout.

- ***Precision made***
- ***Maximum efficiency***
- ***Positive lock—will not corrode***

AMATEUR NET **$2.95**

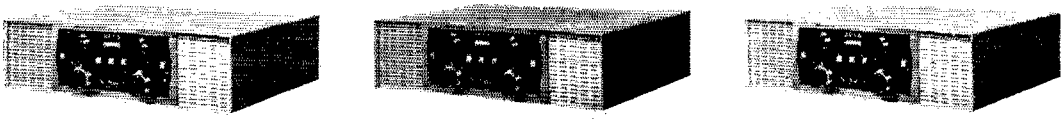
Commandant of Corry Field. K4PIN is planning a fixed antenna for mobile operations. 11F is another newcomer to the area. MS finally worked Georgia on 6 meters for state No. 42. HQG does an FB job on 75 meters. How about some dope from Panama City, Tallahassee and Marianna?

GEORGIA—SCM, William F. Kennedy, W4CFJ—SEC: K4AUM. PAMs: LXE and ACH. RM: PIM. GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs. and at 0800 EST Sun.; ATLCW on 7150 kc. at 2100 EST Sun.; GSN on 3595 kc. Mon. through Fri. at 1900 EST with PIM as NC; the 75-Meter Mobile Phone net on 3995 kc. each Sun. at 1330 EST with UUH as NC; the Atlanta Ten-Meter Phone Net on 29.6 Mc. each Sun. at 2200 EST with VHW as NC. It sure was nice to get reports from 22 clubs in Georgia that participated in Field Day. The Cherokee Amateur Radio Club of Dalton elected K4CCJ, pres.; K4CIR, vice-pres.; HIO, act. mgr.; K4PNP, secy.-treas.; K4KMH, pub. director. It was a pleasure to meet with the Dalton Club recently. KN4OQY is a new Novice in Cedartown. We were very happy to present the new charter of reorganization of the Albany Radio Club on June 28. ETD transmitted 47 bulletins in 18 days on s.s.s.c., c.w. and a.m. on four frequencies. K4COG has a new mobile installed in the car. FGH (BXV's 2nd operator) worked 485 stations in Field Day. K4CFO won a scholarship and is going to Emory in the Fall. K4CSL is enjoying 75-meter phone. KN4QCE is a new Novice in Forsyth. K4DWF has up a new 80-meter antenna. K4HOU is doing research at Emory U. during the summer. K4ADU is DL4BL now. LQQ is DL4ABJ. IPL has a new QTH and new antennas. W4WKP has a new C.E. 600L is on the air now and is putting up new antennas for all bands. ZD has a new 15-meter antenna and is getting good results. Had a wonderful visit with BQT, K4INN, ETD, LVE and others in Valdosta recently. GSN is increasing each month with many new members. CH is EC for Wilcox, Ben Hill and Turner Counties. VWO is EC for Telfair County. YEK is EC for Fulton and DeKalb Counties. Traffic: K4LVE 156, W4PIM 135, K4MCL 85, W4ETD 60, K4CSL 45, W4BXV 17, K4BAI 15, DWF 10, W4ZD 10, K4GNO 6, CFO 5, CFN 4, HOU 4, W4MVZ 3.

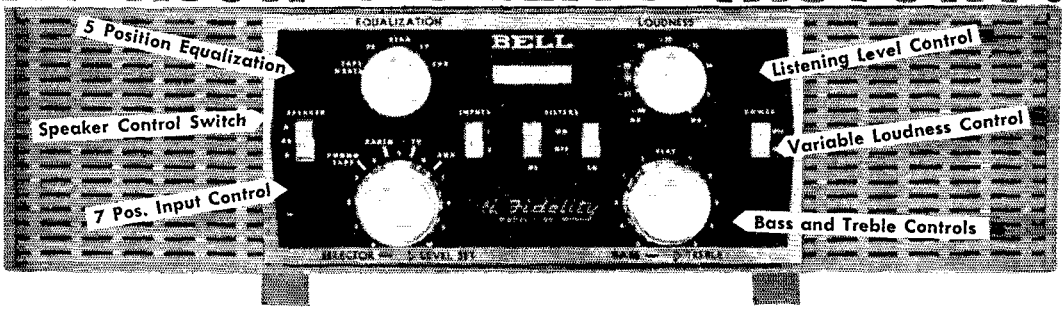
WEST INDIES—SCM, William Werner, KP4DJ—SEC: AAA. HZ resigned as SEC and has been replaced by KP4AAA. If you have not yet received an AREC registration form, contact AAA, DJ or your local EC. The NCS of the P.R. Amateur Emergency Net is now operating from the new police headquarters building in Hato Rey with the call KP4DC using a Viking KW and NC-300 receiver. The present staff of operators includes DC, DJ, SZ, AAA, AAM, ABA and ACQ. If you would like to join our staff visit us Wed. at 7 P.M. New net time is now 7 P.M. instead of 8 P.M. AAM, AFROTC Radio Club president, has been appointed EC for the San Juan District. ABN is Asst. EC for v.h.f. activities. The recently-formed Mayaguez Amateur Radio Club announces a certificate award for contacting ten stations in the Mayaguez District. Certificate No. 1, was won by WT, No. 2 by HG and No. 3 by KV4BA. Send cards to the secretary, KP4HG, F-18-A, Mayaguez Terrace, Mayaguez, P.R. The UPR AFROTC Amateur Radio Club and the Colegio San Jose Radio Club will co-sponsor the "Worked Ten Puerto Rican Novices Contest" to be held Sept. 8, 15, 22 and 29, using the 15-meter band between noon and midnight of these dates. Send calls of stations worked to Dept. of Air Science, Air Force ROTC Det. 755, UPR, Rio Piedras, P.R. The UPR Radio Club, as part of AFROTC, has been assigned the call KP4FAE. AED advises that KP4NY, the Colegio San Jose Radio Club station, now has 10- and 15-meter beams fed by the Globe King 500A. AED is using an AT-1 and simple modulator from a mountain-top location called "Guineo" to report into the 3925-kc. Net. KV4BA is MARS AH2BY in St. Thomas, V.I. W2GRM, ex-DL4OR, is now located at Fort Brooke and will be on s.s.b. using a BW-5100 and an s.s.b. generator driving a pair of 4-400As. KV4BV is on 20 meters with a TBS-50 and dipole. KV4BV is Assistant District Attorney for St. Thomas. KV4BA has a new 75A-4. KP4AEB is a new station at Humacao. AJN, at Isabella, is operator at MARS KP4FAC at Ramey AFB. KP4ABA and KV4BD participated in an 11-meter contest on June 9. KP4BR transferred to Arinc at Denver. W5UGO/KP4 and W4LEV/KP4, at Vieques Island Marine Corp Maneuvers, have returned to Parris Island. YR, trustee of AJH at Colegio Ponceño Amateur Radio Club, is trying to get standing waves off the coax feeder from the Tri-bander beam. RF stays in the DX-100 transmitter. YD is on 3925 kc. after putting back up the coax-fed antenna. AAA has a B29 prop-pitch motor to turn his two-element 20-meter beam. WD has a new prop-pitch rotator to

(Continued on page 136)

GREATEST AMPLIFIER SALE



IN HIGH FIDELITY HISTORY!



THE FABULOUS Bell 2300

RADIO SHACK SCOOP!

- ★ *20 Watts — 40 Watts Peak!*
- ★ *20 to 20,000 cps ±.5 db*
- ★ *Rumble and Scratch Filters*
- ★ *Built-in Pre-amplifier*
- ★ *7 Inputs — including tape!*
- ★ *5 Position Equalization*

Reg. Net ~~$109.95~~

$74.50

$7.50 Down - $7.50 Per Mo.

FREE!
224 Page — 1958
RADIO SHACK CATALOG

Radio Shack Corporation
167 Washington Street Boston 8, Mass.

_____Please send FREE 1958 Catalog

_____Bell 2300 Amplifiers @ $74.50 ea.

_____Check or M.O. Enc._____Time Pay Plan

TO:_____
Name (Please Print)

_____
Address

_____
City State

Never before such features . . . such convenience . . . such breathtakingly realistic reproduction of music . . . *priced so startlingly low that it staggers the imagination!* The BELL Model "2300" 20 watt high fidelity amplifier has been designed to satisfy the most discriminating sound enthusiast. In addition to the dream features listed, the "2300" boasts extremely low harmonic and intermodulation distortion; a continuously variable LOUDNESS CONTROL for exact tonal balance at any listening level. Independent bass and treble controls afford 16 db boost and 20 db cut. Two sets of 4, 8, 16 ohm and Hi-Z recording outputs allow speakers to be switched from front panel. Handsome beige and white cabinet with rich brown and gold escutcheon. Size 4" H. x 15⅝" W. x 11⅜" D. Ship wt. 20 lbs.

Order No. 33-200Q

Shipped by Express Only. Please include sufficient monies for insurance and express charges. Unused amounts will be refunded immediately.

RADIO SHACK CORPORATION

BOSTON: 167 WASHINGTON STREET NEW HAVEN: 230 CROWN STREET

turn his three-element 20-meter beam, RD now has an HRO-60 alongside the 75A-3. RC ordered an SX-101 receiver. MS has a 600L amplifier. ES sold the BW-5100B, 51SB generator and L1000A amplifier and now has a KWS1. The UPR AFROTC Amateur Radio Club held Field Day exercises at Punta Salinas using the call KP4US/KP4. On Field Day the Ramey AFB Amateur Radio Club had 12 operators working 4 bands using the call KP4UY/KP4 at Ramey AFB. The Mayaguez Amateur Radio Club had eleven operators at a location between Añasco and Rincon. The British hurricane guard ship, the Royal weather ship *Victory Bay*, checks in on the 3815-kc. Antilles Net. The West Indies Ragchewing Club meets daily at 9:30 A.M. between 7125 and 7175 kc. VP2VB, of *Yasme* fame, overnighted in San Juan at the QTH of KP4KD on his way to visit KV4AA, St. Thomas, on June 17. HG, Mayaguez ARC secy., sends a program of the club's July activities. A new station at a strategic location is KP4AHL, on Vieques Island to the east of Puerto Rico. WV4BW is a new Novice at St. Thomas using a DX-20 on 40 meters. ABA replaced 17 condensers in his HRO. ABW is coordinator between CAP and c.d. Traffic: KP4WT 85, DJ 4, AAA 2, US 1, UY 1.

CANAL ZONE—SCM, P. A. White, KZ5WA—The Canal Zone Amateur Radio Association's Field Day station made 600 contacts, of which 477 were on 15 meters, in spite of the fact that one of the two transmitters broke down for five hours. VR worked W9PNF, ex-KZ5WJ, on July 4 and found KZ5RM and KA there with K4AEE. They were expecting ex-KZ5s BD and DW to arrive that evening for an old-fashioned Canal Zone get-together. VR worked KH6AGB for their 119th QSO in July and is awaiting the arrival of the gilt-edged QSL card promised by Vic. JS is on leave in Florida and Georgia with his family. DH is on leave in New England with his XYL, who is studying for her Master's Degree in teaching. WZ has returned from leave and now has four 6AG7s in grounded grid running 200 watts s.s.b. Ex-CF reports through JJ that he has just completed temporary duty at "Lost Wages, Nev." A new operator is RJ. Traffic: KZ5VR 72, WA 15.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W6JQB—SEC: LIP. RMs. BHG and GJP. PAMs: K6BWD and ORS. Field Day turnout looked bigger and better than ever before. Congrats to GYH and K6MCA, who made BPL this month. K6ETK and K6GGS are new Emergency Coordinators. DX is going great guns. RW received a card from FW8AA. K6ICS is working South Americans. K6IYJ has 15- and 20-meter beams up. K6COP worked CR7AH. NJU put up a new three-element 20-meter beam. K6OQD now is Chief NCS of ALN2. K6UYK is QRL with glider soaring and glider meet. K6MON made GMTHC. Congrats, Bud. MEP is putting a 420-Mc. repeater station on the air. K6HVC is expecting her 5th harmonic. Congrats, Marge. OLZ is organizing c.d. in Hawthorne. New officers of Rio Hondo Radio Club are K6ACF, pres. (first YL pres.); K6RIP, vice-pres.; K6RTG, secy.; UKC, treas. Public Service awards were received by INH, USY and JQB. CMN is busy with QSL printing. BHG is keeping SCN running in fine shape. K6KUF has a new KWS-1 and a 75A-4. QR is opening a ham parts house in Hemet. Support your section net. SCN, 3600 kc. 1930 PDT daily. Traffic: (June) W6GYH 635, K6MCA 570, MON 260, OZJ 232, COP 147, GOK 135, W6BHG 133, INH 103, VSH 84, K6OQD 64, W6ORS 37, K6HVC 31, EA 26, GUZ 22, W6BUK 18, K6PLW 16, DDO 10, GTG 10, W6USY 8, OLZ 7, MEP 6, K6HOV 4, ICS 4, W6YSK 4, BEQ 2. (May) K6LVL 78.

ARIZONA—SCM, Cameron A. Allen, W7OIF—SEC: YWF. PAM Arizona Emergency Net: ASI. PAM Grand Canyon Net: LUJ. Both nets were quite active all through June. FKK is active both on c.w. and RTTY and keeps plenty of traffic moving. We heard quite a few groups out on Field Day but received reports from only four. MAL and gang were on Mt. Union. UCA and the Mesa gang were lost in the woods but they kept things humming anyhow. The Arizona Amateur Radio Club of Phoenix was on Mingus Mt. YBZ has been moved to a hospital in Los Angeles. Listen on 3865 kc. for the latest bulletins on him. Traffic: W7FKK 224, YWF 22, OIF 8, CAF 6.

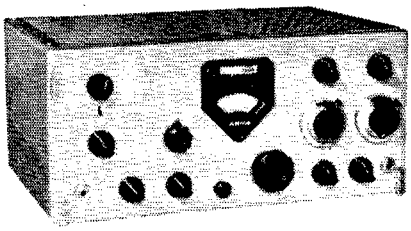
SAN DIEGO—SCM, Don Stansifer, W6LRU—New officers of the Convair Club are K6IAF, pres.; 7WYJ, vice-pres.; K6QXN, secy.; K6EDA, treas. New officers of the Coronado Club are K6SQC, pres.; JVA, vice-pres.; HQC, secy-treas.; NLK, corr. secy. K6PZE is a new member of the Helix Club. A welcomed visitor and operator with the Helix Club during Field Day was Hal Devoe, ex-MI, who is now KL7MF with the FCC in Alaska. VE7AFO now lives in San Diego. FWF

(Continued on page 138)

HARRISON
IS HEADQUARTERS for *Collins*

the Cadillac of Hamdom!

It actually costs less per year to own the best, especially when you get it from Harrison.



You can be enjoying this new Collins KWM-1 Mobile/Fixed Trans-Receiver while paying as little as

$39 A MONTH!

(Even less, if your trade-in and down payment come to more than $68 and the low carrying cost.) You always get the best deal from Harrison!

FOR QUICKEST DELIVERY—

send me your order right now! A deposit of only $5 (returnable any time you say) will start fast action. If you have a trade-in, tell me all about it so I can give you the very highest allowance. Mention the approximate terms you would like, and give employment and credit references.

Prompt, safe shipment to most anywhere in the world, or, you can "Come and get it!" and take it safely home with you.

ALL ROADS LEAD TO HAM HEADQUARTERS, U.S.A.!

because here, in the World's largest trading center, you can get more for your money. Our tremendous volume gives you the benefit of truly lowest overhead per transaction. You get the greatest values, the latest improved equipment, the lowest prices, the easiest terms, the "hottest" trade-in deals, all with the friendliest personal and helpful Service.

Hurry on in! With the new highways, it really isn't much of a drive, from even Maine, Ohio, or Virginia! Easy parking. Bring along your old gear, for my tip-top allowance. I guarantee you'll go home delighted.

73, Bil Harrison, W2AVA

From South and West: Thru New Jersey, leave Holland Tunnel in "Downtown" exit lane, continue straight down for 12 blocks.

From North: Thruway exit 7, Saw Mill River Parkway, (or George Washington Bridge), down Henry Hudson Parkway and West Side Highway. Exit at Chambers St., left on Chambers 3 blocks to West Broadway, right 4 blocks.

From New England: Merritt Parkway, to West Side New York via Henry Hudson and West Side Highways. (See "From North")

From Long Island: Via Brooklyn-Battery Tunnel, right on West St. 9 blocks to Vesey St., right 2 blocks to Greenwich St., left ½ block.

Via Tri-Boro, Queensboro, or Midtown Tunnel: East River (F.D.R.) Drive downtown, and around thru underpass tunnel to Brooklyn Tunnel entrance, but continue straight up West St. 9 blocks to Vesey St., right 2 blocks to Greenwich St., left ½ block.

All New York SUBWAYS can bring you to Ham Headquarters, U.S.A.! —

IRT, Lexington Ave. Express to Fulton Street station, up Broadway to Barclay St., left 2 blocks.

IRT, 7th Ave. Express to Chambers Street station, down West Broadway 4 blocks.

IND: Take A, AA, CC, or D train to Hudson Terminal (Chambers St.), one block west on Barclay St.

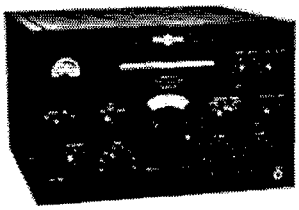
BMT 4th Ave. line to City Hall Station, walk two blocks west on Barclay St.

It's even easy by TRAIN!—
Penn Station: Take IRT Subway Express downtown 2 stops to Chambers St.

Grand Central Station: Take IRT Express downtown 3 stops to Fulton St.

Hudson Terminal: Fulton St. exit, left 1 block to Greenwich St., right 1½ blocks.

Barclay St. Ferry: 2 blocks east to Greenwich St.



No question about it! You're just not getting the most operating fun per hour unless your receiver is a new Collins 75A-4! With almost any kind of a trade-in as down payment, *we'll surprise you with how little a month it takes for you* to have the pleasure of using the best!

WANT TO STUDY IT? You can have the complete big illustrated Instruction and Service Manual for any model, just by sending a $5 returnable deposit. Or, we'll gladly send you FREE literature.

KWS-1 SSB/CW/AM TRANSMITTER. The favorite with thousands of discriminating Hams who take pride in owning the very finest!

You can get yours, a latest improved production model, from Harrison for

ONLY $79 A MONTH.

(Your trade-in and down payment totalling more than **$199** and the low finance charge will make the monthly payments even smaller!) Let's talk it over, now, so you can start living it up, while you're still young enough to enjoy it!

Our big Jamaica Store is Ham Headquarters for ALL LONG ISLAND!

Conveniently located on Hillside Ave. at 145 Street. Easy parking.
Open Friday nites 'til 9.
REpublic 9-4102

HARRISON
Ham Headquarters Since 1925
225 GREENWICH STREET
NEW YORK 7, N.Y.
PHONE ORDERS - BARCLAY 7-7777
LONG ISLAND – 144-24 Hillside Ave., Jamaica

The world-famous HARRISON TRADE-IN CENTER

is the greatest! Come, pick your choice from the hundreds of like-new trade-ins, all money-saving bargain price tagged! Easy terms, trades.

vacationed in Washington and Oregon. Don't forget the Annual Upper Ten Picnic to be held at Glenn County Park, Cardiff, Sept. 15. New members of the North Shores Club include VE7AFO, W5TFS, W6VEO, KN5JUD, K6AJV and W6STN. New officers of the Rohr Communicators include K6LKY as president and KN6STH as vice-president. CAE and WNN again proved their ability in the recent F.M.T. by requalifying as Class I Official Observers. K6BTO, OWV and W6LWT continue to lead the gang down here as OESs. OWV worked Santa Barbara on 144 Mc. with a 4-tt. hunk of wire as an antenna. He is building an 832A tripler for 434.7 Mc. LWT has now completed a 4X150 cavity rig for the higher frequencies. KN6VUL now has a twin six antenna on a 40-ft. tower for 144 Mc. EOT, who is RM, EC and ORS, continues to lead the section in traffic-handling for single operator stations, and was awarded the BPL Medallion recently. Congrats to JVA, who was third high in the country on c.w. for the Spring CD Party. With school starting soon and most vacations now over, your SCM hopes more clubs and individuals in this section can find time to send news in each month for this column. Traffic: W6EOT 359.

SANTA BARBARA—SCM, Mrs. Dorothy E. Wilson, W6REF—Asst. SCM: Bill Farwell, 6QIW. SEC: K6CVR. K6SJG has a Technician Class ticket and is working to join her OM, K6SJF, and his twin, K6SJC, with a General Class license. K6QGZ and 1WD vacationed together in the High Sierras, both mobile. The Paso Robles RC shattered all its previous Field Day records with 885 contacts, 47 states, 8 countries and 67 ARRL sections. AGO and MSG were top scorers. Other operators were ALQ, BRY, FYW, TOP, K6THH, IBT and KN6THT. CMR received a Fresno State College scholarship award. K6OIS is on 40 meters from Yellowstone National Park where his band is playing. WYN and family are QSYing to Kwajalein. CQR is using 813s in Class B linear. K6VMN and KN6CYY are newcomers to Oxnard. Nets: The Peanut Whistle Net, 3850 kc. 0830; the Tri-Counties Net, 3820 kc. 1200; the Channel Cities Net, 2 meters 1800. Traffic: W6REF 79, QIW 44, PWK 3, JPP 1.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, Ray A. Thacker, W5TFP—Asst. SCM: J. Bruce Craig, 5JQD. SEC: BNG. PAMs: AEX and IWQ. RM: AHC. SFW made WAS on 6 meters. HTH is the proud owner of a new Valiant. AEX and the NT-O continues to show an increase in traffic handled. GPO is now on s.s.b. with a new HT-32. The gang at Waco hosted our SEC at a visit which was very much enjoyed. KN5KRV is now on the Novice bands from Sherman. AUJ received a very interesting booklet on Moscow from UA3BJ. The Highway Department is processing and mailing application blanks to all amateurs who have previously had call letter plates. October 1 again will be the deadline for getting your form back to them for 1958 plates. Act now and avoid the last minute rush! Remember, regulations require that you have a working rig *installed* in your car in order to enjoy the privilege of displaying call letter plates. It looks very much as if the usual "summer slump" has us in its grip. There was a very great decrease in activity reports, etc., as of this month. Hope everyone enjoys a safe, restful vacation and when the temperature in the ol' shack drops back below the 100 degree mark that we will be hearing you on the air again. Please remember to drop us a card or QTC come the end of the month, letting us know what's new from your QTH. Remember, also, official appointment openings exist in all categories. What would you be interested in? Let me know! Traffic: (June) K5WAB 1700, FFB 382, W5AHC 257, K5BKH 217, W5DTA/5 120, TFY 69, K5WAT 56, HTH 4. (May) W5DTA/5 134.

OKLAHOMA—Acting SCM, Richard L. Hawkins, W5FEC—Asst. SCM: James R. Booker, 5ADC. SEC: LXH. PAMs: KY and MFX. RM: JXM. As your SCM until a successor to GIQ can be elected I wish to continue the excellent appointments that Ewing made for the various jobs. New officers of the Bartlesville Club are EKA, pres.; K5AOV, vice-pres.; K5BSU, secy.-treas. The section was well represented during Field Day but thunderstorms marred the day. VAX is going s.s.b. K5CAY installed a new 5EL Tri-Band beam. Your SCM logged visits from Army reservists ERM and WAY. BLW and SCX had a successful V.H.F. Party atop Mount Scott. K5DLP is hospitalized with a heart attack. Best wishes for a speedy recovery, Bill. The Storm Warning Net had a busy month with several twisters over the State. DRZ moved to Yukon. K5JSM is back from military duty. ØIEL moved to Vinita. New Novices: KN5KRI and KWI. K5BSU and K5BSV hope to do some mobiling while vacationing in

(Continued on page 140)

Canada. Fellows, keep the reports of your activities coming in as that is the only way this report can be written. Traffic: (June) W5VNC 272, ESB 227, K5EGS 201, CAY 100, W5QVV 68, K5CVU 58, W5CCK 57, K5DVE 57, W5VAX 56, FEC 26, MGK 21, K5AUX 17, W5PNG 12, K5CBA 6, HIV 4.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: QKF, QKF, EV, MSA, LMU and FNT attended the STEN Convention at Kerrville. EV is the new NCS for STEN, with UNE as ANCS. At their business meeting the members voted to register with ARRL, after 21 years of operation as an emergency net. KN5KNY and KN5KOM are new Novices in El Paso. KOK has a new pair of 45-ft. antenna poles. K5INM is leaving for Yakima, Wash. I am sorry to report the passing of BYE on June 5. He will be missed in West Texas. OZQ is 2-meter mobile. K5GUH is s.s.b. EJT is working lots of DX on 15 meters with his Ranger. FQA has a complete transistor station. KN5JCC has dropped the "N" from his call. QKF and his XYL visited in Little Rock with RPH and his XYL. Sorry to hear of the passing of AFC. FSC and 2NLY made the first Texas to New Jersey 2-meter contact. ADZ has a new four-element 15-meter beam. ENT visited the Corpus Christi Amateur Radio Club. KN5KNS is a new YL operator in Houston. The boys and girls in East Texas and Louisiana are to be congratulated on the good job they did during and after the passing of Hurricane Audrey. Well done. Traffic: W5DTJ 152, EGD 34.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: Aaron Solomon, 1OC. SEC: 1FH. 50-Mc. activity is on the increase with ZM, KZ and ACL on the air from Prince Edward Island and ADB operating from Sable Island. RR has been transferred to Washington, D. C. Bill Sullivan ex-8DE, is now 1TV. 3AHU has been operating from the Gaza Strip and has worked FQ frequently. Requests for QSLs should be addressed to 3AHU, Barrie, Ont. Nearly all Maritime clubs were active during Field Day. All Maritime amateurs regret the sudden passing of XL. UT attended the hamfest at North Bay, Ont. Bernie also attended a recent c.d. course at Arnprior, Ont. ADH and GA have accepted appointments as Emergency Coordinators. Asst. SCM OC recently visited the Truro and Colchester Radio Clubs. Mr. H. H. Brannen has been promoted to the position of District Superintendent of the Radio Branch, Department of Transport, on the retirement of Mr. George Harris. Congratulations to Mr. Brannen and many happy days to Mr. Harris. Traffic: VE1FH 42, ME 16, UT 10, AEB 8, DB 7, OM 5.

ONTARIO—SCM, Richard W. Roberts, VE3NG—From all reports, this year's Field Day was one of the best yet. CE is back on after a lengthy absence. AVS visited AZZ in Cochrane. ZR has been active since 1919 and is now in St. Thomas. He is ex-VE2FO. The St. Thomas Club was active in the c.d. (provincial) Operation Alert. BXK has a flying ticket. DXT's XYL, Barbara, is to solo soon. AES is working FB DX on 20 meters with his new W8JK antenna. BUR visited ARRL Headquarters. DH won his WAS and has a new QTH in Ottawa. The Kingston ARC and the Nortown Club received nice publicity on their Field Day efforts. NE, aboard the Aircraft Carrier *Bonaventure* on her maiden voyage to Canada, was active on 20 meters. AHU/Gaza comes in fine on 20 meters also and was heard working the following: ATU, AML, ARS, AZQ, KT and VE1OC and FQ. Traffic from our boys in Gaza to their folks here at home is heavy. We welcome a new club, the Kapuskasing Amateur Radio Assn., which operated ham gear at the local Hobby Show Aug. 3, 4 and 5. TM is DXing on 20-meter c.w. DQX is doing an FB job as editor of the Metro Club's paper, the *Modulator*. The Peterboro Club supplied the communications for the motorcycle races held there recently. 6HI still is in the Toronto Area. NF visited DVM and ARF/3 at Mazinaw Lake. Your SCM made it to the North Bay Hamfest this year. Hurricane Audrey stepped in and WX was stormy. BBH won the Capt. Morgan Trophy for his swimming ability and costume. The Collins receiver was won by DU, of London. Emergency communications were set up by the SCM and the EC in the Lake Simcoe Area following a tornado that did millions of dollars of damage early in July. Traffic was passed from three mobiles at Keswick to Toronto Civil Defense Headquarters. EC DSM was in control at the lake while NG coordinated the operation from Toronto at the c.d. radio room. The following were active: NG, DSM, BBD, BUT, AWC, YS, NP, GJ, AJA, DZA, AER, DQX, DXT, DUU, AIB and IZ. This was the first joint effort of the AREC and the Metro C.D. of Toronto in a disaster where emergency communications were required. Some of those seen at

(Continued on page 142)

The Nation's Best Deal!

1. ONLY 10% DOWN PAYMENT—UP TO 24 MONTHS TO PAY
2. WE HAVE OUR OWN TIME PAY PLAN
3. OTHERS CLAIM IT—WE REALLY GIVE IT—PERSONAL SERVICE
4. ALL ORDERS SHIPPED SAME DAY RECEIVED
5. WE GIVE A DOUBLE BARRELED GUARANTEE—THE MANUFACTURER AND BURGHARDT'S
6. OUR TRADE ALLOWANCES ARE TOPS

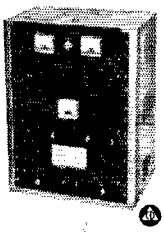
BIG NEW CATALOG!

40 PAGES PACKED WITH AMATEUR GEAR & ACCESSORIES.

SEND FOR FREE COPY TODAY!

Now, increased safety factor through use of the 4-400A Final Tube

Globe King 500B



A bandswitching transmitter for 540 watts on fone and CW; 540 watts on SSB (P.E.P.), with 10W external exciter.

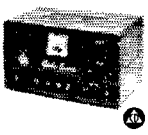
Outperforming any rig in its price and wattage range, the King bandswitches 10-160M in a 31x22x14¾" handsome cabinet, especially designed for TVI-suppression. The Transmitter is relay controlled; includes a built-in antenna relay; built-in VFO; and separate power supply for modulator section, allowing better overall voltage regulation. Commercial-type compression circuit keeps modulation at high level. King features grid-block keying for signal clarity. Pi-network matches most antennas, 52-600 ohms. Provisions for crystal operation.

Only **$72.50** *Down*

Cat. No. 145AF001 — Wired & Tested....**$725.00**

All WRL Electronics Transmitters operate on most CAP and MARS frequencies.

Globe Scout 680



65 watts CW; 50 watts on fone, plate modulated.

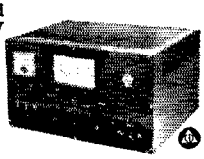
A compact, self-contained, bandswitching transmitter for operation of the 6 through 80 meter bands, with built-in power supply. High level modulation is maintained. TVI-suppressed cabinet. Pi-network output on 10-80M; link-coupled on 6M, matching into low impedance beams. New type, shielded meter. Globe Scout 66 is identical, except bandswitching 10-160M. Size: 8x14x8".

Only **$11.00** *Down*

Model 680
Cat. No. 145AF007 — Kit..... **$89.95**
Cat. No. 145AF006 — Wired & Tested **$109.95**
Model 66
Cat. No. 145AF005 — Wired only.... **$99.95**

FCDA Certified on factory wired and tested models for crystal controlled operation.

Globe Champion 300



A bandswitching, 10-160M, Transmitter for 350 watts CW, 275 watts fone, and 300 watts SSB (P.E.P.), with any 10W external exciter.

The single-switch bandswitching Champion is extensively TVI-suppressed, filtered and bypassed. High level Class "B" modulation is sustained without usual clipping distortion through use of a new commercial type compression circuit. Pi-network output circuit, 48-700 ohms, built-in VFO, push-to-talk, antenna changeover relay, and improved Time Sequence keying are all features. 1000 volt plate capacity of Final tubes offer 33⅓% safety factor. Only 12x21⅜x17" in size, self-contained.

Only **$44.90** *Down*

Cat. No. 145AF011 — Kit.....**$375.00**
Cat. No. 145AF010 — Wired & Tested....**$449.00**

Globe Chief 90

A completely bandswitching, 90 watt transmitter for 10-160M.

Here's a compact, 8x14x8", sturdy rig with well-filtered, built-in power supply. Pi-network matches most antennas from 52-600 ohms. Modified grid-block keying is employed for maximum safety. Has provisions for VFO input and operation. Kit form includes complete manual and all tubes and parts. Meter and cabinet carefully shielded for reduction of unwanted TVI.

Only **$6.75** *Down*

Cat. No. 145AF013 — Kit.....**$54.95**
Cat. No. 145AF012 — Wired & Tested.**$67.50**

Guaranteed
FOR ONE FULL YEAR

Burghardt RADIO SUPPLY

Satisfaction Guaranteed or your money refunded after 10 day trial.

P. O. Box 746, Watertown, So. Dakota • Phone 5749

North Bay were DEX, GH, BBH, 2BE, our Canadian Director, 2CA, AMB, DEW, ADA, AKC, DUU, DPO, KM, DSM, BUT, TA, BUR, AQB, AWC, YD, RH, RG, IB, AIB, DFA, TX and EAW. Ontario operators are envious of the VE2 license plates (Quebec). We still have hopes. Write your M.P.P. please. Traffic: (June) VE3BUR 135, DPO 88, NO 86, NG 65, AUU 44, TM 24, DWN 12, DH 9, AES 8, APL 5, CE 1. (May) VE3AVS 14.

MANITOBA—Acting SCM, James Elliott, VE4LF—Our good friend JA is expected to leave for VO-Land soon. HB has a GO9 on 20 meters. SR is now back to work, and spends week ends at Lake Brereton. KL/LO moved to a new QTH July 1 where there will be more room for antennas. NN has been heard with his mobile once since he moved from Saskatchewan. Would like to hear you more often, Larry. MN was a visitor at the last ARLM meeting. Mert brought his jr. operator back to the hospital. We hope he gets well soon. SA is doing an FB job on 80 and 20 meters. WK is leaving for a visit this summer to the U.K. GE, IF and PE returned (loaded with loot) from the Northern Saskatchewan Hamfest. Thanks for a lovely time, gang. The Winnipeg gang has been working overtime preparing for the hamfest, to be held Labor Day week end. Traffic: VE4AY 10, QD 10, GE 6, JY 6, LF 5, AN 4, AG 2, KN 2, HB 1.

ARRL Model 6-60-90

(Continued from page 18)

show up at 3720 kc. or a bit higher when the receiver is retuned.

Switch the band switch to the 11-meter position and the receiver to either 3.37 or 26.96 Mc. The v.f.o. signal should now be heard when C_3 is adjusted to approximately 25 per cent of maximum capacitance — about 75 on the dial. Tune the receiver to either 3.405 or 27.24 Mc. and rotate C_3 toward minimum capacitance until the signal appears. With the original tank this occurs with about 5 per cent of the capacitance of C_3 in use.

The v.f.o. should now be tuned to 3750 kc. and L_1 in the *transmitter* adjusted for maximum deflection on the v.t.v.m. If the latter is not used, tune L_1 for maximum final-amplifier grid current. In this case, V_3 must be activated with the excitation control at maximum, and the transmitter switched to 3.5 Mc. — without plate voltage to the final.

Readings that may be expected with the v.t.v.m. and the grid meter are approximately 150 volts and 3.5 ma., respectively. The voltage will fall to 100 volts or so and the current will drop a bit when the v.f.o. is tuned to either 3.5 or 4 Mc. Voltage and current will fall off a good deal more when the v.f.o. is switched to the 11-meter range, but this can be compensated for later on by proper adjustment of L_4 and L_9.

Alignment of the r.f. exciter at 7 through 28 Mc. may now be checked. If the stages have been previously peaked at the centers of the bands with crystals in use, it should not be necessary to readjust any of the transmitter coils. Of course, it will do no harm to retouch the slug tuning for each stage with the v.f.o. set for harmonics that fall at 7.15 Mc., 14.175 Mc., and so on.

Using an inter-unit cable appreciably less than fifteen feet in length will reduce the capacitance across the tuned circuit, thereby raising the operating frequency of the v.f.o. tank.

(Continued on page 144)

FREE! LAFAYETTE CATALOG

NEW 180 PAGE ELECTRONIC CATALOG FEATURING THE BEST BUYS IN THE BUSINESS

The newest and largest assortment of Electronic, Radio and TV parts, Hi-Fi and Public Address Components and systems, Test Equipment, tubes, Transistor Kits and miniaturized components for transistor circuitry, Ham Equipment, Builders Kits, Tools, Books, Microscopes, Binoculars, Telescopes, Cameras, and Drafting Equipment.—ALL AT LOWEST PRICES—Catering to the economy minded dealer, serviceman, engineer, technician, experimenter and hobbyist. CRAMMED FULL OF MONEY SAVING BUYS. SEND FOR YOUR FREE COPY TODAY.

LAFAYETTE SMASH HAM CLEARANCE

DEMONSTRATOR CLOSEOUTS PRACTICALLY AT COST!

ALL NEW AND IN PERFECT SHAPE!

QUANTITY LIMITED!

SUBJECT TO PRIOR SALE

MENTION THIS AD IN YOUR ORDER

		Net
1	DRAKE TV52-40LP Low Pass Filter	8.95
1	ELDICO AT-1 Antenna Scope Kit..	22.95
1	ELDICO GDO Grid Dip Osc.	38.95
2	ELDICO GDO Grid Dip Osc. Kit..	27.95
1	ELDICO MRT-2AC Pwr. Supply...	29.95
1	ELDICO MT-2 2 Meter Xmtr.	59.95
1	ELDICO TR-1 w/Pwr. Supply & Tubes	175.00
1	ELDICO TR-75TV Kit CW Xmtr. ..	48.70
2	GONSET 3008 Mobile Converter, 2 Meters.....	34.50
2	HALLICRAFTERS S102 2 Meter Rcvr.	44.95
1	HALLICRAFTERS S106 6 Meter Rcvr.	44.95
2	HARVEY WELLS VFO (Bandmaster)	34.95
1	JOHNSON 240-102 Viking II Xmtr Kit.....	210.00
2	JOHNSON 250-21 TVI Suppression Kit	9.95
2	KRECO CO-6 6 Meter Coax. Antenna	18.75
1	LYSCO A129 10 Meter Mobile Xmtr.	29.50
1	LYSCO A173T Xmtr.	25.15
2	LYSCO 310 (10 meter ground plane)	14.95
1	LYSCO 315 (15 meter ground plane)	17.25
2	LYSCO 316 (20 meter ground plane)	26.25
1	LYSCO 600S Xmtr.	142.45
2	MASTER MOBILE 132C Mount....	3.95
1	MORROW 2BR Mobile Converter...	22.95
1	MORROW 3BR-5 Mobile Converter..	32.95
1	MORROW Fixed Tuned Rcvr. #1059	96.30
2	MORROW Top Hats.....	1.95
1	MOSLEY VPA20-3 Antenna.....	49.75
1	MOSLEY VP20-2 Antenna.....	11.25
1	MOSLEY VP20-3 Antenna.....	17.25
1	NATIONAL NC-98 540kc-40mc Rcvr.	110.00
1	NATIONAL NC-98TS Spkr.	9.95
2	NATIONAL TB-1 Rcvr. Tilt Bottoms	4.95
1	NATIONAL TB-3 Rcvr. Tilt Bottoms	4.95
1	RME MC-53 (2-6-10 meter Conv.)..	49.95
1	RME MC-55 Mobile Converter.....	49.95
1	RME 100 Speech Clipper.....	25.95
1	SONAR MB-26 2 Meter Xmtr.	59.95
1	SONAR SRT-120P Xmtr. w/Pwr. Supply	209.50
1	SONAR SRT-120P Kit.....	148.85
1	SONAR C-120 Mobile Case for SRT-120	7.50

LAFAYETTE—HAM EQUIPMENT HEADQUARTERS

We carry a complete line of all the famous Communications Transmitters, Receivers and Accessories.

ASK FOR W2EGI

HAMMARLUND HQ-100 RECEIVER

Dollar for dollar the most remarkable communications receiver ever produced. Sensitivity and selectivity place it in the really "hot" class. Continuously tunable from 540KC to 30MC. Electrical bandspread tuning with unequalled direct dial calibration. Q-multiplier permits continuously variable selectivity for all operating conditions. Sensitivity: 1.75 microvolts produce 10 to 1 signal-to-noise ratio. Voltage regulated and temperature compensated. Auto-Response automatically adjusts audio response to fit receiving conditions. 10-tube circuit with automatic noise limiter. Seven tuned circuits in two stages of IF. BFO variable from zero to ±4kc. With "S" meter. 16¼" L, 9-7/16" H, 9⅛" D. Wt., 30 lbs.

HQ-100—Receiver .....Net **169.00**

PL-38888-61—6x9" Matching Speaker.Net **14.95**

NATIONAL NC-188 RECEIVER

NEW!

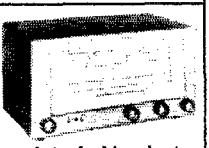
NET ONLY **159.95**

Fine quality, general coverage 4-band receiver (540 kc to 40 mc.) with calibrated electrical bandspread for 10, 11, 15, 20, 40 and 80 meter bands. 12" slide-rule dial has edge and backlighting. Has gang tuned RF amplifier stage and separate, temperature compensated high frequency oscillator. Receives AM, CW and SSB. BFO for CW and SSB. Has two IF amplifier stages and two audio stages with tone control, separate antenna trimmer, RF and AF gain control, automatic noise limiter, and "S" meter. 16-13/16" W., 10" H., 10⅞" D. Shpg. wt., 35 lbs.

National NC-188 .....Net **159.95**

National NTS-1. Matching Speaker for NC-188. .....Net **17.50**

HALLICRAFTERS S-38D RECEIVER



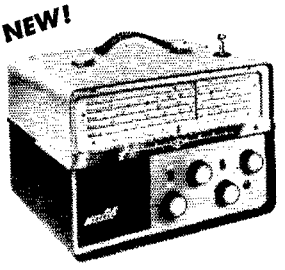
4 BANDS
AC - DC
Superhet
5" PM Speaker

Net **... 49.95**

Provides world-wide and standard broadcast reception—1650 kc to 32 mc on three bands and 540 - 1650 kc. Extremely sensitive and selective AC-DC superhet circuit with 2 watts audio output. Oscillator for reception of code signals or AM phone transmission. Standby-receive switch. Has tip jacks for headphone reception when desired. Gray steel cabinet. 12¾" W., 7" H., 7¼" D. For 105-125 V., 50/60 cycles AC or DC.

Hallicrafters S-38D. Shpg. wt., 13 lbs. .....Net **49.95**

NEW!



NATIONAL NC-66 RECEIVER

5-band coverage from 150 KC to 23 MC, and operation on 115V AC-DC or batteries briefly sums up this new, versatile 4-way receiver. Use it as a 3-way portable, SWL, Ham, or Marine receiver . . . indoors or out. It has electrical bandspread with logging scale, fixed tuned CW oscillator, two built-in antennas (ferrite loop for DF and BC bands, whip for SW), phone jack, 5" PM speaker, and special marine band from 150 kc to 400 kc. Housed in sturdy, two-tone metal cabinet, chrome trimmed, and with carrying handle. 12-5/16" W. 9-11/16" H, 10" D. Wt., 16 lbs., less batteries.

National NC-66 Receiver..Net **129.95**

TRANSISTOR CODE PRACTICE OSCILLATOR KIT

For those interested in mastering the international code, an audio tone oscillator is essential. The circuit of this transistorized feedback oscillator has the simplicity of the neon glow, the signal strength of the vacuum tube, and requires only two penlite cells for weeks of service. It may be used for solo practice, or two may send and receive with the same unit. Kit comes complete with Transistor, Telegraph Key, Resistors, Condensers, Masonite Board, etc., and Schematic Diagram.

KT-72 ..... Net **2.99**

Cannon EC1—Single Headset ..... Net **1.13**

NEW VIKING! JOHNSON 6N2 TRANSMITTER

A compact VHF transmitter with instant bandswitching coverage of 6 and 2 meters. Completely shielded and TVI suppressed. Capable of 6.3V. AC at 3.5 Amps., 300V. DC at 70 Ma, 300 to 750V. DC at 200 Ma, and 30 watts audio. Input 150 watts CW and 100 watts AM phone. Cathode keying. Can be operated by external VFO or built-in crystal control. 8 to 9 Mc crystals used in pentode oscillator. Dual band tank circuit. Flexible output coupling system. Tubes: 2-6U8, 6360, 5894, 6AQ5. Wired and tested. 13⅛ x 8⅜ x 8⅛". Shpg. wt., 14 lbs.

No. 240-201—Less crystals, key and mike .....Net 169.50

No. 240-201—As above in kit form..Net 129.50

Lafayette Radio **DEPT V1**

165-08 Liberty Ave. JAMAICA, N. Y.

100 SIXTH AVE. NEW YORK, N.Y.

Include postage with order.

BOSTON 10, MASS., 110 Federal St.
NEWARK 2, N. J., 24 Central Ave.
PLAINFIELD, N. J., 139 W. Second St.
BRONX 58, N. Y., 542 E. Fordham Rd.

This reduction in circuit capacitance can be compensated by reducing the value of C_6, since it is in series with the cable capacitance across the circuit. However, it should be kept in mind that the circuit will not oscillate if the capacitance of C_6 is made too low without also altering the values at C_4 and C_5. If, for any reason, a very short length of cable is used, it will be advisable to decrease C_6 to approximately 220 $\mu\mu$f. and then increase the capacitances of C_4 and C_5 until the proper frequency ranges are obtained along with the desired band spread. If the fifteen-foot span is considerably longer than needed for a particular installation, don't be afraid to coil up the spare cable as this will have no adverse effect on the tuning ranges.

New parts for the v.f.o. unit — including the Minibox and the dial — will cost approximately $13.50. Fifteen feet of RG-22/U and a pair of PL-284 plugs run another $5.00 or so.

How's DX?

(*Continued from page 74*)

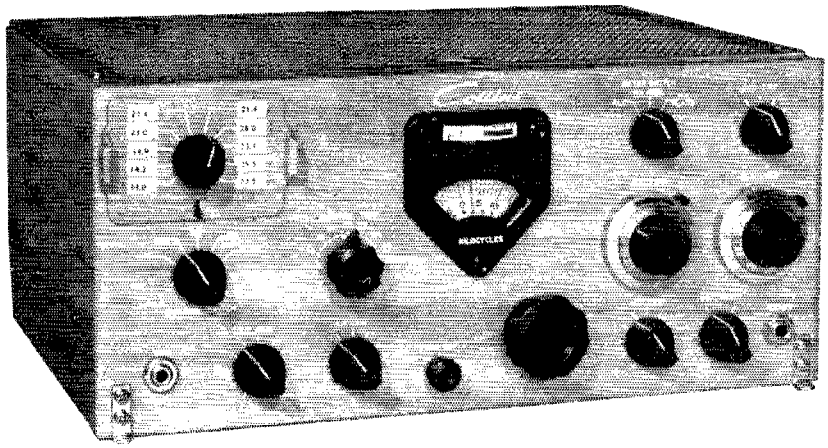
tions collected by W7CSW's 200 watts and ground-plane . . . . . VU2JG sobs on K2OEA's shoulders for a QSL-producing XE QSO around 14,015 kc. . . . . K6LZI finds W6KTE, USMC retired, daily pushing KA5MC's s.s.b. Statesward around 0700 GMT on 20. . . . . G2PL and W1WPO have XW8AG's routine as 1200–1800 GMT on 14, 21 or 28 Mc. depending on conditions. This one is expected to remain active into 1958.

Africa — Gaza Strip is neither a burlesque row nor a separate entity on the ARRL DXCC Countries List. From that refugee-ridden area VE3AHU writes: "I operate fixed-portable from Rafah Camp on the 20-meter phone band daily 0100–0400 GMT. Our station, activated May 15th, has an input of 600 watts, 100-per-cent modulated, and we have two aerial arrays at the moment. Main one is a terminated rhombic with 205-ft. legs aimed at Ontario; the other is a Lazy-H array, top elements fifty feet high, beamed at Edmonton, Alberta. Receivers are Collins and we have no trouble making contact back home when the skip is in." VE3AHU is primarily interested in keeping fellow Canadians of the U.N. Expeditionary Force, Middle East, in touch with VE-land . . . . . VQ2RG prefers to stay away from it all. "Been here for the last 14 years. The country was pretty wild when I first arrived from Johannesburg but now it is getting too civilized and I think I will be leaving within a year." Bob tells W1ICP he hopes to be better prepared for next year's ARRL DX Contest. "I work a terrific number of Yank stations from here and I really enjoy it because they are such good ops." Aw, *shucks* . . . . . Beginning early this spring ZS2HX, a very familiar call to W/K/VE DX hounds, undertook a tour which took him to France, England and the States. On our side he especially enjoyed transcoffee QSOs with Ws 2NXO 2ZQC 3THI 8BIQ 8NWO 8PHJ 9BCY ØIRM and KØBFS. "The U. S. A. and the friendliness of your people were almost overwhelming!" . . . . . Prewar ex-K6DV credits ET2RH with getting him back into the game . . . . . K6LZI notes that 5A2TP, regularly audible around 14,020 kc. at 0300–0400 GMT, needs only So. Dak to complete WAS. At 0500 5A2TP usually unlimbers a 14,310-kc. s.s.b. rig to keep the voice throng happy . . . . . W6DZZ stalks Comoros possibility FB8CD at 1445 GMT near 14,070 kc. . . . . African DX-peditionary rumblings include such areas as Ascension Island (W6HNX & Co.), Ifni (EA9DF and friends), and Bechuanaland (ZE3JO) . . . . . VQ9HAY, a week-end 14-Mc. phantom, evidently subscribes to the adage that rare DX should stay rare.

Europe — The Continental DXpeditionary picture looks bright this fall with HA5AM, OK1MB (OK1KSR) and others directing attention to Albania; W6AWT and II4DW concentrating on San Marino; and other adventurers aspiring to spill more Andorra, Monaco, Luxembourg, Svalbard, Alands, Liechtenstein and Corsica QSOs down on the W/K/VE gang . . . . . EA6AM, via W6RLP, pleads for a 20-meter New Mexico contact to finish up WAS. YO3FT, another WAS-seeker, pines for Me., Mont., Nev. and R. I. around 14,005 kc. and 0300–0430 GMT according to W1AW's W1WPR . . . . . G3CSP's p.p. 807s, unjustifiably accused, are making TVI headlines in the British press. The Sheffield Amateur Radio Club carried the ball up to the parliamentary level in clearing Charlie . . . . . GM2DBX's 300-odd QSOs and 3175 points took top honors for Scotland and second high among U.K. participants in last

(*Continued on page 146*)

Your Ham Headquarters
WASHINGTON TO FLORIDA
for the new *Collins* KWM-1
SSB Mobile Transceiver!



10% DOWN • HIGH TRADES • UP TO 24 MONTHS TO PAY

Limited quantity of this Collins *first* soon available for immediate delivery. First come, first served. Look at the features of this new 14-30 mc 175 watt PEP input transceiver. Use "as is" for mobile or fixed station — no modification necessary. Frequency stability comparable to Collins KWS-1 and 75A-4. Self adjusting automatic load control. Mechanical Filter sideband generation. Complete TVI filtering. Pi-L output network. 6¼" H x 14" W x 10" D. Look at the price, too — a tremendous value for a Collins SSB station.

KWM-1 SSB Mobile Transceiver, Net Price	$770.00
516E-1 12 vdc Power Supply	248.00
516F-1 115 vac Power Supply	103.00
312B-2 Speaker Console with directional wattmeter	146.00
312B-1 Speaker in cabinet	25.00
351D-1 Mobile Mounting Tray	TBA

For all amateur and industrial requirements, write or call. We carry all brands in stock.

LECTRONIC SUPPLY
61 N.E. 9th STREET • MIAMI 32, FLA. • Phone FRanklin 9-4512

LECTRONIC SUPPLY
913 MORNINGSIDE DRIVE • MELBOURNE, FLA. • Phone 1735

LECTRONIC WHOLESALERS, INC.
2345 SHERMAN AVE., N.W. • WASHINGTON 1, D.C. • Phone HUdson 3-5200

autumn's RSGB 21-and 28-Mc. phone contest. Of world-wide scope, the 1957 edition of this affair is scheduled for late November . . . . W9QVY recently fired up in Kassel as DL4YE to roll up 72 countries and 32 states on 14, 21 and 28 Mc. in just two months. Conversely, W9UNW writes, "Just returned to Wisconsin from Germany where I was an exchange student for the past year operating DL4UP. Had a very good year full of DX and it was a wonderful experience for a 16-year-old. Got DXCC in only seven months running 30 watts!" . . . . W4HKJ has it that SVØWB will stay put on Rhodes for another year or more . . . . Ex-ZC4FB comments on our July "emote!" prologue: "Only the other evening I saw a film in London in which Gs are asked to look out for an illicit station, no frequency given. The illicit is using a pukka-agent RX/TX and the hero is shown receiving with an instrument that is supposed to be a receiver. He is honest; he can't read it, though he behaves like a dog with two tails. He rings his mate and tells him he has found the station required, stating, 'He's sending too fast for an amateur!' (about 5 w.p.m. mixed). The episode closes on a note of authenticity, however. His XYL threatens to throw his set out the window and him with it." Ted's ZL plans fell through but now he is shooting for an assignment down VP8 way . . . . VE2DR returned from a summer visit to Scandinavia where he found the hospitality of SM5s BCE CHG CO OI RQ TK WI and WK most pleasurable . . . . W3LMA learns that Svalbard's LA2JE/P expects to remain at the Hopen Island weather station till next July, working 3.5, 7 and 14 Mc. with a 20-watt c.w. rig. Odd's odd duty periods cause a rotating ham schedule which shifts from 1200–1500 to 2100–0200 GMT and back again. SP5LM/LA/P also is reported available up Spitzbergen way . . . . From SP6XA: I am 46 and active since 1927. I work QRP using four watts to a long-wire and an old-type HRO. I contacted 78 countries and 40 states in the last year with this layout. Our PZK association now is an independent one and we hope to re-enter IARU soon." . . . . The LZ1KPZ staff tells SWL Bill Rice that Bulgarian phone candidates now include LZ1s KAB KBA KDP KPZ KSP VK WD and LZ2KST.

Hereabouts — Need Prince Edward Island for your WAVE drapery? W9NLJ/VE1 will be cookin' there on 80 through 10 meters, c.w., a.m. and s.s.b., between September 26th and October 2nd. Pete intends to hit the bands particularly hard during the W/VE Test, September 28th–29th . . . . ON4KT reports a huge 21-Mc. signal from YN1FV who uses gear left behind by Stateside-bound YN1BR . . . . After a long layoff W7FZA is back at it with a DX-100 driving a 750-watt 304TL into a *Handbook* cube quad. He reports a fast rise to 140 countries thanks to a bunch of new ones which were unavailable seven or eight years ago . . . . VE3BWY, with DXCC and WAS in Toronto, reminds the new blood that he also holds prewar WAS and DXCC as G6WY . . . . Icelandic items from TF2WBU (W2FGD) dealing with Uncle Sam's boys: TF2s WBM WBQ and WBV sign off, the latter heading for a KG1 assignment. TF2WBU still seeks Mont., Nev., N. Dak., Utah and Wyoming for you-darn-well-know-it . . . . WØWMA, informed by the medics that he's not long for this veil of tears, awaits overdue QSLs from GI6VU, OD5DA, UC2KAB, VK9YT, VPs 2JC 3HAG 8BR and VQ2HJ . . . . W7DJU decries excessive testing on wide-open DX bands. "One day I started up at the top of 20, tuned clear through to the bottom and counted six stations holding their keys down or making other tests. To them, some rotten eggs!" . . . . OT KP4KD takes the floor: "Big news here at the moment is that my youngest son, Bob, has a Novice ticket, KN4PUJ. Hoping to add the 12-year-old grandson to the list soon! Now we have a father-and-two-sons combo: KP4s KD BJ and KN4PUJ." Ev reports that KP4s JE ZV and ZW have gone north, and that he himself casts about for Utah and Washington to close out his phone WAS effort . . . . During this year's ARRL Field Day K6DV had the W6UW/6 gang, including ARRL Pacific Division Director W6HC, enthusiastically racking up transpacific DX from Mt. Hamilton . . . . Caribbean notes via W1ZJE: Dominica's VP2DJ, with p.p. 814s and 811s modulating, acts as NCS for the southern leg of the 3815-kc. Antilles Weather Net. Many of the local lay gentry keep tabs on ill winds by eavesdropping on this group. Grenada Radio Club prexy VP2GX assigns stations to regular tours of weather net duty . . . . Potomac Valley Radio Club, W4ZM secretary, is donating a year of *QST* to deserving DX men CT2BO, EA8BF, VP7NM, ZL1MQ, ZP9AY and 4X4BX. PVRC hopes to arrange such presentations annually . . . . K6SRZ contemplates an early DXpedition to rare Sierra County, a notorious stopper along the road to WACC . . . . Our KL7 brethren and sisters flipped and frolicked at the Second Annual All-Alaska ARRL Hamfest in July, this ball held at Anchorage under AARC auspices . . . . W2s EQS HTI and NLQ will sign an FP8 call during the middle two weeks of this month, 160 through 10 meters, using c.w., a.m. and s.s.b. W2HTI will parry QSL thrusts . . . . W4WRY wonders how to obtain HR1AT's QSL for a 1954 QSO, while W7FZA hunts data on the present whereabouts of former Andamans' VU2PB and VQ1LQ.

Ten Years Ago in "How's DX?" — Arrival of Sep-

(Continued on page 148)

tember, 1947, finds DX returns at low ebb except for never-say-die 20-meter c.w. There the biz is booming because of DXotic AC4YN, Cs 6YZ 7XX, EK1AS, EP2BU, ET1IR, F8EX/FC, FQ3AT, FT4AN, G3BMJ/VS7, I6USA, KH6KL/KS6, KM6AB, KS4s AC AE, LI2JC, MB9s AA AH AJ, MX2A, OX3GE, OY3IGO, PKs 3CK 3FL 4OO 6EE 6HA 6SA, RAEM, SU1US, SV1RX, TA1B, UAØKQA, UD6AA, UG6AB, UJ8AA, UO5AD, VRs 5IP 5PL 6AA, W2WMV/C9, W6VDG/KW6, W6YAW/J8, WØTKK/VK9, YI7BZ, YR5V, YU7LX, one ZA1RP and ZM6AF. On 14-Mc. phone there are EL5B, Js 2JCQ 3GNX, KG6AB, KP6AA, VK9BI and W8OK/KG6 _ _ _ _ Other DX ranges struggle gamely through the dog days but pickings are slim. Forty turns up KM6AA, KP6AB, VR2AM and W6NQG/KM6; 28-Mc. c.w. produces KG6AO, PZ1FM and ZD4AB; ten phone has HR1MB, OQ5AE, PZ1A, VR6AA and Basutoland's ZS4H; and 75 phone finds KL7DJ chatting consistently with ZLs 1KN 1QF 2BE 2DW 2LM 4DC 4DU and 4HH, a long transpacific haul _ _ _ _ We note report of the formation of the Rochester (N. Y.) DX Club under the leadership of DX savants W2s DOD PUD and PYW. Hmm — ham clubs organized strictly of, by and for DX men! Will this sort of thing click and stick?

YL News and Views

(Continued from page 68)

a given community, one location may be defined as from two places no two of which are more than 25 miles apart.

4) Six QSL cards, or other written confirmation showing proof of contact, must be submitted with application. Sufficient postage must be remitted with the confirmations to finance their return. The YLRL will not be responsible for any loss or damage to same.

5) The custodian for the YL/WAC award is Barbara Houston, W3OQF, 109 Seneca Drive, S. E., Washington, D. C.

—...—

From *QST* staffer Ed Collins comes the following item:

"Miss Barbara Markley of Richmond, Indiana, an employee of the U. S. State Department, while en route from Karachi to Singapore aboard the Flying Enterprise II, skippered by the famous Kurt Carlsen, W2ZXM, was inoculated by the Captain with the amateur radio bug and came down with it heavily. Miss Markley was up to 10 words per minute and a good grounding in theory by the time Singapore was reached, and when the ship arrived at San Francisco on May 27, she was able to go before the FCC examiner in that port. She is now awaiting her novice and general ticket. It is well known that Skipper Carlsen is one of the most active missionaries for ham radio that the hobby has."

—...—

Oooops! WØKJZ says we were a bit generous in crediting her with six BPL medallions as per the July '57 column. Lydia claims ownership of just one medallion at present, but on the strength of her traffic-handling talents, we predict it won't be long before it's a legitimate six for her.

Strays

The Milwaukee Radio Amateur's Club is celebrating its 40th year of continuous activity. It is one of the oldest clubs affiliated with ARRL, having received its charter in 1919.

The newest concept in mobile communication

Collins KWM-1 SSB TRANSCEIVER

These are some of the features that make the Collins 175 watt PEP input 14-30 mc Transceiver a revolutionary development in Amateur communication.

- Transceiver design saves both space and cost, 6½" H x 14" W x 10" D.
- Use for mobile or fixed station without modification.
- Frequency stability comparable to the KWS-1 and 75A-4.
- Break-in CW using VOX circuits, side tone monitoring for CW.
- Self adjusting automatic load control.
- RF inverse feedback for better linearity.
- Mechanical Filter for sideband generation and receiver selectivity.
- Complete TVI filtering.
- Pi-L output network.

WE FEATURE
A COMPLETE LINE OF
COLLINS EQUIPMENT
AND ACCESSORIES.
24 MONTHS TO PAY.
TRADE-IN ALLOWANCES.

RADIO SUPPLY COMPANY
Wholesale Electronics
3101 4th Ave. So. Birmingham, Ala.

June V.H.F. Party

(Continued from page 67)

enabling him to make 56 contacts for 1120 points, a respectable score for a section where local activity is low. W4RMU, Oceanway, Fla., W4ZXI, Greensboro, N. C., W8LPD, Cincinnati, Ohio, K2ITP, Riverton, N. J., your conductor, and a few others made this hard-way method pay off. It brought the W1HDQ section total to 29 on 50 Mc., and we estimate that the use of c.w. on both 50 and 144 Mc. raised our 10,880-point (noncompeting) score by at least 20 per cent.

The summary to follow includes 443 acceptable logs, from 61 ARRL Sections, both all-time highs for June and September V.H.F. Parties.

SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation.

ATLANTIC DIVISION

E. Pennsylvania

W3TDF...8505-242-35-ABD
W3OWW..1462- 86-17-AB
W3JNC[1]..1258- 74-17-A
W3CCX...1170- 78-15-AB
W3ABF...1134- 81-14-A
W3SXD...1095- 73-15-A
W3SAO...1040-104-10-B
W3ARW..1026- 48-18-ABCD
W3JBA...869- 79-11-A
W3UQJ...748- 64-11-AC
W3OCI...672- 56-12-AB
W3AMO...560- 70- 8-A
W3HTG...459- 51- 9-AB
W3YWW..432- 48- 9-A
W3IBN[2]...406- 58- 7-A
W3AJD...320- 36- 8-AC
KN3ALJ[3]..284- 71- 4-B
WN3JXT..240- 48- 5-B
W3HIX...228- 38- 6-B
W3CHC...225- 25- 9-AB
W3DRF...222- 37- 6-B
W3GFZ...215- 43- 5-B
W3BUC...190- 38- 5-B
W3BNR/3.140- 35- 4-B
W3GCR/3...96- 32- 3-B
WN3KXG...80- 40- 2-B
W3FKJ/3...15- 15- 1-A
W3AMC....12- 6- 2-B
W3KX/3[4] (11 oprs.)
19,872-398-46-ABCD
W3KKN (W3s KKN VIR)
15,824-318-46-ABCD
W3LXM (5 oprs.)
6870-229-30-AB
W3UCA/3 (10 oprs.)
6656-256-26-AB
W3OLV/3 (W3s OLV OSA)
1946-139-14-B
K6IBY/3 (W3s ESC FVV, K6IBY/3) (1260- 90-14-A)
W3WKR/3 (W3s FHP TEB WKR WN3MIU)
756- 84- 9-AB

Md.-Del.-D. C.

W3CGV..2737-114-23-ABCD
W3UCR..1443-111-13-AB
W3BBG..1309- 77-17-AB
W3LMC..1199-108-11-BD
W3GKP...996- 83-12-B
W3PYW..670- 67-10-B
W3JXN...610- 61-10-A
W3MAR..580- 58-10-A
W3OTC...429- 39-11-A
W3LFN...392- 56- 7-A
W3HB....225- 45- 5-B
W3TFA...123- 41- 3-B
W3ILS....96- 16- 6-A
W3MBZ/3 (7 oprs.)
320- 64- 5-B

S. New Jersey

K2JVX...4860-162-30-AB
W2BLV..1106- 75-14-BD
K2UBR..1078- 77-14-A
W2ADA...912- 48-19-AB
K2BWR...324- 27-12-A
K2KFJ....255- 51- 5-B
K2ITP (K2s JTP JTQ)
10,846-319-34-AB

Western New York

W2ORI...940- 94-10-B
W2VCL...680- 85- 8-AB
W2LXE...600-100- 6-B
W2SOK...600- 75- 8-AB
W2QNA...518- 72- 7-ABC
K2DPV...476- 68- 7-AB
W2BLN/2.352- 32-11-A
K2SLV[1]...280- 28-10-A
W2PST...264- 44- 6-AB
W2TKO...204- 51- 4-B
K2PEY...117- 39- 3-AB
W2GBN/2.108- 18- 6-B
K2QIG....102- 34- 3-B
K2VYH...102- 34- 3-A
W2MYN...96- 48- 2-B
K2LXC....90- 45- 2-B
VE3FT/W2.52- 26- 2-A
K2CUQ....30- 10- 3-AB
KN2YGC...14- 14- 1-B
K2YIH....11- 11- 1-A
K2KSB....9- 9- 1-B
K2UOR....1- 1- 1-A
W2SPU/2[4] (11 oprs.)
8547-253-33-ABC
W2ALL/2 (W2s ALL JTE, K2s CEH HIT)
5874-178-33-AB
W2WZR/2 (10 oprs.)
4648-164-28-ABC
W2JGJ (WZS MTA OPT)
2912-107-26-ABC
W2TCU/2 (16 oprs.)
1534-118-13-AB
K2ERQ (W2YLM, K2TOL)
1140- 76-15-A
W2FRL (W2FRL, K2EGB, KN2YDZ) 462- 66- 7-AB
W2ELX/2 (W2s ELX QY YIE)....378- 42- 9-B

W. Pennsylvania

W3FPH...1976-104-19-AB
W3TIF....440- 40-11-A
W3LNA/3 420- 60- 7-B
W3EBH...414- 46- 9-A
W3MSR/3..60- 15- 4-B
W3PIE[5]....50- 10- 5-B
W3DEK/3 (W3s DEK IHF)
540- 60- 9-A
W3CRZ (W3s CRZ FAZ HMX)... 264- 44- 6-A

CENTRAL DIVISION

Illinois

W9ROS..2608-163-16-A
W9ALD..1955-115-17-AB
W9QKM.1620-108-15-AB
W9AAG...630- 35-18-AB
W9AGM..572- 50-11-ABD
W9HFB...570- 38-15-A
W9PBP...378- 54- 7-B
K9HMB..369- 41- 9-A
K9BDI...364- 52- 7-A
W9DRN..324- 36- 9-AB
KN9HIH..255- 51- 5-B
K9DHH...252- 42- 6-A
W9CT....150- 30- 5-B

(Continued on page 152)

K9AXO . . . 104- 26- 4-A
W9BUB . . . 60- 20- 3-A
K9ATE 8- 4- 2-A

Indiana

W9APY . . . 1072- 67-16-AB
W9SWH . . . 540- 60- 9-A
K9EFU . . . 522- 38-14-A
W9MHP . . . 336- 42- 8-AB
KN9EEK . . . 186- 31- 6-B
W9LIT/9[6] . . . 4- 2- 2-A
W9FJI 18- 6- 3-A
W9FB/9 (6 oprs.)
2505-115-52-AB

Wisconsin

W9JCI/9 . . . 4000-200-20-A
W9TQ 504- 56- 9-AB
K9ETD 312- 26-12-A
W9JFP/9 . . . 260- 26-10-A
K9CAL (K9s CAL DQW)
195- 39- 5-B

DAKOTA DIVISION

North Dakota

WØWVR . . . 208- 26- 8-A

Minnesota

WØOFZ . . . 1958- 89-22-A
K2WJT/Ø . . . 416- 26-16-A

DELTA DIVISION

Louisiana

K5BWN 8- 4- 2-A

Mississippi

W5KRH/5 . . . 117- 13- 9-A

Tennessee

W4VFC . . . 770- 55-14-A
W4HHK/4 . . . 434- 31-14-A
W4YRM . . . 39- 13- 3-A

GREAT LAKES DIVISION

Kentucky

K4HZO . . . 585- 65- 9-A
K4HTO . . . 250- 25-10-A
W4CSN 60- 10- 6-A

Michigan

W8RMH . . . 3483-126-27-ABD
W8NOH . . . 2940-105-28-AB
W8SDK[1] . . . 2394-126-19-A
W8ZCJ . . . 2058- 97-21-ABD
W8CVQ . . . 1155-105-11-AB
W8URO . . . 1080-135- 8-B
K8AKQ 832- 64-13-A
W8ARR . . . 820- 78-10-ABD
W8VRH . . . 318- 53- 6-B
W8JUV . . . 300- 50- 6-B
K8CZP 276- 46- 6-A

Ohio

W8LPD . . . 5824-202-28-ABC
W8NRM . . . 3402-120-27-ABCE
W8LAH . . . 2464-112-22-AB
W8HXT[1] . . . 1377- 81-17-A
W8EPW . . . 1320- 88-15-AB
W8NEE . . . 980- 92-10-ACD
W8SVU . . . 882- 63-14-A
W8BAX . . . 780- 60-12-ABCD
W8LOF . . . 660- 60-11-AB
W8PLQ . . . 525- 75- 7-AB
KN8DOH[3] 456- 57- 8-B
W8NAF . . . 434- 62- 7-AB
K8AJF 195- 39- 5-B
KN8DOW . . . 170- 34- 5-B
W8PBX . . . 105- 15- 7-A
W8BMO . . . 99- 32- 3-ABC
K8DKE 90- 30- 3-A
KN8CTM . . . 75- 25- 3-B

HUDSON DIVISION

Eastern New York

K2GCH . . . 4818-145-33-ABD
W2HBC . . . 2755-128-19-ABCD
KN2ZDJ . . . 658- 94- 7-B
W2HF/2 . . . 450- 45-10-B
W2UKA . . . 400- 50- 8-AB
K2OJR 104- 26- 4-B
W2IP 60- 15- 4-B
W2TMM . . . 30- 15- 2-B
K2HJX 21- 7- 3-B
W2TFR 2- 2- 1-B
W2LWI/2 (5 oprs.)
6815-235-29-AB
K2PRB (K2PRB, KN2ZCZ)
138- 23- 6-B

NYC-L. I.

K2IEJ/2 . . . 8155-233-35-AB
KN2/K2VIX[1]
2622-138-19-AB
W2AOC . . . 2184- 79-21-BC
W2WOF . . . 1170- 46-15-BCD
K2LIO 1150-115-10-B
W2VSA . . . 1144- 81-13-AD
W2AOD . . . 915- 55-15-AD
K2JWT . . . 876- 73-12-B
KN2VDR[3]
760- 95- 8-B
K2AZT . . . 630- 63 10-A
K2OIL 528- 48-11-A
K2HTQ . . . 504- 72- 7-B
W1JRV/2 . . . 396- 36-11-B
KN2ZLE . . . 357- 51- 7-B
W2SKE . . . 322- 46- 7-B
K2RLW . . . 300- 50- 6-A
K2UOY . . . 265- 53- 5-B
W2MZY . . . 220- 44- 5-B
W2JBQ . . . 216- 27- 8-B
K2SNW 72- 24- 3-A
K2JXD 40- 10- 4-A
K2PHT 30- 10- 3-A
K2CTK 12- 12- 1-B
W2GFK/2 (W2s FSN GFK, K2CMI) 1512-126-12-B
K2OZH (W2JU, K2OZH)
496- 62- 8-B

Northern New Jersey

W2FBZ[7] . . . 6048 167-32-ABC
W2ONV . . . 4760-280-17-B
W2DWJ . . . 3216-102-24-BCD
K2LXI . . . 3009-177-17-A
W2ISK . . . 1507-137-11-B
K2KIB . . . 1485-135-11-B
W2IDZA . . . 1462- 68-17-ABCD
K2ICE 948- 79-12-B
K2PRR 896- 87- 8-B
W2CBB 476- 34-14-B
K2GLS 440- 55- 8-AB
K2DIG 352- 32- 8-A
W2CVW/2 . . . 52- 13- 4-B
K2QNI 12- 12- 1-B
W2LOY/2 (W2s LOY WCM, K2s AWY GLQ)
11,818-300-38-ABC
K2MYQ (K2s IZV MYQ)
640- 80- 8-A

MIDWEST DIVISION

Iowa

WØSMJ . . . 3596-116-31-AB
WØUSQ . . . 600- 40-15-AB
WØYPT . . . 210- 30- 7-B
KØEMQ . . . 182- 26- 7-B

Kansas

WØQDH . . . 495- 33-15-AB

Missouri

WØWEQ . . . 2016- 96-21-A
KØJNH . . . 304- 38- 8-A
WØLFE . . . 120- 24- 5-B
WØWKG . . . 120- 24- 5-A
WØYZZ . . . 112- 16- 7-A

Nebraska

WØWWN . . . 560- 40-14-AB
W9EET/Ø . . . 161- 23- 7-AB
WØWRT . . . 81- 27- 3-AB
WØEMS . . . 78- 26- 3-B
KNØICL/Ø . . . 5- 5- 1-B
WØRYG/Ø (W0s RYG YOY)
124- 31- 4-B

NEW ENGLAND DIVISION

Connecticut

W1HDQ[8]
10,880-272-40-AB
W1PHR . . . 4234-146-29-AB
W1FTX . . . 3930-131-30-AB
W1OSQ . . . 2472-103-24-A
W1DXE . . . 1884-157-12-B
W1OAX . . . 1495-115-13-B
W1BYX[1] . . . 1072- 67-16-A
W1SUZ . . . 1064- 56-19-A
W1TCJ . . . 671- 61-11-B
W1FHP . . . 632- 79- 8-B
WNIMEO[3] 500- 50-10-B
W1VNO . . . 495- 45-11-A
W1BIH . . . 328- 41- 8-B
W1QUJ . . . 294- 42- 7-AB
W1AW[5,9] . . . 288- 36- 8-AB
W1OBS . . . 270- 54- 5-B
KN1AZF . . . 270- 45- 6-B
W1WHR . . . 228- 38- 6-B
W1RFJ . . . 203- 29- 7-B
W1FVV . . . 140- 20- 7-A
W1FYF 74- 37- 2-B
W1NLM . . . 72- 18- 4-B
W1BDI[8] . . . 33- 11- 3-B

(Continued on page 154)

WN1MWB..22- 11- 2-B
WN1NZF...17- 17- 1-B
W1LGE/1[4] (5 oprs.)
6270-203-30-ABC
W1ZTT (W1s IXY JJL URM ZPT) 3256-148-22-AB
W1GKR (W1s GKR YCO) 432- 36-12-A

Maine

W1GKJ...372- 31-12-A

E. Massachusetts

W1HOY..8652-309-28-A
W1QXX.5175-207-25-AB
W1AQE..4814-166-29-AB
W1QMN.2288- 88-26-ACD
W1AHE..1995- 95-21-AB
W1DBH.1246- 89-14-AB
W1GRW..810- 54-15-A
W1JSM...740- 74-10-B
WN1LMZ[3] 490- 70- 7-B
W1UJQ...456- 38-12-A
WN1NQQ.366- 61- 6-B
KN1BSM.325- 65- 5-B
WN1MNY 245- 49- 5-B
KN1AKK/1 225- 45- 5-B
WN1NKA.155- 31- 5-B
W1FQD...145- 29- 5-A
W1MEG..126- 21- 6-AB
W1KSW..105- 35- 3-B
W1LUW..102- 17- 6-A

W. Massachusetts

W1ZWL/1 4400-200-22-A
W1JYH....32- 8- 4-B
WN1LJF...18- 9- 2-B
W1UCB....12- 4- 3-A
W1RFU (W1s EOB JYH RFU) 13,584-261-48-ABC
W2AEE/1 (W1SDO, K2s DVT VXX, KN2YUT) 2941-173-17-AB

New Hampshire

W1UON/1 13,545-307-43-ABCD
W1JTR..3451-117-29-ABCD
W1QD...150- 25- 6-AB
W1MHL/1[4] (18 oprs.) 36,482-592-58-ABCD
W1WBM/1 (5 oprs.) 1050- 70-15-AB
W1ASZ/1 (W1s ARR CCE
W1UZIZ)..264- 44- 6-B
W1PYM/1 (W1s HUB PYM) 27- 9- 3-B
W1BSF/1 (W1s BSF WMK) 8- 4- 2-B

Rhode Island

W1KCS..8730-181-45-ABCD
W2BVU/1 8388-214-36-ABCD
W1UHE[1].3724-111-28-AC
W1ZJQ...1898-146-13-B
W1CPC...936- 72-13-A
W1WTR..329- 47- 7-A
W1CJT...222- 37- 6-A
W1FEO....24- 8- 3-B
W1VXL/1 (W1YNE, K1ABR)..165- 33- 5-B

Vermont

W1UIZ/1 16,900-310-50-ABCD
W1FMK/1 1526-105-14-AC
W1EXZ...481- 37-13-A
W3LCC/1.216- 24- 9-A
W1FTF...176- 22- 8-A
W1MMN...56- 14- 4-B
K1AAW (W1BYO, K1AAW, KN1BZV)4048-176-23-AB
W1NBN/1 (W1s EUJ GEF, K1s AFX AHH) 1180- 59-20-AB

NORTHWESTERN DIVISION

Idaho

W7ACD...297- 27-11-A

Montana

W7EPZ...351- 27-13-A

Oregon

W7YZZ/7.774- 85- 9-ABD
W7HBH...280- 56- 5-AB
WN7HIO...44- 22- 2-B
W7OTV/7 (7 Oprs.) 1133-103-11-AB
W7WRA/7 (W7s WQZ WRA) 342- 57- 6-A

Washington

W7PRW..996- 83-12-A
W7DYD..972- 81-12-A
W7VOG...750- 75-10-A
W7RPD...528- 44-12-A
W7KO....192- 24- 8-AB
W7DJN....42- 14- 3-A
W7PUA/7 (8 oprs.) 2072-137-14-ABCDE
W7UZB/7 (3 oprs.) 1288- 92-14-AB
W7ZOW/7 (6 oprs.) 144- 24- 6-A

PACIFIC DIVISION

Hawaii

KH6DQ....14- 14- 1-B
KH6OS....13- 13- 1-B

Santa Clara Valley

W6PBC..1695-105-15-AD
K6HYX....16- 8- 2-B
W6CDT/6 (W6s CDT ORR SUE, K6MZN) 2496- 93-24-ABD
K6HWJ/6 (K6s HWJ JEU) 425- 85- 5-A

East Bay

W6ASH/6 2496-192-13-AB
K6RNQ..1521-117-13-A
K6IIN....315- 45- 7-A
K6ITZ.....21- 7- 3-A
W6EY.....15- 5- 3-B

San Francisco

W6AJF..1827- 80-21-ABD
K6VXI....280- 56- 5-A
K6EOW/6 (K6s EOW GOW YPD) 2556-142-18-AB

Sacramento Valley

K6GIJ....588- 49-12-A
W6PIV....280- 35- 8-AB
KN6YII....81- 27- 3-B

San Joaquin Valley

W6GQZ...350- 35-10-AB
K6TSK/6 (K6s EYN HXZ TSK)...9099-288-27-ABCD
W6HAB/6 (W6HAB, K6s IXA RPL SNA) 680- 68-10-AB

ROANOKE DIVISION

North Carolina

W4ZXI...1875- 75-25-AB
W4CVQ..1000- 50-20-AB
W4MDA..198- 33- 6-B
W4NHW..140- 28- 5-B

South Carolina

W4NWB..392- 28-14-A
W2BH8/4.144- 24- 6-AB
W4KSU....14- 7- 2-A

Virginia

K4LGD..3266-137-23-ABC
W4JCJ...1728- 96-18-AB
K4BNI (K4s BNG BNI) 560- 80- 7-B
W4AAI/4 (W4s AAI ALY, K4s CHA EKO) 360- 40- 9-A

West Virginia

W3PGA/8[4] (5 oprs.) 7300-286-25-ABC

(*Continued on page 156*)

W3MPT/8 (8 oprs.)
6804-231-28-ABC
W3SFY/8 (7 oprs.)
5130-179-27-ABC
W3NKF/8 (6 oprs.)
1212-101-12-AB
W3AMH/8 (W3s AMH HIB, W8s IIH IWT)
357- 51- 7-AB

ROCKY MOUNTAIN DIVISION

Colorado

WØIXF...390- 30-13-A
WØIC.....372- 31-12-A
WØTII....140- 20- 7-A
K6CLJ....102- 17- 6-A

New Mexico

W5N8J...516- 43-12-A

Wyoming

W7ILL....330- 30-11-A

SOUTHEASTERN DIVISION

Alabama

W4AZC...700- 50-14-A
KN4/K4MBM
616- 44-14-AB
K4HQS...119- 17- 7-A
K4IQU....112- 16- 7-A

Eastern Florida

W4AYV...380- 38-10-AB
W4RMU..364- 28-13-A
K4IXG...192- 24- 8-AB
W4LTU....24- 12- 2-B

Georgia

W4IKK..1120- 56-20-A
W4FWH..736- 46-16-AB
W4VZR...132- 22- 6-AB

SOUTHWESTERN DIVISION

Los Angeles

W6NLZ 6669-215-27-ABCDE
W6PUZ..1104-184- 6-A
W6BWG.1053- 63-18-AB
W6NTC.261- 23- 9-ABCDE
W6PFE...177- 59- 3-B
W6PRJ/6.100- 50- 2-B
K6DLY....34- 17- 2-B
K6TRO....20- 20- 1-A
K6OEE/6[4] (7 oprs.)
17,110-510-29-ABCDE
W6EMM/6 (8 oprs.)
10,800-406 24-ABCDE
K6TQH/6 (5 oprs.)
3575-324-11-ABD
K6KCZ/6 (W6OJN, K6s KCX KCZ)
780- 64-10-BCD

Arizona

W7QLZ/7..42- 14- 3-A

San Diego

K6COE/6
1956-163-12-AB
K6UJL....240- 40- 6-A
K6BPI....189- 27- 7-AB
K6QCR....34- 17- 2-A
W6RDF (11 oprs.)
1860-114-15-ABCD
KN6UGL (KN6s UGL UHS)
752-188- 4-B

Santa Barbara

W6FYW...15- 5- 3-B

WEST GULF DIVISION

Northern Texas

W5SFW..2794-127-22-A
W5LFQ...1560- 78-20-A
W5ERG[1]..648- 72- 9-A
W5FEG...522- 58- 9-AB
K5BDL...259- 37- 7-A
K5DCQ...240- 40- 6-A

Oklahoma

W5DFU...216- 27- 8-AB

Southern Texas

W5HFF..1491- 71-21-AB
W5LFM...705- 47-15-A
W5GHL...600- 50-12-A
W5YCK...184- 23- 8-AB
W5FFS...170- 17-10-A
K5BXM.....7- 7- 1-A

CANADIAN DIVISION

Maritime

W1QCC/VE1
3330-185-18-A
VE1EF....792- 72-11-A

Ontario

VE3AIB..1400- 96-14-ABC
VE3BQN..560- 76- 7-BC
VE3MR...528- 88- 6-B
VE3AQE..495- 99- 5-B
VE3DSU..477- 53- 9-AB
VE3AGU..231- 21-11-A
VE3DUU..220- 55- 4-B
VE3HW...184- 46- 4-B
VE3BPB..125- 25- 5-B
VE3GD....48- 24- 2-B

Quebec

VE2CD....44- 11- 4-B

British Columbia

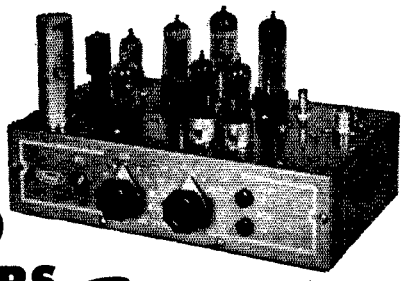
VE7ND...200- 25- 8-A
VE7NM...147- 21- 7-A
VE7AOD..102- 17- 6-A
VE7MT....36- 18- 2-B
VE7ACV....8- 4- 2-A
VE7ASM/7 (VE7s APB ALJ)
1806-129-14-AB

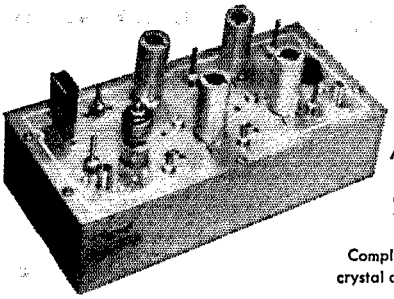
[1] Technician award winner; [2] W3ACN, opr.; [3] Novice award winner; [4] Multioperator award winner; [5] W3SGA, opr.; [6] K9AYH, opr.; [7] W2FBR, opr.; [8] Headquarters staff, not eligible for award; [9] W1QIS, opr.

Strays

KN2VAB reports that he is just 10 years old, and he wonders if he is the youngest ham in the Northern New Jersey Section. If there are any challengers, please write to *him*.

1¼, 2, 6 or 10 METERS with Tecraft





AMATEUR NET
$42.50

Complete with crystal and tubes.

Tecraft Transmitters For 220, 144, 50, or 10-11-15 Mc. Hi-Level Plate Modulation • Hi-Impedance Mike Provisions for Metering All Stages • Tuned Antenna Output System to 52/72 Ohm Line • RF Output-Indicator • Power Requirement 6.3 v AC @ 4 amps & 250 v DC @ 250 ma. • Tubes: 6AU6 osc.; 5763 Buf/Dblr; 6360 Buf/Mult; 6360 final amp.; 12AX7 speech amp. & driver; 2–6AQ5 modulators • Power Input to Final, 20 Watts.

Complete with tubes, crystal and plugs.....**$59.95**
Matching Power Supply..... **39.95**

Tecraft converters may be had with IF output frequencies to suit the tuning range of your receiver, and provide the ideal system, in terms of **extreme sensitivity, maximum stability, low noise, high gain and selectivity.**

LOW NOISE FIGURE: Approximately 4 db. 1 microvolt of signal will provide better than 20 db. thermal noise quieting.

SENSITIVITY: Approximately 1/10 microvolt input will provide a signal 6 db. over noise level.

GAIN: Better than 30 db.

MODEL: CC5-50, CC5-144, CC5-220 for
Collins 75A1, 2, 3.....Specify IF 26–30 Mc.
Collins 75A 4.....Specify IF 28–30 Mc.
National NC-300.....Specify IF 30–35 Mc.

MODEL: CC5-50 and CC5-144. For General Coverage receivers. Choose either 6–10, 7–11, 8–12, 10–14, 12–16, 14–18. Any of above in kit form, **$29.75.** CC5-220. For 14–19 Mc. only. Wired only.

Tecraft

AT YOUR DEALER, OR WRITE
The Equipment Crafters, Inc.
523 WINNIE AVE. RIVER EDGE, NEW JERSEY COLFAX 2-0159

IN THE MICHIGAN AREA

Warren Radio Co.

IS THE PLACE TO BUY

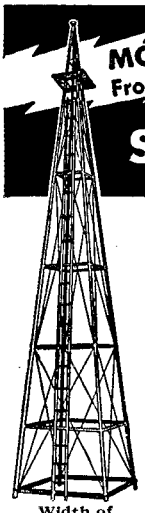
Collins **EQUIPMENT**

KWS-1
1 kilowatt Transmitter
w/Power Supply $2,095.00
75A-4 SSB Receiver $695.00
KWM-1 SSB
Mobile/Fixed Station
Transceiver $770.00
and a complete stock
of all Collins accessories.
Liberal trade-in allowance.
Convenient Time Payment Plan.

WARREN RADIO CO.
713 PORTAGE STREET
KALAMAZOO, MICHIGAN

MORE SIGNALS PER DOLLAR
From Money Invested in an Antenna

Self Supporting
STEEL TOWERS
For Rotary Beams, FM, TV



Width of Base Equal to 1/5 Height

You can erect this tower yourself. Just dig four holes, set anchor posts in place, bolt the pieces together. 5¼ ft. ladder sections make it easy to work higher as tower goes up. It's a lot of fun to build your own tower — and saves you money, too!

ATTRACTIVE — NO "GUY" WIRES!

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- Withstands Heaviest Winds

SMALL DOWN PMT. — EASY TERMS

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22'-$104, 28'-$127, 33'-$149, 39'-$182, 44'-$208, 50'-$239, 61'-$339, 100'-$895.

Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change...so order now! Send check or money order. ...or write for free information.
Cable address: "VESTO"

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

VESTO CO., Inc.
20th and Clay
North Kansas City, Mo.

Happenings of the Month

(Continued from page 58)

direct legal counsel for any and every amateur who may be involved in some local difficulty, ARRL does concern itself with certain specific cases where the decision of a court may in general affect the rights of all amateurs. In accordance with this policy, the League has litigated through the highest courts of the states of New Jersey and Pennsylvania the question of whether an amateur antenna tower was an accessory use of residential property; both courts ruled that it is.[1] Another state, Minnesota, had earlier reached a similar decision in favor of the amateur tower.

Despite these precedents, in recent years a number of other amateurs planning towers have encountered difficulty with local zoning ordinances, building inspectors and zoning boards. This problem appearing particularly acute on Long Island, approximately two years ago the League selected a suitable case for presentation to the courts. While the case was in process of preparation, independently another amateur tower problem on the Island was brought to a head suddenly and moved into local courts. Upon a request for League assistance, to avoid having two separate cases on the same subject under litigation simultaneously, the League took over the second one, that of Ozzie Presnell, W2HC.

During these past two years, the case has moved through the courts of the state of New York and earlier this year reached the Court of Appeals, highest in the state. We are obliged to report that the decision was in favor of the zoning board. The Court split, five members concurring in the majority opinion, and two members filing a dissenting opinion which expressed the view that the decision should have been in favor of the amateur.

As a result, we now have conflicting law on the subject of whether an amateur tower constitutes an accessory use of residential property. The highest courts of Minnesota, New Jersey and Pennsylvania have found in favor of the amateur; New York has now decided otherwise.

Further procedural steps are now under study by the League and its General Counsel.

LORAN

In this department of *QST* for July, 1956, we reported the withdrawal from amateur use, in certain locations near the Gulf, of operating privileges in the 1800–2000 kc. portion of the spectrum. This restriction was required during a

[1] *QST*, June, 1951, p. 39; October, 1951, p. 13.

(Continued on page 160)

period of reorganization of the Loran navigation system by the Coast Guard, and was expected to maintain for approximately one year.

While that phase of the program is now accomplished, the greatly increased use of radio navigation facilities, particularly on the part of another Government agency, has required a considerable expansion of the Loran system — a task again to be handled by the Coast Guard. The result is that the Coast Guard cannot at this time, as it had expected, return the amateur sharing arrangement to its earlier pattern. It is not possible to predict how long the required engineering and other studies will last, nor whether any additional modifications will need to be made in the amateur sharing arrangement.

This situation, while not a happy one from our standpoint, is wholly within the provisions of the regulations, which stipulate that the Loran system has priority, that amateur use is not a bar to the expansion of Loran, and that the amateur sharing arrangement is subject to cancellation or revision at any time, without hearing.

VE MOBILE IN U.S.A.

Previous items in *QST* concerning Canadians wishing to obtain authorization for mobile operation in W-land have included an FCC address which has now been changed. Requests for application forms for such authorization should now be addressed simply to The Secretary, Federal Communications Commission, Washington 25, D. C.

The World Above 50 Mc.

(*Continued from page 65*)

420-Mc. Record Moves to Europe

We haven't had a change in our v.h.f. DX records box for more than a year, but now we have two. The KH6UH – W6NLZ record is a jump beyond our fondest expectations in the 2-meter department, and we have a new one for 420 Mc., also. Thanks to our good friend G6CL, of RSGB, we have news of some 420-Mc. work than definitely costs us the record on that band.

This probably should have happened before, for there was a report about two years back of a 420-Mc. QSO across the Mediterranean. We never received complete details on this one, though it appeared to be well beyond the 410-mile record we've carried since June 12, 1954. G6CL tells us that on June 19, at 2232 GMT, G3HAZ, near Birmingham, worked DL3YBA, 16 miles east of Hannover, Germany, on 420 Mc. c.w. Distance appears to be almost exactly 500 miles. We list this tentatively until more details can be obtained from the principals.

With the kind of tropospheric conditions reported for early July on 144 Mc., extension of the 220- and 420-Mc. records in this country would appear to have been waiting merely for some stations in the right spots to have a go at it. With S9 signals over paths of nearly 1000 miles on 144,

(*Continued on page 162*)

it is logical to assume that 220 and 420 might have done as well, or perhaps better. Let's try!

A new amateur frontier was opened recently when W6NSV and K6YYF worked two-way on 36,500 Mc., the highest frequency yet used for amateur two-way communication, outside of that done with light beams. More details on this one coming up.

50-Mc. WAS for W8CMS and WØMVG

The aurora of June 30 posed a difficult choice for WØMVG, Salina, Kan. Jim was hearing states he hadn't worked on 144 Mc., including W4ZXI, Greensboro, N.C., a very rare opportunity, indeed. But there were Oklahoma stations on 6, and as so often is the case with large Middle-Western states, it was only that adjacent one that WØMVG had needed for many months. The choice of 6 for the best period of the aurora netted 50-Mc. WAS Award No. 26, though it was a rough job, with nearly everyone attempting to use voice. Jim thus became the first Kansas 50-Mc. operator to make WAS on 6. (WØZJB, now a Kansas resident, was in Missouri when he knocked off No. 1 back in 1948.)

Award No. 25, and the distinction of being the first W8 to make 50-Mc. WAS, goes to W8CMS, Newton Falls, Ohio. Eda Williams, W7EPZ, Billings, Mont., played the lead in this drama, becoming the first YL on 6 to provide the final state in a quest for 50-Mc. WAS. We understand that she received a dozen American Beauties along with her QSL, as Claire's expression of gratitude!

W8CMS was given special honors, a case of champagne, and a K8AOG-style WAS certificate at the Northeast Ohio V.H.F. Picnic, held recently at Akron. Some 550 participants were on hand to do honor to Claire, long a leader in Ohio 6-meter circles.

Note to 50-Mc. WAS aspirants: Be sure to send a covering note with your cards for a 50-Mc. WAS award. Two regular WAS certificates have now been issued to applicants who earned 50-Mc. awards, because they sent cards only. Remember — there are thousands of the other kind, and cards for them arrive in nearly every mail.

Here and There on the V.H.F. Bands

Anyone interested in a 50-Mc. transcontinental relay? W7RGS, Milwaukie, Ore., writes that provision will be made to start a relay from Oregon during the September V.H.F. Party, the week end of the 21st. Four portable stations will provide a network from the Oregon coast to Idaho. From there it is hoped to work W7ACD at Shelley, Idaho, but from there on some additional cooperation is needed. Floyd says that they will give it another whirl in June, if there is interest to warrant the effort. Transcontinental communication is easy on 6 at times, but a relay across the country under dead-band conditions is quite another matter. Volunteers?

One of the mountain expeditions to participate in this effort will climb 11,750-foot Mt. Hood. Members of the Portland Amateur Radio Club with equipment for both 2 and 6 will make the climb. W7VLE, Forest Service Ranger in the Mt. Hood area, is helping with planning. W7OZL, PARC president, has had forestry service experience and knows the problems well. Others in the party include W7HVX and W7ZHF.

Another September expedition is planned by the Phoenix V.H.F. Radio Club. The objective is the San Francisco Peaks, north of Flagstaff, Ariz. Call will be W7VMP/7. Operation is planned for 50, 144 and 420 Mc., from about 1200 MST, Aug. 31 to the same time Sept. 2. The Fenwicks of W7VMP are mountain-topping this summer. Using a 700-watt 144-Mc. rig formerly W9KLR's, they made their first trip to Mesa Verde National Park, near Grand Junction, Colo. This netted contacts on 144 Mc. with W7VMP in Phoenix and W5FAG, Albuquerque, N. Mex., both in the

(*Continued on page 164*)

"first Colorado" category. Meteor pings and one call identification, but no QSO, resulted from evening skeds with W9KLR. On the Colorado expedition were W7s RUC WMK VMO and VMQ. Antennas available for expedition work on 144 Mc. include two Gonset "Big Berthas."

Speaking of states on 144 Mc., having worked W4AIB, Aiken, S. C., July 13, W3NLY now has all of them east of the Mississippi, which may be a "first" as far as we are able to determine. It wasn't so many years ago that a well-known W5 told your conductor, "We've tried 2 meters here again and again, and it simply doesn't work!" One of these days somebody is going to be W ¾ S on 144 — and if that can happen, how long will it be before a Grand Slam is made on 2. W9KLR and W8KAY lead the pack with 34 each! Perhaps it's not too early to be thinking about an appropriate trophy.

Notice how large 6 and 2 are beginning to loom in the Field Day picture? W1FVZ says that his club, the Bristol County Radio Association, made 134 contacts on 50 Mc., while two rigs working all lower bands managed only a combined total of 179 more. Many hotshot contest clubs now rely on v.h.f. setups for 200 contacts or more. Not a few of these groups would have scoffed at the idea of including 6 and 2 in a serious contest lineup a few years ago.

Largest 6-meter array? Could be the fixed two-tower structure of W4HHK/4, special IGY project of W4HHK and W4GYS. Two 100-foot towers support a 24-element collinear array facing northwest-southwest. This project was taken on especially for IGY purposes, and the antenna was several months in the building. Paul is running regular 50-Mc. skeds with W1HDQ on 50 Mc., and will welcome other skeds along the line of the big beam. His scatter signal at W1HDQ is good enough for more-or-less routine c.w. QSO's when the band is dead, and when there is sporadic-*E* about the sig is like nothing we've ever heard on 6. More about this project at the National Convention, and shortly in *QST*.

V.h.f. enthusiasts within driving range of Syracuse should circle Oct. 12 on their calendars. That's when the big V.h.f. Roundup will be held. If you already circled Oct. 5, the date we gave in a previous mention, please move the circle along a week. Don't know how that 5 got in there! More details next month. Your conductor will be there, this time.

Want meteor-scatter skeds with Rhode Island on 144 Mc.? W1KCS has been a good bet in the past, and now W1AJR is willing to give it a whirl. He has up to 500 watts on c.w. and has been doing very well in aurora work.

Not all v.h.f. newcomers are youngsters, by any means. K8ACC, Richland, Mich., who has worked 41 states on 6 since March 27, writes: "I'm 61, and believe me, the Technician ticket is a godsend to fellows who, like myself, start a bit late in life to master the code at 13 w.p.m." He's working on it still, but enjoying life on 6 meanwhile.

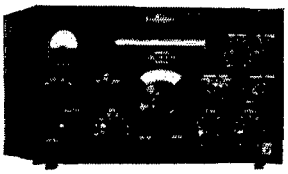
Hint from one of the younger 6-meter enthusiasts to those who yearn for larger section multipliers in v.h.f. contests: "Skeds on 50 Mc. with W4IKK and W4RMU in the June V.H.F. Party paid off in additional multipliers. Both QSO's were completed in under 7 minutes, which was less than expected. Seems that this method of fattening section multipliers should be exploited by more v.h.f. men. A good antenna, high receiver selectivity and the willingness to use a key are all that's needed. We have high power in the works, but all our scatter contacts have been made with 50 watts!" — K2ITP, Riverton, N. J. To which we add, "Amen!" Scatter work on 6 gave W1HDQ 5 sections in the June Party. We had skeds with W4IKK and W4RMU, also, but worked them both before sked time.

The Oklahoma Central 6-Meter Net, club style, was organized July 12, with 32 members. They meet on 50.1 Mc. (that frequency, again!) each Sunday at 2030 CST. A certificate of honorary membership is available to anyone who works and QSLs 6 of the members. Send your list of

(Continued on page 168)

AVAILABLE IN STOCK NOW!

COLLINS



75A-4 . . . . $695.00
KWS-1 . . . . $2,095.00

NEW HAMMARLUND HQ-110
RECEIVER. Net $229.00

THE NEW RME NO. 4350
RECEIVER $229.00

VISIT "THE ATTIC" YOUR WEST COAST HAM HAVEN

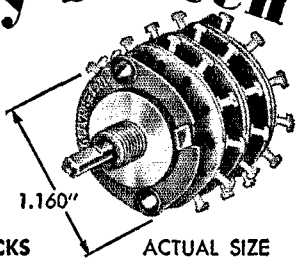
Also available in stock: Gonset, Elmac, Hallicrafters, Johnson, National, Morrow and all other amateur lines.

universal distributors inc.

4642 W. CENTURY BLVD.
INGLEWOOD 2, CALIF.
ORCHARD 4-5740
OREGON 8-5509

NEW

series 7000 sub-miniature
rotary switch



ACTUAL SIZE

OFFERING UP TO TWELVE POSITIONS PER DECK AND THREE DECKS

Maximum versatility, 1 to 3 decks, wide range of contact arrangements. Specially impregnated glass melamine wafer. Solder type lugs. Positive indexing.

Write FOR ENGINEERING DATA SHEETS ON ROTARY SWITCH AND:

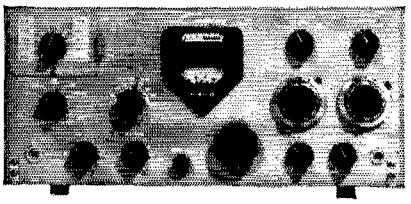
1½" Ruggedized Meters; 1" and 1½" Panel Meters; 1½" VU, Db and Illuminated Meters; Miniature Multitesters; and Side Indicators.

international instruments, inc.
P.O. BOX 2954, NEW HAVEN 15, CONN.
Cable "INTERINST"

---

the Collins KWM-1

SSB Mobile Transceiver



FIRST Mobile SSB Transceiver — 175 watts PEP input, 14-30 mc. Excellent frequency stability. Use as mobile or fixed station without modification. Break-in CW using VOX circuits, side tone for monitoring CW. Ten 100 kc. bands available anywhere in the 14-30 mc range. 6¼" H x 14" W x 10" D. Net price ----------$770.00

Write or see us about trade-ins, time payment terms.

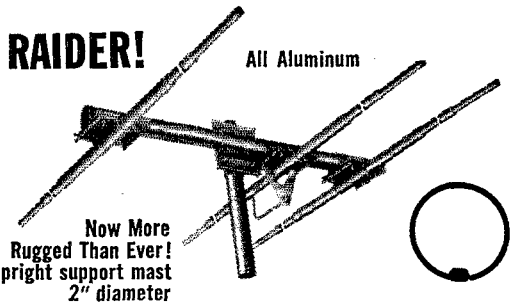
HARRIS RADIO CORP.

c/o TERRY W9DIA

289 North Main St., Fond du Lac, Wisc.

THE NEW SPACE RAIDER!

New aluminum element support clamps for simple, fast assembly & extremely rugged construction. Plus maximum performance in adverse weather.



Element detail shows exclusive reinforcing rib traversing entire length of each element to add bracing and to insure minimum droop.

Check these prices and gain figures!

	Gain	F/B	Wt.	Ham Net
20 meter—3 element, 1¼" dia. tapered to ¾"	8 db	20db	22 lbs.	$54.50
15 meter—3 element, 1¼" dia. tapered to 1"	8 db	20db	18 lbs.	44.40
15 meter—4 element, 1¼" dia. tapered to 1"	9.5db	30db	26 lbs.	54.50
10 meter—3 element, 1¼" dia. tapered to 1"	8 db	20db	15 lbs.	34.50
10 meter—4 element, 1¼" dia. tapered to 1"	9.5db	30db	20 lbs.	44.50
6 meter—6 element, 1" dia.	11.5db	30db	16 lbs.	39.50

SPACE RAIDER BEAMS COME COMPLETE!

Each beam pre-tuned. Beams have built-in pre-resonated matching section and special corrosion resistant hardware. Space Raider beams are easily assembled in minimum time. No special tools. No soldering. Coaxial fitting is built into matching unit. SWR is unit in middle of the band and less than 1.5:1 at band edges.

Order now from your ham distributor
Free literature available

Space-Raider

Full size beams for full size performance

Mfr. by **NATIONAL WIRE & CABLE CORP.** / Antenna Division / 136 San Fernando Rd., Los Angeles, Calif.

BANDPASS CRYSTAL FILTERS

New, improved models of both i.f. filters used in W1DX's receiver. (*January QST and 1957 Handbook*)
Postpaid anywhere upon receipt of check or M.O. **$44.50**
Specify **Model 2215KA** for phone
Model 2215KB for C.W.

HYCON EASTERN INC., **Dept. Q9** 75 Cambridge Pkwy. Cambridge 42, Mass.

ELECTRONICS • RADIO • RADAR • TELEVISION

36 Years of Successful Training in Electronics

COMMERCIAL RADIO INSTITUTE

Approved by Maryland Board of Education

38 West Biddle St. Baltimore 1, Md.

Write for Free Catalog • Tel. LE 9-3342

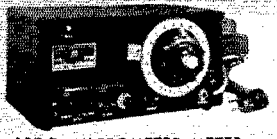
In your shack . . . in spare time . . .

START YOUR OWN BUSINESS

. . . in commercial mobile-radio maintenance!

Commercial MOBILE RADIO is bursting its seams . . . these rigs require first-rate maintenance . . . pay first-rate money . . . usually on a term-contract basis! GET STARTED while it's NEW!

These Lampkin meters in your shack will mean money in your pocket!



105-B MICROMETER METER. Price $220.00 net.

205-A MODULATION METER. Price $240.00 net.

It's a natural for hams—so write for free booklet "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE".

TIME PAYMENT PLAN NOW AVAILABLE!

LAMPKIN LABORATORIES, INC. BRADENTON, FLORIDA

LAMPKIN LABORATORIES, INC.
Mfg. DIVISION, BRADENTON, FLA.
At no obligation to me, please send
☐ Free Booklet ☐ Technical data on Lampkin meters
Name_____
Address_____
City_____ State_____

6 stations worked (their cards not needed) to Lee Whitaker, W5CZA, 3001 NW 30, Oklahoma City.

Ask any Novice how things go above 145 Mc., and he'll tell you about the DX enthusiasts who never tune above 144.2 Mc. But low power can work out in the Novice band, with a little cooperation. KN4LRV, Valley Station, Ky., worked 7 states and 5 call areas before tackling the General Class exam. His Communicator was helped along by a 32-element array, but he says the big factor was cooperation from W4HJQ and W4MKJ in steering the DX his way. Let's not forget the boys above 145 Mc.!

2-Meter Standings

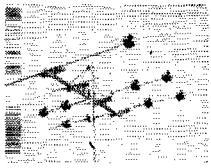
	States	U.S. Areas	Miles
W1REZ	24	7	1175
W1PZJ	21	6	1120
W1RFU	20	7	1150
W1HDQ	20	6	1020
W1AJR	20	6	810
W1KCS	19	6	1080
W1AZK	18	6	850
W1IZY	17	6	750
W1UIZ	17	5	680
W1BCN	16	5	650
W1KHL	16	5	540
W1MMN	15	6	800
W1AFO	15	5	810
W2NLY	30	8	1390
W2ORI	29	8	1075
W2CXY	28	8	1140
W2AZL	25	8	1050
W2BLV	23	7	1020
W2DWJ	21	6	720
W2OPQ	20	6	970
W2AMJ	20	6	960
K2CFH	20	7	910
W2PAU	20	6	880
W2CBB	20	6	740
W2UTH	19	7	880
W2AZP	19	7	650
K2IXJ	19	6	925
W2RGV	19	6	720
W2KIR	19	6	—
K2IEJ	19	6	785
W2AOC	18	6	660
W2LHI	18	7	620
W2RXG	17	6	675
W2SHT	16	6	650
W2PCQ	16	5	650
W3BGT	28	8	740
W3RUE	28	5	850
W3IBH	23	7	650
W3GKP	23	6	800
W3TDF	22	6	880
W3FPH	21	8	—
W3KCA	21	7	—
W3LZD	20	7	—
W3KWL	19	7	740
W3NKM	19	8	660
W3YHI	19	6	800
W3BNC	18	7	750
W3LNA	16	7	720
W4HJQ	30	8	825
W4HHK	29	9	1280
W4AO	29	7	950
W4JCJ	22	6	660
W4UMF	21	6	720
W4DWU	20	6	675
W4MKJ	20	8	725
W4OLK	19	6	720
W4LTU	18	7	1080
W4JFV	18	7	830
W4IKZ	18	6	720
W4VLA	17	7	825
W4WNH	17	7	750
W4TLV	16	7	1000
W4CLY	15	5	720
W4ZBU	14	5	800
W4WCB	14	5	—
W4TCR	14	5	720
W4SOP	13	5	680
W4CPZ	12	5	650
W4UDQ	11	5	850
W4MDA	11	5	68
W4GIS	9	2	335
W5RCI	23	7	950
W5DFU	20	7	1225
W5AJG	18	7	1280
W5HEH	15	7	830
W5MWW	14	5	700
W5FSC	12	5	1390
W5ABN	12	5	780
W5QNL	10	5	1400
W5CVW	10	5	1180
W5SWV	10	3	600
W5ML	9	3	700
W5NDE	8	3	520
W5PZ	8	3	500
W5FEK	8	2	580
W5VY	7	3	1200
W6NLZ	6	3	2540
W6WSQ	5	3	1380
W6DNG	5	3	660
W6AJF	5	2	640
W6RRZ	4	2	360
W6PJA	4	3	1390
W6ZL	3	2	1400
W6AJF	3	2	640
W6BAZ	3	2	400
W6MMU	3	2	388
W6ORS	3	2	365
W6LSB	2	2	360
W7YMP	7	5	1280
W7LEE	6	3	1020
W7LHL	4	2	1050
W7JU	4	2	353
W7JIP	3	2	850
W7YZU	3	2	240
W7JUO	2	2	140
W8KAY	34	8	1020
W8WXV	30	8	1200
W8RMH	29	8	800
W8SRW	27	7	850
W8SFG	26	7	850
W8PT	25	8	985
W8ILC	25	8	800
W8LPD	25	8	750
W8DX	25	8	720
W8LOF	24	8	700
W8WRN	23	8	680
W8BAX	23	8	675
W8SVL	22	8	725
W8JWV	22	8	710
W8EP	18	7	800
W8ZCV	17	7	970
W8RWW	17	7	630
W8LCY	17	7	610
W9KLR	34	8	950
W9WOK	28	8	800
W9FVJ	26	8	850
W9ZHL	25	8	760
W9EQC	25	8	820
W9GAB	24	7	1100
W9EHX	24	7	725
W9BPV	23	7	1000
W9UCH	22	8	750
W9UED	22	7	960
W9AAG	22	7	850
W9KPS	21	7	690
W9MUD	19	7	640
W9REM	19	6	—
W9LF	19	6	—
W9ALU	18	7	800
W9JGA	18	6	720
W9MBI	16	7	660
W9JYI	15	7	560
W9LEE	15	6	780
W9DSP	15	6	760
W9DDG	16	6	700
WØEMS	27	8	1175
WØHD	26	7	870
WØGUD	25	7	1065
WØINI	19	6	830
WØUOP	18	6	—
WØONQ	17	6	1000
WØSMJ	16	6	1000
WØUSQ	14	6	750
WØIFS	14	5	—
WØOAC	14	5	725
WØMVG	13	5	700
WØTJF	13	4	—
WØZJB	11	4	650
VE3DIR	26	8	915
VE3AJB	25	8	910
VE3BQN	17	7	790
VE3DER	16	7	820
VE3BPB	13	6	715
VE2AOK	12	5	550
VE3AQG	11	7	800
VE1QY	11	4	900
VE7FJ	2	1	385
KH6UK	1	2	2540

We've got the Hy-Gain line!

IMMEDIATE DELIVERY...

10% DOWN — EASY TERMS

We've listed the full Amateur Net prices — but remember any of this quality Hy-Gain gear can be yours for just 10% down and easy terms!



HY-GAIN "TRI-BANDERS"—Here are the beams preferred by Hams everywhere! Adjustable, weather-proof trap circuit. Rated at full KW. Excellent match to single 52-ohm coaxial line on 10, 15, and 20 meters — less than 1.65 to 1 SWR. Really rugged construction.

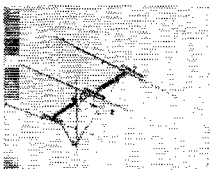
MODEL 152-T1 — 1 ELEMENT — Single, 3-band dipole. Rotate or leave in fixed position. 28 ft. in length. Weight: 10 lbs. . . . . **$39.95** Amateur Net

MODEL 152-T2 — 2 ELEMENT — 5.8 db gain — only 6 ft. long. With separate 10 meter reflector. Weight: 36 lbs. . . . . **$69.50** Amateur Net

MODEL 152-T3 — 3 ELEMENT — Most gain per dollar! 18 ft. boom — 29 ft. element. With separate 10 meter reflector. Weight: 58 lbs. . . . . **$99.75** Amateur Net

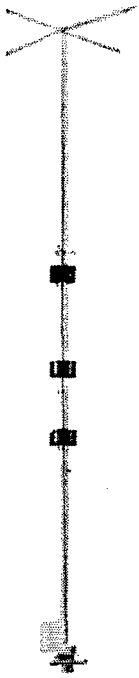
MODEL AD-1 — Additional 10 meter director element for increased power on the 152-T3 . . . . . **$14.95** Amateur Net

MODEL 152-T5 — 5 ELEMENT — 12 db gain! Deluxe array. 36 ft. boom. Weight: 96 lbs. . . . . **$395.00** Amateur Net



HY-GAIN STANDARD SINGLE-BAND BEAMS — Here's a group of well-designed, really rugged beams at real economy prices. Pre-tuned for best performance and excellent impedance match.

Model	Band	Elements	Gain	Price
25	2	5	10.5 db	$ 7.95
210	2	10	12.0 db	9.95
65	6	5	10.5 db	14.95
103	10	3	8.5 db	19.95
153	15	3	8.5 db	29.95
203	20	3	8.5 db	49.95



HY-GAIN AUTOMATIC-TRAP VERTICALS — Automatic selection of 10, 15, 20 and 40 meters. Calibrated base loading coil available to extend coverage to 80 and 160 meters. Weather-proof, adjustable "Insu-Traps." Maintains low SWR across all bands. Only 21 ft. high.

MODEL 40-AV — 40 through 10 meters . . . . . **$27.95** Amateur Net

MODEL 80-AV — 80 through 10 meters . . . . . **29.95** Amateur Net

MODEL 160-AV — 160 through 10 meters **32.95**

- ✓ TERRIFIC TRADE-INS
- ✓ 10% DOWN—EASY TERMS
- ✓ SPEEDY DELIVERY
- ✓ PERSONAL ATTENTION

BIG NEW CATALOG — The most up-to-date presentation of amateur equipment available. Chock full of gear and accessories. Write for your free copy today!

Satisfaction Guaranteed
or your money refunded after 10 day trial

Burghardt RADIO SUPPLY

P.O. Box 746, Watertown, So. Dakota • Phone 5749

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. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested signature and address be printed plainly. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.**

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

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

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9VIV, Troy, Ill.

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

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

WANTED: All types aircraft & ground transmitters, receivers ART-13, RT18/ARC1, R5/ARN7, BC61OE, ARN6, BC788C, ARC3, BC342. Highest prices possible paid. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

ATTENTION Mobileers! Leece-Neville 6 volt 100 amp. system alternator, regulator & rectifier, $45.00. Also Leece-Neville 12-volt 100 amp. system, alternator, regulator & rectifier, $85.00. Good condition. H. A. Zimmerman Jr., K2PAT, 115 Willow St., Brooklyn 1, N. Y. Ulster 2-3472.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallicrafters, Hammarlund, Johnson, Lysco Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

WANTED: Receiver R5/ARN-7, MN-62A transceivers, RT18/ARC-1, AN/ARC-3, BC-788C, 1-152C, Collins, Bendix equipment, test sets, dynamotors, inverters. We pay highest prices. Advise quantity condition, price in first letter. Aircraft Radio Industries, Inc., 15 East 40th St., New York City. Tel. LExington 2-6254.

DX'ERS Notice! Save money? Save Time? Free info. DX QSL Coop, Box 5938, Kansas City 11, Mo.

MULTI-BAND Antenna, 80–40–20–15–10, $19.95. Patented. Send stamp for information. Lattin Radio Laboratories, Owensboro, Ky.

SAN FRANCISCO and vicinity. Communication receivers repaired and realigned. Guaranteed work. Factory methods. Special problems invited any equipment. *Associated Electronics, 58 South P St.*, Livermore, Calif. W6KF, Skipper.

RECEIVERS: Repaired and aligned by competent engineers, using factory standard instruments. Authorized Factory Service Station for Collins, Hallicrafters, Hammarlund, National. Our twenty-first year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

VACATIONS. Ham with my equipment, modern housekeeping cabins, American plan. Big McKenzie Lake, Spooner, Wis. Tony Martorano, W9HZC.

SCHEMATIC diagrams ARC-5 80-40 meter rcvrs and xmitters, 25¢ each or trade. S. Consalvo, 4905 Roanne Drive, Washington 21, D. C.

RADIO magazines. Buy, sell or trade. Bob Farmer, Plainview, Texas.

HALLICRAFTERS, Central Electronics ham gear — others. Swartzlander Radio Limited. Fremont, Ohio. Call Jerry, W8EPI or write.

WANTED: BC-221, BC-348, BC-312, BC-342, BC-610-E, ARN-7, BC-788, ARN-6, APR-4, ARC-1, ARC-3, ART-13. All types surplus or amateur transmitters, receivers, test equipment taken in trade for New Johnson Viking Ranger, Pacemaker, Valiant, Hallicrafters, Hammarlund, National, B&W, Gonset, Elmac, Telrex, Fisher Hi-Fi, etc. Write Tom, W1AFN. Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048. Store: 60 Spring St., Newport, R. I.

QSLS? SWLS? Finest and largest variety Samples 25¢ (refunded). Callbooks (Fall), $4.50. "Rus" Sakkers, W8DED, P.O. Box 218, Holland, Mich.

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

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

QSLS-SWLS. Now printing for a third generation YL ham! Samples 10¢. C. Fritz, 1213 Briargate, Joliet, Ill.

QSLS-SWLS. Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

QSLS-SWLS. 100, $2.85 up. Samples 10¢. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

WSLS. Twenty exclusive designs in 3 colors. Rush $3 for 100 or $5 for 200 and get surprise of your life. 48 hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSL Samples. Dime, refundable. Roy Gale, W1BD, Box 154, Waterford, Conn.

QSLS. Neat, Attractive. Samples 10¢. Woody's. Box 164, Asher Sta., Little Rock, Ark.

QSLS. Taprint, Union, Mass.

QSLS. Samples 10¢. H. J. Snyder, 398 Washington, Peru, Ind.

QSLS, Sharp! 200 one color, glossy, $4.75; Multi-color samples dime. K9DAS QSL Factory, Edward Green & Sons, Box 197, Frankfort, Ind.

QSLS Glossy, two colors, samples 10¢ (refunded). 200 cards $3.75. W1GKH Press, Candleview Ridge, Danbury 18, Conn.

QSLS. Reasonable. 3 Week Delivery. Samples dime (coin). Dick, K6GJM, Box 294, Temple City, Calif.

QSLS samples, dime. Gay Krenz, Fall Creek, Wis.

QSLS. Reasonable. Nice designs. Samples free. Stan, W2DJH, 19 Elm St., Warrensburg, N. Y.

QSLS-SWLS. Samples dime. Refundable. Bob Cushing, W1HOU, 43 Ashland St., Manchester, N. H.

QSLS-SWLS. Samples free. Bartinoski, W2CVE Press, Williamstown, N. J.

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

QSLS — All kinds and prices. Samples 10¢, fast service. DX Card Co., Kulik St., Clifton, N. J. Tel. GR 3-4779.

DIFFERENT! "Angl' Call" QSLS; 2 sides, glossies: $2.45. Radoprint, Ojai, Calif.

QSLS: Cartoons, colors, something different. Samples 15¢, Chris, W9PPA, 365 Terra Cotta, Crystal Lake, Ill.

CREATIVE QSL and SWL Cards. Are you proud of your card? If not, let us print your next order. Write for free samples and booklet. Personal attention given to all requests. Bob Wilkins, Jr. KN6ZMT, Creative Printing, P.O. Box 1064-C, Atascadero, Calif.

QSL Special Free Sample. Nat Stinnette, W4AYV, P. O. Box 155, Umatilla, Fla.

QSLS-SWLS. High quality. Reasonable prices. Samples. Bob Teachout, W1FSV, 204 Adams St., Rutland, Vt.

QSLS, Reasonable, nice designs. Samples free. Stan, W2DJH, 19 Elm, Warrensburg, N. Y.

QSLS, SWL's, VHF's, XYL-OM's. (Sample assortment approximately 9¾¢.) Covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazzy, unparagoned, cards. Rogers, KØAAB, 737 Lincoln Ave., St. Paul 5, Minn. Also glamorous, pulsating (Wow!).

QSLS, California only. Samples 10¢. Dauph, K6JCN, Box 66009, Mar Vista 66, Calif.

QSLS! Shack accessories! Brochure free. WAT, Box 128, Brecksville, Ohio.

QSLS of distinction! Three colors and up. 10¢ brings you samples of distinction. Uncle Fred, Meshoppen, Pa.

SEND $3.00 for 200 2-color QSLS-SWLS. Fast service. Samples 25¢. Bolles, W5OWC, Box 9007, Austin 17, Texas.

RUBBER Stamps for QSLS, sample impressions. W9UNY, C. W. Hamm, 542 North 93rd St., Milwaukee, Wis.

QSLS, SWL's, 1¢ each, samples 10 cents. Rusprint, Box 7507, Kansas City 16, Mo.

QSLS. Glossy, Quality, Reasonable. Nick, W1HLF, 236 Highland Street, Hamilton, Mass.

QSLS. Samples, Eddie Scott. W3CSX, Fairplay, Md.

QSLS. SWLS. Samples free. Backus, 703 Cumberland St., Richmond, Va.

QSLS. Glossy. Samples 10¢. W1OLU Press, 30 Magoun, Medford, Mass.

FOR Sale: Collins 30K1 400 watt transmitter, like new condx. W8VYE, Orville Wood, Camden, Ohio. Tel. 243.

ETCHED — Circuit material, supplies, instructions, free catalog. Etched circuits! P.O. Box 2582, South Bend 14, Ind.

JOHNSON Viking Ranger. Used very little. Push-to-talk. Reasonable. W2BAA, Flushing, N. Y. Tel. 9-4009.

ATTENTION Communicator owners! Illuminated "S" meters that just plug in to attach. No disassembly of communicator required. Also new and used Communicators, Linear Amplifiers, V.F.O.'s, and all types of mobile gear. Graham Company Bob, W1KTJ, Stoneham, Mass.

CASH Paid! Sell your surplus electronic tubes. Want unused, clean transmitting, special purpose, receiving, TV types, magnetrons, klystrons, broadcast, etc. Also want military, and commercial lab test and communications gear. We swap, too, for tubes or choice equipment. Send specific details in first letter. For a fair deal write, wire or telephone: Barry Electronics, 512 Broadway, New York 12, N. Y. Tel. WAlker 5-7000

WANTED: Used receivers and transmitters. Will pay cash or trade. 10% down with up to 24 months to pay. In stock: New 75A4's KWS-1s, KWM-1 SSB mobile transceiver, Johnson, B&W National, Hallicrafters, Elmac, Hammarlund, Gonset, Central Electronics, Mosley, Hi-Gain and Gotham Beams. Write for list of bargains in reconditioned receivers and transmitters with new guarantee. Shipped on approval. Write Ken, WØZCN, or Glen, WØZKD for your best deal. Ken-Els Radio Supply Co., 428 Central Ave., Ft. Dodge, Iowa.

WANTED: Highest prices paid for ART-13, ARC-1, BC788, BC610, BC348, ARC-3, BC312, BC342 and other military or aeronautical surplus. Name your price. We pay freight and C.O.D. James S. Spivey, Inc., 4908 Hampden Lane, Bethesda, Md.

WANTED: ARC-3, ARC-1, ART-13, BC-312, BC-342, BC-610, BC-788 and other surplus. Advise what you have and price. W4VHG, Box 5878, Bethesda, Md.

STUDY at home for Commercial radio licenses. Very reasonable fee. Free sample lesson. Write Radio License Aids, Box 159, Buzzards Bay, Mass.

SALE: VHF Climaster, Model 62T10, 2, 6 and 10 meter xmitter, 200W. A1 and 160W. A3; 4X150X final, p. 135, Nov. 1956 *QST*; Gonset Communicator, 2 meter, Eldico electronic key, Mod. EE 2. Tom Moody, W4HJQ, Glendale, Ky.

SEND for this month's standout listings of Reconditioned Equipment. Also request our new "1957" Amateur Catalog. We feature all leading brands and promise you an attractive deal always regardless of your needs or budget. Check our offer first. We deal quickly, easily and always on a personal basis. Stan Burghardt, WØBJV, Burghardt Radio Supply, Watertown, S. Dak.

TECHNICAL Manuals TM11-273, 120 pages covering BC-312 receivers and BC-191 transmitters, $2.50. ID-60/APA-10 Panadaptor manuals, $2.75. Both postpaid in U.S.A. Electronicraft, Bronxville, N. Y.

"PIG-In-A-Poke"? Not if you visit Ham Headquarters, USA, and take your choice from the hundreds of "Like New" bargains in the world-famous Harrison Trade-In Center! (SS photographs, p. 137, March *QST* and p. 133 April *QST*). Greater values, because tremendous turnover means lower overhead! Terms. Trades BCNU. Bill Harrison, W2AVA, 225 Greenwich St., New York City.

SSB transformers, newly manufactured for 10A, 10B, 20A and W2EWL exciters $12.45 per set of three, postpaid USA. Electronics Associated, P. O. Box 206, Montclair, N. J.

FOR Sale: following new items: 1.87 Kw and 9.3 Ka 120V 60 cycle 1800 rpm generator with exciter; 6 tube farm radio less battery, six 5VCT 30A 20 KC insulation fil. xfrmr; also: prop pitch motor 50 ft. 8 PC 1¼" alum. masts, miscellaneous smittg tubes and meters, BC-458, 6V dual Vibrapack, 500V DC. W2PUK, Glen Ridge, N. J.

SHAW Electronic Supply has new and used ham gear. Clyde, W9KLF, Darling at Gale, Angola, Ind.

CODE Course Supreme, on magnetic recording tape. Results guaranteed. Novice tape, basic instruction, practice material to 8 WPM, $5.95; advanced tape — practice material 9 to 18 WPM, $4.95. Combined, $9.95. 7" dual track, 3¾ IPS. Tapedcode, Box 31-E, Langhorne, Penna.

WANTED. Jennings variable condenser and bargain in HT33 or similar linear bargain. W6KDR, 904 N. Dickel, Anaheim, Calif.

FOR Sale: BC221-AA with 110V built-in supply and original calibration book: $85; BC1004 receiver and supply. Best offer over $175. W2ZOL, Fayetteville, N. Y.

DELTA-TENNA ground planes, commercial quality 2 mtr., $19.95, 6 mtr., $24.95; 10 mtr., $29.95. Also cut to any commercial frequency 450–20 Mc. Western Gear, Dept. Q, 132 W. Colorado, Pasadena, Calif.

SELL pair AX-4–125A's new, $15; pair 4–250A's new, $16; 3–832A's, 75¢ each; 813, $5; 829B, $5; 9001, 9002, 9003 each, 50¢; TMS50D variable condenser new, $1.50; Vibroplex bug, $3; Johnson SWR Bridge 52 ohms, new, $5; power transformers, audio and chokes. Write for list. W. Steckiel, W3QEW, 2215 Riverside Dr., Scranton, Penna.

GONSET G66 receiver with power supply, 12 volt-115. Complete, $175. In new condition. 310B band-switching Collins exciter, completely TVI suppressed, $150. J. E. Shutt, W4JBN, Sturgis, Ky.

FOR Sale: Hallicrafters SX28A receiver, all new tubes, realigned and calibrated w/manual, $125; Heathkit SG-8 signal generator with manual, $15; Precision signal marking generator Series E200C 90 Kcs-200 Mc., $45. John Salsgiver, W1RMI, 88 Lawson Rd., Egypt, Mass. Phone SCituate 1036-W.

FOR Sale: Complete 10 meter mobile rig for 6 volt automobile, incl. Stancor ST-203 xmittr, Palco 500v. 200 Ma. Vibrapack, Gonset 10–11 converter, complete Master Mount antenna, all working, with tubes, vibrator, $45. J. Bullock, W4GAP/2.

REGENCY ATC-1 for sale: Won in recent contest, in perfect condx. Best offer over $68 takes it. E. Jones, KNØHQX, Rt. 2, Excelsior Springs, Mo.

SELL BC610E, complete with BC614E speech amplifier, tuning units and coils 80, 40, 20, 10 meters, plus spare tubes. Clean and original condition. Instruction manual. $350. Will not ship. W9GHK, RR 4, Bloomington, Ind.

SELL Collins 75A4 used only a few hours, like new condx, $525; Collins 32V2 in exc. condx, new VFO, $360; B&W 51SB with adaptor, new, $220. W2JRV, Bob Collins, 33 McKinley Ave., Westwood, N. J.

WANTED: January 1948 issue of QST. Needed to complete my back copy file. Don Meserve, WØWYK.

LAST Offer: Collins 32V3 and B&W low pass filter, $450 F.o.b. Clifton, N. J. Alfred Bein, K2BWQ, 26 Lenox Ave., Clifton, N. J.

SELL: Adventurer, in perfect condx, with xtal and key: $35. David Dahan, K2TTA, 80–56 Grenfell St., Kew Gardens 15, N. Y.

NATIONAL NC-173 receiver with speaker: $100. F.o.b. Pierre, So. Dak. Cecil Ice, 1104 E. Dakota Avenue.

FOR Purchase: S53A, year old, $60. Write: Louis Beshara, 5555 Stuber, Canton, Ohio.

WANTED: DX-100, also receiver. Only best deals considered. W8QKU, 2748 Meade St., Detroit 12, Mich.

VIKING II, Johnson V.F.O., like new, $195. Also inquire about many other articles for sale or trade. E. T. Holbrook, W4DND, General Delivery, Warner Robins, Ga.

SIDEBAND and High Power operators: End antenna relay problems with our vacuum coaxial relay. Send for dope sheet. South Bay Electronics, 3125 Barney, Menlo Park, Calif.

WANTED: Automatic tape transmission equipment, Kleinschmidt, Boehme or similar. Perforator, keyer, puller, etc. in gud condx. Write giving details and price. Huntley, W6RNC, 972 Grizzly Peak Blvd., Berkeley 8, Calif.

NEW Peerless 650 watt MultiMatch modulation transformer, $55; pair of Eimac 250TH's, new, $11 each. Ship anywhere collect. W6VZB, Wehe, 16080 Cambrian Drive, San Leandro, Calif.

FOR Sale: Johnson Viking I with TVI kit, B&W low pass filter and 52 ohm coaxial relay: $1.40 F.o.b. South Bend, Ind. Robert Kasa, 821 — 24th St., South Bend 15, Ind.

SALE: Collins 75A3 speaker, filter Ranger transmitter (factory wired and tested); DX-100 transmitter (new); Johnson Matchbox, excellent condition. H. L. Corson, 1308 Wright, Richland, Wash. W7YLW.

WANTED: BC779 or HQ120X. Particulars and price. California only. CWO Wiot L. Clarke, KA5CL/WYEDG, USN, FASRon 120, Navy 955, c/o FPO San Francisco, Calif.

SELL: SX-99, Heath VF-1, Globe Scout 65B factory wired; JT-30 microphone and Winter 1956 Call Book, $200. Only used for six months. K1AMN, 26 Yorktown Rd., East Greenwich, R. I.

CLOSED Circuit TV camera kit, complete with Vidicon and 1.9 lens, $395. For details write J. P. Morgan, W5LQR, P.O. Box 10561, Dallas 7, Texas.

FOR Sale: Westinghouse Dynamotor, 600V, 175 Ma. outp. 6V inp. $15. W9DGV, 711–44th St., Rock Island, Ill.

FOR Sale: TV FS meter, 488 Simpson, like new, plus Channel 48 coil; one B114 and B175 Lysco portable mobile transmitter. Ed Zibulka, W8AWK, 6620 Roe, Cincinnati 27, Ohio.

FOR Sale: Viking II, factory wired and tested and VFO, exc. condx, $240; Will trade Speed Graflex 4 x 5, hardly used, 4.7 optar lens with film pack adapter, flash gun, 8 cut film holders for linear amplifier (Lakeshore or Central). J. Chooljian, K2KRF, 530 Palisade Ave., West New York, N. J.

NC-98 Rcvr. Brand new condition, spotless and not a scratch, with new set Sylvania tubes, original carton and instruction book. Try it before you buy it. 90 day guarantee. Locals only. Cash only, $95. George M. Clark, W2JBL, 123 Davis Avenue, Hackensack, N. J.

MOBILE Station: Gonset Super-Six, $32.50; James C-1050 mobile power supply, $32.50; Master Mobile all-bander antenna, new, $25; Elmac AF-67, $135; K6SGD/KG6, Lawrence B. Loughran, Navy 926 Box 134 c/o F.P.O. San Francisco, Calif.

WANTED: HRO coils, G-180–430 Kc, H 100–200 Kc, J50–100 Kc, AC 21 Mgc, AD 50 Mgc, MRR2 table rack. Wells Chapin, W2DUD, 317 Southfield Dr., Fayetteville, N. Y.

FOR Sale: B&W 5100 transmitter, very little used, absolutely perfect; B&W low pass filter; B&W "TR" switch; B&W antenna change-over co-ax switch, Bud 100 Kc calibrator. All for $350. Will pay shipment. C. Judd, W2LZW.

SELL: HRO-M all coils and 100-watt converted to Ham band radiotelephone. Sacrifice both: $170. C. Van Demburgh, Byrdton, Va.

FOR Sale: Globe King 400-B, 20–40 mtr. coils; Hallicrafters HT-18 VFO, in gud condx, both for $275. W5KNZ, 302 Tophill Rd., San Antonio, Texas. TA 4–3764.

WANT: General Coverage Ham receiver about $50 limit. K. Streed, 3344 Beard Ave., N., Minneapolis 22, Minn.

SELL: Hallicrafters S-85, $90; Heathkit AT-1, $25; and AC-1, $5; all in excellent condx. Cal Swanson, 924 Hurst View, Duarte, Calif.

PERFECT DX100, $200; perfect HQ-129X, $175. Having to part with this excellent 160 thru 10 meter rig for college expenses. W5EYH, J. K. Kincaid, Box 25, Sabinal, Texas.

SELL: Harvey-Wells VFO, $25; 3650V, 450 Mil. power xfrmr, Universal 15 watt mod. xfrmr, Blue Racer model bug, Heathkit grid dip meter (hand calibrated/c coils); crystals, 75¢; other xfrmrs and odd parts. W1ZQP, 65 Suffolk St., Worcester, Mass. PL-7–1874.

SELL: Model 26 teleprinter, $85; Heathkit GDO kit, $17; VFO kit, $17; ASB-5 rcvr, $13, new; Teletype equipment, write for list. Ray Disbrow, Hazlet, N. J.

TRAVELLING Engineer needs CW "Suitcase" transceiver. Any suggestions appreciated. Schultz, W2EEY, 1829 Cornelia, Ridgewood 27. Brooklyn, N. Y.

FOR Sale: WRL Tri-bander, used, $55; WRL Tri-bander, new, $75; Workshop 20 meter 3-el. beam, new, $95; VHF 152A, $50; 2 Vocaline Model JRC 400 transceivers, new, with GP5-50 antenna, $130; Simpson field strength meter, $50; Knight 50 watt c.w. xmittr; wired, tested, never used, $40; Morrow 3BR1 converter, $35; Sonar SR9 2 meter rcvr, $50; Eldico keyer, $25; Carter Gen-E-Motor power supply, control panel and cabling for Harvey-Wells or other mobile xmittr, $50; Jones Micro-Match MM1, $15; Intercom, $10. All items in excellent condition. K5JLP, Box 808, Duncan, Okla.

SELL: Globe Chief 90, like new, $45. Lad Jelen, K8DEW, Rte. 4, Medina, Ohio.

BEAM: 20-meter Mosley Vest-Pocket. First class condx, like new: $50 or make an offer. Jim R. Hickok, RFD 2, Ulysses, Kans.

SELL: SX-71, in excellent condx: $110. W9JFB, 852 Marion, Nappanee, Ind.

SWAP: Have complete TV service equipment, 'scope, sweep, Sams and tubes. Want ham gear. Richard Clark, 1533 Edith N.E., Grand Rapids, Mich.

FOR Sale: National HRO-60 rcvr and speaker, $325. Three heavy-duty xfrmrs reasonable, also tubes and A.C./D.C. New Multimeters $30. Inquire of Mrs. Walter Williams, 56 E. 2nd St., Winona, Minn.

FOR Sale: Eldico TR-1TV, 300 watts with an Eldico antenna tuner, TVI suppressed. $200. Local deal preferred. D154693 after 6 P.M. Si Zaval, K2AUX, 38 Hegeman Ave., Brooklyn 12, N. Y.

WANTED: Johnson Kilowatt final amplifier. Have exciter. Cash. No trade-in. C. Herring, 1306 W. 8th St., Plainview, Texas.

FACTORY Wired Viking Ranger, latest model, $175. Hammarlund HQ140X with matching speaker, $180. Both units like new. WØPRM.

SELL: GPR-90 and speaker, new with guarantee: $459 F.o.b. Melbourne, Fla. George Guler, Trailer Haven.

PRINTED Circuits: Boards any size. Resists and etchants, complete line of supplies. Boards made to your designs. Lowest prices. Printed Circuits, 139 N. Locust, Palmyra, Penna.

MOBILE Transmitter built by G-E engineer exactly as on page 436 of 1955 ARRL Handbook, $40. K4KIN, New Haven, Ky.

SELL: Cubex quad, WRL-auto topper, two Televue towers, can't ship; Scott binaural tuner with equalizer, B&W T-R switch, E-V mobile mike, Drake & Sonar L-P filters, mobile 6V power supply, tape-disc recording unit, Gonset 12V Communicator, Johnson bi-net, Davis 75M mobile coil, 50 $\mu\mu f$ vacuum condensers, transmitting micas, Millen S.W. meter, Johnson neutralizing condenser, many parts. What do you need? Make offers: W3VDE, 1219 Yardley Rd., Morrisville, Penna.

HAMMARLUND HQ140XA receiver. Like new condx, $175; also Hallicrafters S40B, very gud condx, $65. Gerst, 2674 West 25th St., Cleveland, O. Want: RME-45, Calomatic.

HALLICRAFTERS SX-88, R46B speaker, clean, unmodified, $375; Morrow 5BR-1 converter 6V. Best offer. All letters will be answered. D. McDonald, W6OVF, 472–41st St., Oakland, Calif.

SALE: 3 304TL, 1 fil. xfrmer 5Vac at 30 amp.; 1–304TL socket. All for $25. Johnson Matchbox nearly new, $40. Signal Sentry, w/tubes, $13. C. L. Boschen, W91ZX, 403 W. Tilden Rd., Brownsburg, Ind.

SELL: Gonset Communicator No. 2 with Gonset model No. 3063 linear amplifier and Gonset Monitor. All units are like new, used about 50 hours. Prefer local sale. Stop in and work station. Philip Kantz, WN3JLD, 7336 Woodbine Ave., Phila 31, Penna.

COMPLETE Line of Hallicrafters receivers at lowest prices. Commercial Radio Corp, 36 Brattle St., Boston 8, Mass.

SELL: S-38D and QF-1 with power supply; $45 takes all. George Healey, 1051 Grand View, Lancaster, Penna.

BARGAINS: With New Guarantee: RME-84, $65.00; HT-20 xmtr., $275.00; Collins 32V3, $495.00; Collins 32RA8, $69.00; TBS-50C, $69.00; TBS-50D, $69.00; APS-50 p.s., $29.50; TBS VFO, $15.00; Lysco 382 VFO, $19.95; Lysco 600, $69.00; Eldico TR-75TV, $25.00; Viking II, $209.00; Adventurer, $34.50; Knight CW xmtr., $34.95; Gonset No. 3024 VFO, $45.00; Globe Scout 65B, $75.00; Sonar SRT-120, $99.00; Globe Trotter, $29.50; Globe King 500A, $495.00; Globe King 275, $199.00; Globe King 400B, $275.00; Scout 65A, $69.00; Globe King 400C-TVIed, $299.00; HQ-129X, $159.00. Free trial, terms, write Leo, W0GFQ for best deals. World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

SELL Or swap: National MB40L, commercial audio line amplifier from radio station. Want good RF gen., mobile all-band condenser, 35 mm equipt. or? K2ITO, CL 6-5686, Brooklyn. H. Cohen, 1975 83rd St., Brooklyn 14, N. Y.

10B Exciter, 458 VFO, QT-1, extra rack panel, speech restriction. Best offer over $100 by Sept. 15th. Wanted: Collins 455 Kc. mechanical filter, 3.1 Kc band width. State price and condx. W1RWD, Box 1832, New Haven, Conn.

TRADE: Viking Adventurer xmttr, Electro-Voice Mercury microphone, Gotham 3-el. beam, Vibroplex Zephyr bug, Sear's best Hawaiian electric steel guitar. FOR a good xmittr 150 to 250 watts, phone and c.w. bandswitching with VFO. Can be homebrew, *QST* constrx or Handbook xmittr. K4HQH, 2228 Vaughan St., So. Boston, Virginia.

COLLINS 32V3 and 75A2 for sale, in excellent condx. K2JHA. Tel. FLushing 9-0534. 26–28 157th St., Flushing 54, L. I., N. Y.

CLEAN UP Sale! Two BC654 xmitter/rcvrs, new condx; two BC611 Handie-Talkies, 3885 Kc, gud condx, less batts, best offer. Also hv miscel. gear. Write for full list. W2DGG, A. Vandervoort, 44 Buena Vista Way, Morse Lake, Bloomingdale, N. J.

SELLING: 2 Meter transceiver, works; TBY-7 transceiver (10–2 m), a beautiful job; BC704-A radar indicator; PP104/APT-J H.V. supply, clean; 10,000 VOH xfrmr. Want: Rotator. B. Fernandez, 376 E. Palisade, Englewood, N. J.

FOR Sale: LM-7 frequency meter with modulation and original book. Excellent condx, $40. Need blank book for BC-221. Harry Brettschneider, P.O. Box 385, Huntsville, Ala.

SELL: Two Handie-Talkies, BC-611, 3885 Kc with manuals. In exc. condx. Both $75. Walter B. Ford, K6DZ, 181 Westdale Ct., El Cajon, Calif.

FOR Sale: NC300 modified with xtal, 2nd conversion for ease of alignment, full wave noise limiter, XCU calibrator, $325 f.o.b. Monrovia, Calif. Also: South California area only! 20 meter 2 element beam, cost $125 to build. Will sell for only $35. W6GMC.

NATIONAL NC125 with matching speaker and Heath Q multiplier. BC221 frequency meter, SCR522 transmitter, will sell or trade for 4–1000. vacuum variable condenser, mobile gear, or Hi-Fi equipment. M. D. Haines, W5QCB, 1316 S. W. Military Drive, San Antonio 21, Texas.

FOR Sale: GONSET G-66B, 3-way power supply, two months old, $200. G. E. Dominick, W4UWC, 1025 Nokomis Circle, Knoxville, Tenn.

DX100 grid blocked keying, $185; compact ten meter mobile transmitter, $22. Will ship f.o.b. Art Ford, 85 Franklin, Northport, L. I., N. Y. Tel. NOrthport 3-0501-J

SX-71 with 15 meter calibration, $145; Mon-Key, $20; mounted balun coils, $5.00; Johnson SWR Bridge, $8; Motorola 7MX transistor powered 12V. radio with speaker, $45; Wanted: Micro-Match and Johnson Matchbox. Leon W. Stuber, W8PJV, 373 North Main, Amherst, Ohio.

FOR Sale: Heath DX-35 transmitter; AR-3 receiver. Both brand new. Emore O. Johnsrud, Box 72, Dahlen, N. Dak.

TECHMASTER: New 29 tube TV chassis with 12" speaker and 21" plastic mask, adjustable mounting brackets up to 24" picture tube. Just the thing for in-wall mounting or Hi-Fi cabinet. Sell or trade for Viking II or what have you? W7FLO, Henry, Nebr.

WIRE Recorder for sale. Webcor brand with built-in P.A. system and neon recording level indicator. Recording wire, microphone, and line cord included. $79.50, postpaid. Write: W. R. Oringderff, Box 284, Elk City, Okla.

BARGAINS: Reconditioned with new guarantee. Shipped on approval. Hallicrafters S38, $29.00; S40A, $69.00; SX99, $119.00; SX71, $149.00; SX100, $229.00; Viking Adventurer, $39.00; Viking II, $199.00; Ranger, $179.00; Valiant, $379.00; S40B; S85; SW54; NC98; NC183D; NC300; HQ129X; HQ140X; GPR90; A54; AF67; PMR6; PMR7; Collins KWS-1; 75A1; 75A3; 75A4; 32V3; many other items. Easy terms. Write for list. Henry Radio, Butler, Missouri.

SALE: 6 tube AC-DC metal cased radios with timing motors and coin mechanism, excellent for Conelrad monitors. $7.95 ea.; 1 Motorola FMR-13 trans. and rcvr, 50 watt, 30 to 40 Mc. FM with cables and control head, $85; 1 Motorola FMR13 rcvr (30 to 40 Mc FM) with AC power supply, $35. F.o.b. Whites City, New Mexico. K5RMK.

SELL: HQ-129X with speaker and book. In perfect condition, no scratches: $139 F.o.b. Chamblee, Ga. Don Vaughan, W4MTY, 4511 Briarcliff Rd.

SELL: Hallicrafters S-53A, in exc. condx, $50; Heathkit FM-3A wired, gud condx, $10. Will pay shipping. D. Stoike, 608 Lincolnway Valparaiso, Ind.

DELUXE Low Power station for sale: Every item in mint condition: Includes NC-183 recvr with matching spkr, Johnson Viking Ranger transmitter, Johnson Matchbox, Johnson low pass filter, Johnson 100 Kc xtal calibrator, Astatic D-104 microphone with desk stand; Johnson standing wave ratio bridge, Johnson Speed-X straight key and instruction manuals for all equipment. Will send only as complete unit. Free delivery 50 miles radius of New York City. First $400.00 cash or cashier's check takes it all. K2GXP, 130 Midvale Rd., Mountain Lakes, N. J.

SELL: Johnson SWR Bridge. Never used! $5.00. O. H. Ketchum, 10125 Flora Vista Blvd., Bellflower, Calif.

SELL: NC-88 plus extras; best offer. F.o.b. Forest Hills 75, L. I., N. Y. Leonard Friedman, K2YGN, 108–43 63 rd Rd.

WANTED: Ranger, Viking II, or DX100, receiver, crystal mike. Low price. Write first. K2OUR, 144 Bonnavilla, Roselle, N. J.

FOR Sale: One Gonset G-66B rcvr., 3 mos. old, w/Universal pwr. supp., $180.00; one AT-1 transmitter and AC-1 tuner, $30. Contact A/2C Frank T. Laughner, 46th FTR INTCP Sqdn (ADC), Dover AFB Del.

SELL: BC-348 excellent with power supply, speaker, and S-meter, $60. Leon Sams, W7CEZ, W. 2816 Olympic, Spokane, Wash.

FOR Sale: Coast Guard DAE-1, 240 to 2000 K.C. direction finder with loop assembly, original cost, $450 for $60 and Navy RBL-4, 15 to 600 K.C. radio receiver (six bands), original cost $600 for $45. Both sets unused in original waterproof overseas shipping cases. Information furnished concerning these sets. William S. Loomis, 933 Central Avenue, Highland Park, Ill.

BC 312 receiver, crystal filter, speaker, $50; S76 with speaker, $120; Heathkit VTVM, $13.75. Tubes, power supplies, chokes, transformers, etc. Send stamp for list. K2JDW, 62 Gaston St., West Orange, N. J.

SELL Crystal frequency standard 7 Mc. 100 Kc. 10 Kc. with crystals and power supply, $20; Antennascope with Triplett 200 microamp meter, $12; grid dipper *QST* circuit with power supply, $10. Bedside ragchewer complete 40–80 meter transmitter/receiver, same January CQ, $30; Q multiplier, $6; Millen 10035 dial, $4. K4OBM, 10923 N.E. 9th Court, Miami, Fla.

PSSST! "Hot Bargains": New SX100 receiver with R46A speaker, $225; Dumont 274 "scope, $50; Elenco PA400 linear, $125; Dynamotor power supply 6V/425V/375 Ma., $25; spare dynamotor, $10; Harvey-Wells VPS-50 vibrator supply 6V/300V/200 Ma., $15; Radiart No. 435 supply 6V/225V/250V/275V/300V/200 Ma., $15. Money back guarantee. W1RMS, 198 Euclid Ave., Waterbury, Conn.

WANTED: Used receivers and transmitters: will pay cash or trade. 10% down with up to 24 months to pay. In stock new 75A4's, KWSI's, KWM-1 SSB mobile transceiver, Johnson, WRL, B&W, National, Hallicrafters, Elmac, Hammarlund, Gonset, Central Electronics, Mosley, Hy-Gain and Gotham beams. Write for list of bargains in reconditioned receivers and transmitters with new guarantee. Shipped on approval. Write Ken, WØZCN, or Glen, WØZKD for your best deal. Ken-Els Radio Supply Co., 428 Central Ave., Ft. Dodge, Iowa.

COLLINS 310B xmitter bandswitching 80 to 10 meters; P.A. output control TVI suppressed, excellent condition; make offer. KW amplifier TVI suppressed, pair Eimac 4–250A air flow sockets, B&W Buttertly condenser coils 40–15–10M MB 40SL in grid; screen and bias supplies; phone or c.w. SWS meters, $125; Telrex 503–20 meter, 3-element beam, $50; Central "B" Slicer, factory aligned, $50. W4AIX, Bonaire Motel, Hendersonville, No. Carolina.

DX-35 with Heath VFO. Want 750V. power supply and 50 watt modulator or $70. K4CSY, H. Merrill, Box 588, Kingsport, Tenn.

RECORDING & Brochure: Limited Edition. A tribute to Radio and Morse operators. "The Saga of Telepathy" is a historical story of communications men and their radio progress since 1844. It highlights courageous deeds performed by them. Available in two parts: 33⅓ record, playing time 45 minutes, includes narration and code. Brochure is the written & illustrated story. Special price to amateurs: Brochure, $1.00; Recording, $3.00 or both for $3.75. J. R. Graham, W4RJX, P.O. Box 15556, Arlington 3, Va.

FOR Sale: VHF152A, $45. List of 2 meter, 420 and surplus gear. Wanted: Silver Model 906 signal generator in good or better condition. Ohmite dummy antenna resistors Model D-100-100. Dick Haskin, W6KEC, 5608 N. Farna Ave., Arcadia, Calif.

FOR Sale: National NC300, $350; Johnson Pacemaker, $375; Telrex 5-el. 10-meter beam, $75, all like new. F.o.b. Westbury, N. Y. W2COR, 70 Palm Lane.

VIKING Valiant wired, used 4 hours, perfect, $285; Communicator II 115 volt 6/12 volt per July *QST*, $135; HQ-100 with clock, calibrator, $155. Joseph DiLiberti, K2IQZ, 290 Greve Drive, New Milford, N. J.

SELL: Plate transformer, Pri. 117 Vac, Sec. 1800 VCT, at 500 Ma. Like new condx, $12.50. W7QJN, 21429 68 W., Edmonds, Wash.

FOR Sale: Test equipment, low-power transformers, variable capacitors, and other receiving components. Send stamp for list. Cecil Baumgartner, Box 343, Milton, Pa.

SELL: DX-35, VF-1, in excellent condx: $70. K2UMH, 53 Louise St., Delmar, N. Y.

WANTED: Band-switching transmitter, suitable for a driver, or a transmitter up to 500 watts, kit or wired, also Matchbox, push-to-talk table stand with mike. Write details and price to James Clewley, K8AEV, 1509 Massachusetts St., Lansing, Mich.

WANTED: Collins 310 or 32W1 and Collins crystal calibrator. K4JZG, W. S. Coon, Sebring, Fla.

FAMOUS VHF "Lunenburg" antennas, 6 meter 5 element, $14.95; 2 meter 6 element, $6.95; 6 meter horizontally polarized mobile antenna. Wholesale Supply Co., Lunenburg, Mass.

120 WATT CW/Fone Sonar transmitter. Built-in power supply and modulator. Bandswitching 80–10 meters. A-1 condx. $100. VFO, $10. G. Paules, 231 Sherman Ave., NYC 34, N. Y.

FOR Sale: Carter, converter A1080 CW, practically new, in exc. condx. $40. Stickney, W7BXW, 438 Beverly Hills, Billings, Mont.

LM-7 Frequency meters, 190–20,000 Kc., with modulation, used excellent, complete with xtal standard, tubes, less calibration book, $27.50. Voltage regulated power supplies, 115/220V 60 cy. input, 200VDC 100 Ma. regulated, 12-15VDC at 4A, 12VAC at 1.5A, complete with plugs, cover 10" x 8" x 9" and 6 tubes, $19.95; coaxial cable RG-11/U, 72 ohm, $6.00 = 100 ft, $45; 1000 ft. Filament transformer 115V 60 cy., 5VCT 30A, 2.5KVT, $6.95; Eimac 4–1000 tube socket, $5.95; microamp meters 4½" Sq., 0–50VA., 12.95, 2½" Rd., 0–200 VA., $3.50. 100 Kc xtal, $3.50. Techtonics, Inc., 340 Canal St., N. Y. 13, N. Y.

SELL: 300 watt, rack mounted modulator. New UTC Multi-Match transformer, pr. 805s. Reasonable. W1WXC, Concord, Mass. Tel. EM 9-3919.

SELL: 75A1, $225; W6SAI conversion, recently aligned, manual, excellent condition. W6VM, 737 Northampton, Palo Alto, Calif.

FOR Sale: Complete station for $500 or separately: NC-300 with speaker, $300; DX-100 with push-to-talk coaxial relay and tube socket adapters for 807's in final, $155; Astatic mike with push-to-talk stand, $20; 3-el 3 band (15–10–20 M) beam (WRL) with approx. 100 ft. coaxial cable, $70. A/1C Dick Atwood, W7FMM, 779th AC&W sqd., Opheim, Mont.

INSTRUCTION, General Theory Class beginning Oct. at Jamaica, L. I. Evening Community Center. Data on application. S. Schachet, W2HNG, 13530 232 St., Springfield Gardens 13, L. I., N. Y.

SELL: Complete station, Globe Scout xmitter; Heath VFO and Q multiplier; Hallicrafters SX-28 revr, R-46B speaker; Gotham 4-el. 10-meter beam; rotator and control box; JT-30 mike. Will deliver up to within 75 miles from my QTH. $225 or best offer. Jerry Bravo, Uniondale, Pa.

SSB transmitter for sale. Eldico 100A, P.E.P. 100 watts output. Full coverage ham bands. In perfect condition: $495 which is ⅓rd off new price. K2CIV, Tom Patterson, 50 Crescent Lane, Roslyn Heights, Long Island, N. Y.

TRADE: 4 x 5 Speed Graphic; Omega DII enlarger, both with accessories. Desire commercial linear final. Write for detailed list. K5AKH, Box 818, State College, Miss.

FOR Sale: 15 each transformers, less enclosure, 1⅓ KVA, 7200 volts primary, 120/240 volts secondary with center tap. Excellent condition. $19.75 each. Power Electric Co., 1920 No. Mill St., Jackson 5, Mississippi.

SELL: Viking Adventurer, guarantee $45; also DX100 for $180. Need WRL VFO. K4EBW, Box 1022, Bristol, Va.

VALIANT, D-104 mike and stand, low pass, $340; NC173 with xtal calibrator, $110. Schedule? Jablonske, W9NNS, 1800 Sims, Stevens Point, Wis.

PERFORATED Aluminum sheet, .051, 5/64" OD holes, ⅛" centers, $1.20 sq. ft. Send for listing on Beams, Aluminum Tubing, etc. Radcliff's, Fostoria, Ohio.

HAM Register for those who care to know something about the other ham. Ham Register, Inc., 37 So. 6th St., Indiana, Penna.

FOR Sale: Globe Scout 65-B, -65 watt xmitter, $72 plus freight. Joe Rodriguez, 571 E. Congress, San Antonio, Tex.

CASH Pickup, in perfect condition, HT9 with coils for all bands, three extra final tubes seventy-five dollars. Walt Downer, W2MCU, Shinhopple, N. Y.

COLLINS 310B-1 with National NB40-SL in final tank circuit. TVI suppressed, in gud condx, $125; LM-13 freq. meter with mod. power supply and calibration book, $65. W8YMG, 826 Lane Blvd., Kalamazoo, Mich.

DIAGRAMS: BC-229, BC-429, RU-18, RU-19; show parts values, wire colors, connections for power and controls. 50¢ each. BC-430, circuit only, 25¢. Want: Gonset 1.6 to 6 Mc and 3-30, Bendix MT-68 rack. W4NZY, 119 North Birchwood, Louisville, Ky.

SSB transformers, newly manufactured for 10A, 10B, 20A and W2EWL exciters $12.45 per set of three, postpaid USA. Electronics Associated, P. O. Box 206, Montclair, N. J.

TRADE: Kodak folding camera w/portrait attachment, $7.00 value. K2BIB, 307 Richardson Dr., North Syracuse, N. Y.

FOR Sale: HRO50T1, like new, with speaker and 6 coils, including 15 meter AC and 10 meter AA coils: $325. F.o.b. Bernard Shapiro, K2IMD, 1783 Marmion Ave., Bronx 60, N. Y.

FOR Sale: Johnson Viking II complete with all up-to-date modifications plus push-to-talk, matching VFO, and low-pass filter. Selling to go high power on VHF. $250.00 or best offer. PMR6 mobile receiver. Best offer. J. B. Harwell, Jr., Gurdon, Arkansas. W5JWL.

TUBES: Western Electric power amplifier No. CW701A, some in original packing, all new, $5.00 each. F.o.b. Washington, D. C. W3WQN, S. Ades, 1924 Tulip St., N.W., Washington 2, D. C.

SELL: BC779A revr and power supply unit, $125; transformer 1.5 KVA at 500 mils. One amp Class B xfrmr, matches Class B 810's to Eimac 250THs or similar load. Also chokes, filter condx, plate xfrmrs, filament xfrmrs, all from one kilowatt plus rig of Ex-W2JV. Two-cent post card of inquiry for items too numerous to list to W2LXI, 57 Hoover Ave., Bloomfield, N. J.

SELL: Viking II, VFO, Matchbox, LP-Filter; SX-71 w/spkr; Vibroplex original; antenna rotator; complete 80 mtr. mobile transmitter; Tri-Band converter; Bendix TA-12. Best offer on lot or parts, W5-FDL, 503 Edward Gary, San Marcos, Texas.

SALE: Six P.M. dynamotors, three ZA/VSA0515, three ZA/VSA-0516; excellent condition, $3.50 each. J. T. Hoffman, W4MVN, North Jackson St., Tullahoma, Tenn.

NC300 receiver, new, with warranty, $315; B&W No. 300 freq. meter, $99.00; Telrex beams, No. 153A, 3-el. 15 mtr., $72.00; No. 203A 20 mtr. 3-el., $80; Morrow MBR5 receiver, $185; none used, all postpaid. Send for free list of more excellent gear. Cash only for new QTH. No trades. W9MOT, 4845 N. 64th St., Milwaukee 18, Wisconsin.

SELL: Hallicrafters S-76 receiver, $105; matching R-46 speaker, $10. Will sell either separately or together. Equipment in original condition, prices F.o.b. Paul S. Chenoweth, RFD No. 2, Otterbein, Ind.

CASH Paid for BC-342, BC-312, BC-610E/UP, BC-614E/UP, BC-939, BC-221, JB-70, BC-60; also TTY equipment and parts for TG-7, model 15, etc., RM-39 remote control, AN/TRC-7 transceiver, surplus test equipment. Freight paid. Amber Industrial Corp., 75 Varick St., N. Y. 13, N. Y. Tel. CAnal 6-7455.

FOR Sale: Modified SCR-522, mounted in 3 ft. enclosed rack, heavy-duty power supply, $40; RME-70 revr and spkr, $30; Hallicrafters S-52, $40; Harvey-Wells TBS-50 with power supply, $55, pair EE-8A field telephones, $10. A. W. Speyers, W2CZA, 39 Lowell Ave., Summit, N. J.

FOR Sale: Globe Scout 65A, in excellent condition; factory wired; one year old, $70. Bob Seyfarth, K2ULI, 1787 Oakhill Dr., Union, N. J.

VOCALINE JRC-400, Citizens band transceivers, brand new, complete with mikes, antennas and 6 and 110V, cables. The whole works for $99.50 for the pair. Jim Leonard, W4FPS, P.O. Box 2366, Roanoke, Va.

HRO-60T with matching speaker; A, B, C & D coils, new condition, in original cartons and warranty card, $475; Globe King 500A used less than five hours transmission, excellent condition, looks like new, $500. F. W. Reilly, Lookout Mountain, Tenn.

NEW Surplus — 250TH, $15.00; 304TL, $10.00; 830B, $2.00; BC733D w/tubes, crystals, $15.00; BC732A, $1.00; MC211A for ARC5, 75¢; BC366, 65¢; BC348 volume control, $1.95; BC454 w/tubes, $11.00; BC457 & BC458 w/tubes and crystal, $10.00 each; MN28, $3.00; PE206, $15.00; MN52H, $2.50; 1E36, $15.00; TS10A, $15.00; BC450, $1.50. Plugs for SCR522, ARB, MG149, MN26, BC348, TA2, $1.00 each. Plugs for SCR274N, BC375, APN1, BC733D, 75¢ each. M359 coax right angles package of 10, $1.50. Conversion manuals, $2.50, schematics, 35¢ and 65¢. F.o.b. Houston. L. I. Radio Co., 8309 Lockheed St., Houston 17, Texas.

SELL: Viking II with LP filter and coax relay, $225; Heath VFO, $15; NC183 with speaker, $185; Viking Mobile xmittr, $75; Elmac PMR6 revr with supply, $85; all-band mobile antenna with mount, $15. All equipment in excellent condx. Rev. C. R. Wilson, Rte 1, Spartanburg, S. C.

FOR Sale: Harvey-Wells TBS-50D with APS-50 pwr supp, $100; Eldico MT-2 2m. transmitter, $30; Gonset 2m. converter, $25; Gonset Tri-Band converter, $30; complete 100 amp. Leece-Neville system, $50; 6V dynamotor system 400V, 375 Ma., $20; 12V dynamotor system only 230V., 100 Ma., $5; dual 6V Motorola Vibrator supply, $10. Wanted: BC221-AK and teletype TD-14. Don Scher, W2KDW, 11 Webster St., Irvington, N. J. Tel. ES 5-7193.

FOR Sale: The following Lab instruments: Audio generator, VTVM, 215 Simpsontester, Precision condenser, variable inductor, Variac. Leo A. Holbrook, 199 Main St., Montpelier, Vt.

FOR Sale: Tubes, brand new, 813's, $8; 810's, $7.50; 832A's, $3.50; 250TH, $17.50; complete ARC-1 50 channel VHF transceiver, dynamotor, some crystals, plugs, rack, $475; power supply for SCR-522, $12; converted ARC-4 transceiver for 2 meters, revr tunable, transmitter xtal controlled, $45.00; Sonar SR-9 2-meter mobile receiver, $40; Hallicrafters S-38 receiver, $29; Krico 25-watt 2-meter mobile transmitter, $45; Hallicrafters S-102 2-meter revr, $45; Gonset 2-meter converter, $29; Collins 1000C.c.t., 212 mils xfrmr, $22; BC-221 original calibration book, $75; ANIPDR-8C Navy Geiger counter, $150 or trade. All items guaranteed. Can ship C.O.D. Bill Slep, W4FHY, Ellenton, Fla.

2000 WATT P.E.P. linear final. Johnson breaks price and power barriers with the new Viking Thunderbolt using two 4–400A's; band-switching with self-contained power in Valiant sized cabinet. 500 watt Linear-Johnson breaks the cost and size barrier with the new Viking Courier using two 811A's — bandswitching with self-contained power in Ranger sized cabinet. Photos, Prices, Specifications and your highest trade-in allowances available on request from Ladd Electronics, 111 No. 41st, Omaha, Nebr.

SONAR SRT120, new, $120.00; 20A, QT-1, DeLuxe 458VFO and10 meter conversion kit for VFO, $225; RME Clipper, $25; the Sonar is new with factory warranty. Other items as new. F.o.b. Port Washington, L. I., N. Y. Cornell Jaray, W2NEK, 215 Main St.

COMPLETE Station: 32V2 with spare 4D32, press-to-talk mike, key, coax relay, 75A3 mech. filter and speaker. Very clean. Instruction books, $685. 4-element 10-meter beam included. Don Gardner, W2-GSS, 209 Knapp Rd., Syracuse 4, N. Y.

MODIFIED ART-13 for sale: $120. Complete AC and DC voltages, modulator, RF section with exciter, and antenna tuner built in a Bud cabinet. Write for complete details. Prefer local sale. Rodney Greene, Box 405, Homedale, Idaho.

FOR Sale: Viking Adventurer with instruction book, practically new, 2 Bilie xtals for 40 meters and Ameco code course containing 5 records, code speed start to 7½ wpm., $50. Robert B. Hupper, K2PLD, 47 Willits Rd., Glen Cover, N. Y.

FOR Sale: Viking KW with desk, with Pacemaker, audio amplifier, power reducer; spare modulator tubes, spare rectifier tubes and spare 4–250A. All offers will be considered. I prefer not to ship. W1NLU, Marblehead, Mass.

WANT: BC-348 receiver or equivalent. Have top condx Omega B4 enlarger plus Zeiss 2.8 Tessar lens and many accessories. Buy, sell or swap. K2YUS, 341 East Grand St., Mount Vernon, N. Y.

WANTED: Viking Ranger, Valiant, or Pacemaker, or gud SSB xmittr. Advise condx, price. Will answer all replies. K2HA, 39–39 223rd St., Bayside, L. I., N. Y. Tel. BA 9-5248.

CLEANING House! Everything goes! Stancor mod. xfrmr Multi-match 250 watts audio, new, $25; PE103, $17.50; Carter Gen., 6V inpt., 600V. 175M-a. outp., $9; B&W lo-pass filter, 415, $10; MB40-SL, $10; Mosley Vestpocket 2-el. 20-M., $25; Simpson 380 wavemeter w/ant. & coils, $15.50; Heath 20 watt Williamson Hi-Fi & preamp kit, cost $79 new, assembled, $60. 14TO 30 Mc. coils, HRO Sr. & Jr., $10; Astatic R10 mike, new, $20; 220V, 7.5 KC Variac, like nu condx, $40. Big pwr xfrmrs & chokes; KW amp. & KW pwr supp. Write for data & fotos. Frank Smith, W8HMI, RFD No. 3, Paw Paw, Mich.

827 R Tube, New RCA 800 Watt diss., 110 M.C., $45; 500 watt isolation xfrmr, $9.00; 110V Selsyn, $3.50. B. J. Kucera, 10615 So. Highland Avenue, Garfield Hts. 25, Ohio.

SELL: National NC-88 receiver, $70; RME DB23 preselector, $32; Heath Antennascope, $10; Bliley 100 Kc xtal, $4; Johnson Viking Adventurer, $35; Johnson Matchbox, $30; Triplett 0–10 D.C. Ma, $5; Viking VFO, $30; 25 watt modulator and pwr supp, only $20. All equipment is in exc. condx. K2HPC, Robert Goldstein, 38 Forest Ave., Saratoga Springs, N. Y.

Index of Advertisers

Tested & Proven in the World's Ham Shacks

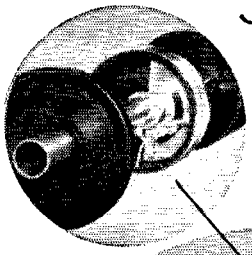
FULL SIZE — NOT A MINIATURE BEAM!

the hy-gain 3-Element Tri-Bander

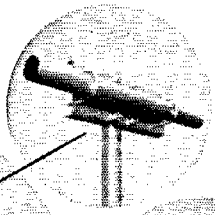
ONE FEEDLINE - THREE BANDS (10, 15 & 20M)

There Are More hy-gain Tri-Banders In Use Than All Other 3-Band Beams Combined!

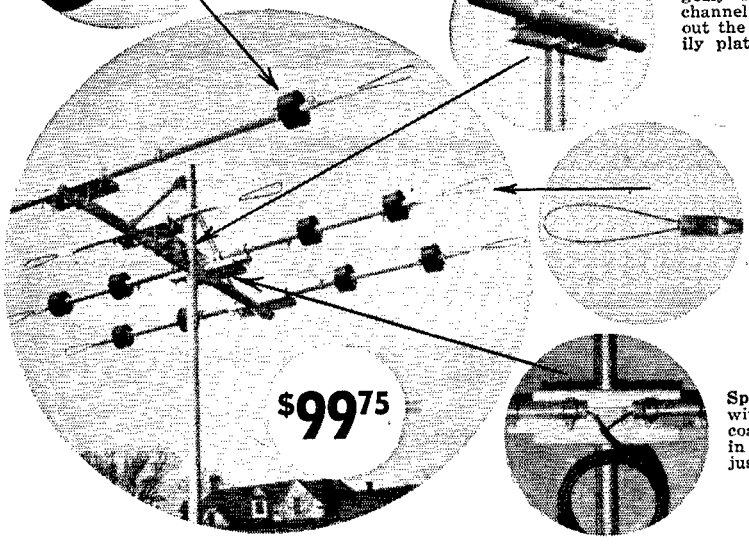
3 Active Elements on Each Band!



Exclusive New Insu-Trap;- a new concept in parallel resonant trap circuits obsoletes old fashioned open-type coils. The only adjustable, completely weatherproof trap. Adjustable capacitor color coded for Fone or CW. Hi-Q coils wound on high impact styron forms which also act as low power factor dielectric for adjustable capacitors. No air dielectric involved. Trap assembly completely enclosed in weatherproof polyethylene cover with 2 grams of silica gel to absorb condensation.



Boom/Mast and Element Clamp;- ruggedly designed 12 Ga. galvanized steel channel for positive grip. Used throughout the entire Tri-Bander Series. Heavily plated and serrated 5/16" U-Bolts.



The "Carpet Beater" Ends;- employed on all Tri-Banders, specially designed of aluminum wire to reduce fatigue caused by vibration, increase the broad band characters of the beam, and to reduce element sag to a minimum.

Split Insulated Dipole;- fed directly with RG-8U ohm coaxial cable and coaxial line balancing choke results in low SWR on all bands. No adjustment necessary.

All specifications furnished from experimentally derived data. These figures will maintain in most installations if antenna is relatively in the clear.

	Model No.	Gain in DB Over Dipole	F/B Ratio In DB	SWR	Max. Power	Horizontal Beam Width	Boom Length	Boom Diameter	Element Diameter	Element Wall	Element Alloy	Longest Element	Approx. Net Wt.
3 Element	152T-3	8 Aver.*	25 Aver.	Less Than 1.5:1	1 Kw	59°	216"	1½" Hot Dip Galv. Steel	1⅛", 1", ⅞", ¾"	.058, .049, .035	6061ST6 Ant. 41	31', 9"	58#

* Additional Director Element for Increased Gain and F/B Ratio on 10M, Net $14.95.

The standard of comparison for three band antenna systems, the hy-gain Tri-Bander is factory pre-tuned, prematched and pre-adjusted and may be erected in an extremely short time with no test equipment and no further adjustment necessary. Guaranteed to outperform stacked arrays, because interaction and detuning effects have been eliminated. All hardware hot dip galvanized steel for maximum weather ability. Injection molded polyethylene, styron and cycolac plastic used throughout. Complete assembly and installation instructions furnished.

IN STOCK AT LEADING AMATEUR RADIO DISTRIBUTORS EVERYWHERE

Write for Complete Brochure!

Economy Model, 3-Element 3-Band Beam
"TRAP MUSTY" HAM NET: $89.95
SHORTENED 14' BOOM, SHORTENED 28' ELEMENTS, LESS CARPET BEATER ENDS, LESS INTERLACED REFLECTOR FOR 10 METERS, NON-ADJUSTABLE TRAPS.

hy-gain antenna products

1828 N STREET LINCOLN, NEBRASKA

September is

SSB BONUS* month at ALLIED

Outstanding SSB Gear Ready for Immediate Shipment From Stock

TRANSMITTERS

Collins KWM-1
Collins KWS-1
Hallicrafters HT-32
Hallicrafters HT-33
Johnson 500
Johnson Pacemaker
Johnson Valiant
Central 20-A
Central 100V
Central 600L
Lakeshore Phasemaster
Lakeshore P-400 GG Amplifier

RECEIVERS

Collins 75A4
Hallicrafters SX-101
Hallicrafters SX-100
National NC-109
Hammarlund HQ-110 with HC-10
RME 4350 with 4301

Join the Swing to SSB—It's Easy at Allied!
Get the Deal of a Lifetime in September

*

10% more for you

BONUS TRADE-IN ALLOWANCE

When you trade with ALLIED for SSB equipment in September, we'll give you a whopping 10% MORE than our regular high trade-in allowance for your old ham gear. You'll not only get our regular liberal allowance, but we'll add a big EXTRA 10% to help you get that SSB rig you want. Remember—you get that 10% bonus at ALLIED—during September only. Our usual liberal time payment terms still apply—only 10% down, up to 18 months to pay.

Select your new equipment now from the ALLIED 1958 Catalog—just off the press. It's packed with *everything* in Ham gear, including many new SSB units.

Free!

NEW! 1958 ALLIED 404-PAGE CATALOG

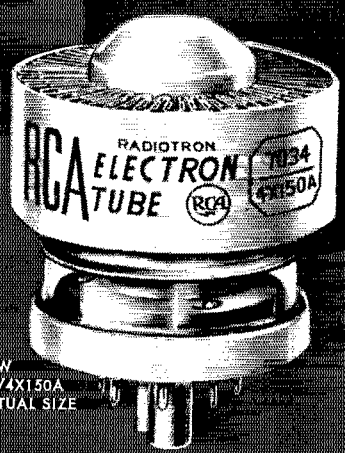
You'll want this most widely used Electronic Supply Guide—get it and keep it handy. Features the largest selections of quality station gear—it's your complete buying guide to everything in Electronics: Hi-Fi, recorders, P.A., test instruments, build-your-own Allied KNIGHT-KITS, industrial equipment, tubes, parts, tools and books. Write for your Free copy of the 1958 ALLIED Catalog today.

ALLIED RADIO

Serving the Amateur for 37 Years

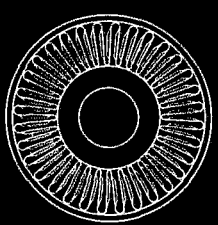
100 N. Western Ave., Chicago 80, Ill.

500 WATTS INPUT



NEW
RCA-7034/4X150A
SHOWN ACTUAL SIZE

- Can take 500 watts CW or SSB—in new transmitters.
- Operates with higher margin of safety and longer life—directly replaces 4X150A in present transmitters.
- Useful up to 500 Mc at reduced ratings.



Key to High Power
New, high-efficiency radiator is hard soldered directly to plate for increased heat transfer.

New RCA-7034/4X150A Beam Power Tube uses new high-efficiency radiator to handle higher power

This is it—for its size, the most powerful RCA beam power tube suitable for amateur service. Plate dissipation rating is 100 watts higher than for the 4X150A. Plate input power of 500 watts can be used in CW and SSB operation—at frequencies as high as 150 Mc.

Small as golf balls, two RCA-7034/4X150A's are the answer for compact, all-band finals handling inputs up to the legal limit. And note this fact: RCA-7034 can be used to replace type 4X150A in your present transmitter to give longer life. *No circuit changes needed!*

RCA-7034's are now available from your RCA Tube Distributor. Tube technical data is available from RCA, Commercial Engineering, Section I-37-M, Harrison, N. J.

RCA-7034/4X150A Typical CW Operating Conditions (up to 150 Mc)			
DC Plate Voltage	1500	2000	Volts
DC Screen Voltage	250	250	Volts
DC Grid Bias	−88	−88	Volts
DC Plate Current	250	250	Ma
DC Screen Current (approx.)	24	24	Ma
Driving Power	1.5	2.5	Watts
Power Output (approx.)	260	370	Watts

TUBES FOR AMATEURS
RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.