September 1968
75 Cents

QST

devoted entirely to

amateur radio

10 reasons to buy Hallicrafters' new SR-400 Cyclone

FEATURE	Hallicrafters SR-400	Collins* KWM-2	Drake* TR-4
Power Input	SSB=400 watts CW=360 watts	SSB=175 watts CW=160 watts	SSB=300 watts CW=260 watts
Accessory "dual receive" VFO available	**Yes**	No	No
Noise Blanker	**Yes**	$135.00 Accessory	No
Receiver Incremental Tuning	**Yes**	No	No
Built-in notch Filter	**Yes**	No	No
Sharp CW Filter	**Yes** 200 cycles	No	No
Sensitivity	.3 uv for 10 db S/N	.5 uv for 10 db S/N	.5 uv for 10 db S/N
1 kHz dial readout	**Yes**	Yes	No
Carrier Suppression	60 db	50 db	50 db
Unit Price	**$799.95**	**$1,150.00**	**$599.95**

*Data from published specifications.

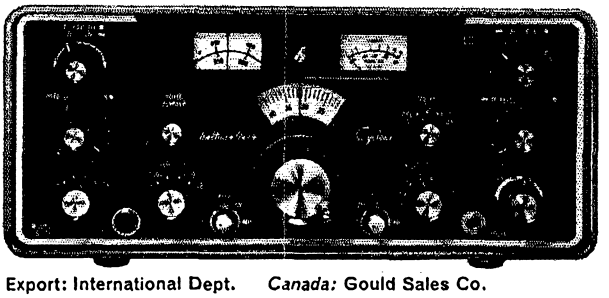
Now: can you think of one reason why you shouldn't?

Superb sensitivity, 400 watts RF, 200 cycle CW selectivity, receiver incremental tuning, 1 kHz readout, amplified automatic level control, exclusive notch filter! There's even the HA-20 dual receive VFO for sensational, award winning DX operation. No matter what specifications or features you choose as a standard of comparison, the exciting new SR-400 fixed/mobile transceiver is unsurpassed. Unsurpassed feature for feature. Unsurpassed for rugged dependable performance in all environments. Unsurpassed in value and versatility. Prove it to yourself. Write for complete specifications in a four page brochure. See your Hallicrafters' distributor today.

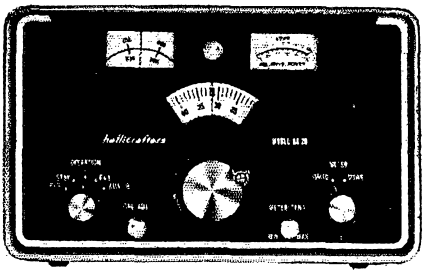
hallicrafters

600 Hicks Road
Rolling Meadows, Illinois 60008
A Subsidiary of Northrop Corporation

SR-400 Cyclone Transceiver



HA-20 VFO



Export: International Dept. *Canada:* Gould Sales Co.

JOIN THE ARMY...

the Air Force, the Navy, the Astronauts, the FAA, most major airlines, police and fire departments,

and hams everywhere who've improved their 2-way communications with noise-canceling microphones and handsets from Electro-Voice.

Why do they choose E-V? It is the company that pioneered the noise-canceling principle. And Electro-Voice set the highest standards of reliability, year after year.

To stop noise right at the source, put a dependable Electro-Voice noise-canceling microphone to work today. It can be the start of a quiet revolution!

Electro-Voice®
A SUBSIDIARY OF GULTON INDUSTRIES, INC.

ELECTRO-VOICE, INC., Dept. 982Q
631 Cecil Street, Buchanan, Michigan 49107

☐ Send me complete information on Electro-Voice microphones for amateur radio.

Name_____

Address_____

City_____ State_____ Zip_____

HANDS OFF

Tired of twiddling and twiddling with the tuner to dig out a solid signal . . . of chasing QSO's up and down the band?

The answer is Collins' 75S-3B Receiver. Most stable front end and sharpest selectivity offered in a ham receiver.

COLLINS

QST — SEPTEMBER 1968

VOLUME LII NUMBER 9

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

Subscription rate $7.50 per year postpaid, U.S. funds, in Canada and U.S.; $8 elsewhere. ARRL Membership, including *QST*, available only to individuals with a bona fide interest in amateur radio: $6.50 per year, U.S. funds, in Canada and U.S.; $7 elsewhere. Single copies, 75 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U.S. and for an equivalent amount in U.S. funds.

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

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

OUR COVER

Only 200 more ma. to go! With 400 ma. of p.a. collector current flowing (at 12 volts, that is), only a few more adjustments are needed to get this top-band (160 meters) mobile transmitter up to its 8-watt rating. See page 11 for complete details.

—CONTENTS—

Don't gamble on your future

FIELD ENGINEERS... there's a good deal for you at Raytheon Service Company

Pick your specialty from Raytheon's wide variety of career assignments. Raytheon's broad-based company activities are growing and expanding throughout the world. To qualified field engineers, the Raytheon Service Company offers immediate openings ranging from permanent and travel assignments within the U.S., to travel assignments world-wide.

Career opportunities are now available at all levels of technical capability for experienced personnel acquainted with operation • maintenance • installation • training • and publication of handbooks and operating manuals.

HEAVY GROUND RADAR • MICROWAVE • SONAR • FIRE CONTROL • DIGITAL • COMMUNICATIONS

Raytheon's comprehensive benefits program includes hospitalization, surgical, major medical, life, disability, travel and accident insurances, company-sponsored education opportunities, and other allowances and benefits.

Total compensation includes attractive starting salaries, overseas and overtime bonus, and per diem as applicable.

To arrange a convenient interview, send resume to, or call collect, Kenneth H. Slovin, Employment Manager, Raytheon Service Company, Dept. 66, Second Ave., Burlington, Massachusetts 01803. Telephone: (617) 272-9300, Ext. 209.

RAYTHEON

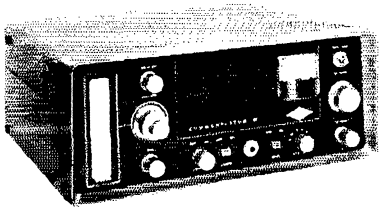
An Equal Opportunity Employer

GONSET Amateur Equipment

GSB 201 SSB RF LINEAR AMPLIFIER

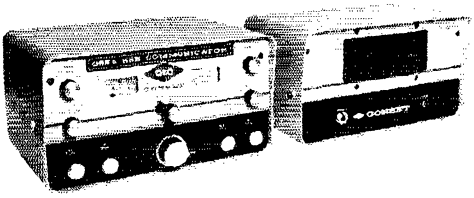
Exceptionally compact — only 8½" high, 12⅝" wide and 17" deep — the GSB 201 lends itself readily to table-top mounting. Finished in blending light greys, it presents a handsome, clean-cut appearance. This linear amplifier provides 10 db gain on the 80, 40, 20, 15 and 10 meter bands.

3341 2-METER & 3342 6-METER COMMUNICATOR IV



Transmitter power of the Communicator IV is greater than ever at 24 watts input. High level speech clipping and 10 watts of audio insure full talk power! Transmitter is crystal controlled, offers choice of six frequencies. Broadband circuitry in driver eliminates panel controls.

GSB-6 SIDEBAND COMMUNICATOR



SSB, AM and CW operation. VFO or Crystal Control. Matching AC or DC Power Supply. Covers 6 meter band in 1 Mc segments. Designed for SSB, AM and CW operation on the entire 6 meter band, the superb Gonset 910B Sideband employs solid state design in all low level circuits for maximum dependability and minimum current consumption and utilizes common circuits in the oscillator, IF section and crystal lattice filter to minimize size and weight.

903A & 913A RF POWER AMPLIFIERS

The 2 meter and the 6 meter VHF amplifiers have a power input of 500 watts peak. Operating Class AB, for SSB, service and class C for AM, CW MCW, FSK, FM and PM service, they also have an extended frequency range to cover the MARS, CAP and other military frequency allocations. In addition, both units are rated for CCAS (Continuous Commercial and Amateur Service).

See your favorite distributor • Write for free catalog

GONSET® A DIVISION OF AEROTRON, INC.

P. O. BOX 6527 / RALEIGH, NORTH CAROLINA 27608

Section Communications Managers of the ARRL Communications Department

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

ATLANTIC DIVISION				
Delaware	K3NYG	John L. Penrod	RFD 1	Townsend 19734
Eastern Pennsylvania	W3HK	George S. Van Dyke, Jr.	4607 Convent Lane	Philadelphia 19114
Maryland D. C.	K3JYZ	Carl E. Andersen	14601 Claude Lane	Silver Spring, Md. 20904
Southern New Jersey	W2ZI	Edward G. Raser	19 Blackwood Drive	Wilburta Gardens, Trenton 08628
Western New York	K2KTK	Richard M. Pitzeruse	303 Woodland Rd.,	Syracuse 13219
Western Pennsylvania	W3NEM	Robert E. Gawryla	1463 N. Allen St.	State College 16801
CENTRAL DIVISION				
Illinois	W9PRN	Edmond A. Metzger	1520 South 4th St.	Springfield 62703
Indiana	W9BUQ	William C. Johnson,	2838 Hillside Ave.,	Indianapolis 46218
Wisconsin	K9GSC	Kenneth A. Ebneter	822 Wauona Trail	Portage 53901
DAKOTA DIVISION				
Minnesota	WØTCK	Herman R. Koplschke, Jr.	RFD 2	Janesville 56048
North Dakota	WØDM	Harold L. Sheets	21 Euclid Ave.	Grand Forks 58201
South Dakota	KØTXW	Seward P. Holt	Box 58	Clear Lake 57226
DELTA DIVISION				
Arkansas	W5DTR	Curtis R. Williams	10508 West 12th St.	Little Rock 72205
Louisiana	W5PM	J. Allen Swanson, Jr.	RFD 1, Box 354-E	Covington 70433
Mississippi	W5EMM	S. H. Hairston	1511-36th Ave.	Meridian 39301
Tennessee	K4RCT	Harry A. Phillips	5200 Oak Meadow Ave.	Memphis 38128
GREAT LAKES DIVISION				
Kentucky	K4HY	Lawrence F. Jeffrey	1605 Antler Ave.	Owensboro 42301
Michigan	W8FX	Ralph P. Thetreau	27209 W. Six Mile Road	Detroit 48240
Ohio	W8ETU	Richard A. Egbert	6479 Red Fox Road	Reynoldsburg 43068
HUDSON DIVISION				
Eastern New York	K2SJN	Graham G. Berry	50 Parcot Ave.,	New Rochelle 10801
N. Y. C. & Long Island	K2IDB	Blaine S. Johnson	266 Cypress St.	Massapequa Park, L. I. 11762
Northern New Jersey	W2LQP	Louis J. Amoroso	180 Pleasant Ave.	Bergenfield 07621
MIDWEST DIVISION				
Iowa	KØMHX	Wayne L. Johnson	Rural Route #1	Kellerton 50133
Kansas	KØBXF	Robert M. Summers	3045 North 72nd	Kansas City 66109
Missouri	WØGS	Alfred E. Schwaneke	Route 1, Box 169	Rolla 65401
Nebraska	KØOAL	V. A. Cashon,	334 Pine St., Box 488	Chadron 69337
NEW ENGLAND DIVISION				
Connecticut	W1GVT	John J. McNassor	218 Berlin Ave.	Southington 06489
Eastern Massachusetts	W1ALP	Frank L. Baker, Jr.	85 Solar Ave.	Braintree 02185
Maine	K1DYG	Herbert A. Davis	RFD 1	Franklin 04634
New Hampshire W1SWX/	K1DSA	Robert Mitchell	Box 137-A, RFD	Chester 03036
Rhode Island	K1AAV	John E. Johnson	30 Fruit St.	Pawtucket 02860
Vermont	K1MPN	E. Reginald Murray	3 Hillcrest Drive	Montpelier 05601
Western Massachusetts	W1BTR	Norman P. Forest	36 Valley Rd.	Springfield 01119
NORTHWESTERN DIVISION				
Alaska*	KL7AEQ	Albert F. Weber	Box 735	College 99735
Idaho	W7ZNN	Donald A. Crisp	3498-8th St. F	Lewiston 83501
Montana	W7TYN	Joseph A. D'Arcy	1916 Haggin Ave.	Anaconda 59711
Oregon	K7WWR	Dale T. Justice	2711 Firwood Lane	Forest Grove 97116
Washington	W7BQ	William R. Watson	1005 E. 1st Ave.	Ellensburg 98926
PACIFIC DIVISION				
East Bay	K6LRN	Richard Wilson	629 Blue Ridge Dr.	Martinez 94553
Hawaii	KH6BZF	Lee R. Wheat	45-601 Luluku Rd.	Kaneohe 96744
Nevada	W7PBV	Leonard M. Norman	652 Utah St.	Boulder City 89005
Sacramento Valley	WA6JDT	John F. Minke, III	6230 Rio Bonito Drive	Carmichael 95608
San Francisco	WA6AUD	Hugh Cassidy	77 Coleman Drive	San Rafael 94901
San Joaquin Valley	W6JPU	Ralph Saroyan	6204 E. Townsend Ave.	Fresno 93702
Santa Clara Valley	W6NVO	Edward T. Turner	2837 Fernwood Ave.	San Mateo 94403
ROANOKE DIVISION				
North Carolina	W4BNU	Barnett S. Dodd	420 West Franklin St.	Salisbury 28144
South Carolina	W4PED	Charles N. Wright.	711 Merriwether Drive	North Augusta 29841
Virginia	W4SHJ	H. J. Hopkins	8600 Hammett Ave.	Norfolk 23503
West Virginia	W8JM	Donald B. Morris	1136 Morningstar Lane	Fairmont 26554
ROCKY MOUNTAIN DIVISION				
Colorado	KØFDH	Richard Hoppe	Star Route	Idaho Springs 80452
New Mexico	W5WZK	Kenneth D. Mills	Rt. 1, Box 654 F	Albuquerque 87102
Utah	W7QWH	Thomas H. Miller	3118 South 3360 East	Salt Lake City 84109
Wyoming	W7CQL	Wayne M. Moore	142 South Montana Ave.	Casper 82601
SOUTHEASTERN DIVISION				
Alabama	K4WHW	Edward L. Stone	1806 Spring Ave., S.W.	Decatur 35601
Canal Zone	K2SOB	Russell E. Oberholtzer,	P.O. Box 107	Margarita
Eastern Florida	W4MVB	Jesse H. Morris	P.O. Box 1241	Jacksonville Beach 32050
Georgia	W4RZL	Howard L. Schonher	P.O. Box 1902	Columbus 31902
West Indies	KP4DV	Albert R. Crumley, Jr.	P.O. Box 10073	Caparra Heights San Juan, P.R 00922.
Western Florida	W4RKH	Frank M. Butler, Jr.	323 Elliott Rd., S.E.	Fort Walton Beach 32548
SOUTHWESTERN DIVISION				
Arizona	W7FKK	Floyd C. Colyar	3411 West Pierson St.	Phoenix 85017
Los Angeles	K6UMV	Donald R. Etheredge	12040 Redbank St.	Sun Valley 91352
Orange	W6DEY	Roy R. Maxson	1434 South Olive St.	Santa Ana 92707
San Diego	WB6GMM	James E. Emerson, Jr.	6561 Foyle Way	San Diego 92117
Santa Barbara	WA6OKN	Cecil D. Hinson	1933 Coventry Court	Thousand Oaks,91360
WEST GULF DIVISION				
Northern Texas	W5LR	L. E. Harrison	1314 Holly Glen Drive	Dallas 75232
Oklahoma	W5PML	Cecil C. Cash,	1802 Smith Ave.,	Lawton 73501
Southern Texas	W5AIR	G. D. Jerry Sears	5634 Eskirdge St.	Houston 77023
CANADIAN DIVISION				
Alberta	VE6TQ	Harry Harrold	1834-5th Ave., N.	Lethbridge, Alta.
British Columbia	VE7FB	H. E. Savage	4553 West 12th Ave.	Vancouver 8, B. C.
Manitoba	VE4JT	John Thomas Stacey	19 Cottonwood Cres.	Brandon
Maritime*	VE1NR	William Gillis	Rural Route 6, Shediac Rd.	Moncton, N. B.
Ontario	VE3BUX	Roy A. White,	5 Northwood Crescent,	Belleville
Quebec	VE2OJ	Jim Ibey	1755 Brookdale Ave.	Dorval, P. Q.
Saskatchewan	VE5HP	Gordon C. Pearce	1903 Connaught St.	Regina

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

NEW FROM INTERNATIONAL

FM-2400 FREQUENCY METER

- For Mobile Or Base Station Use
- Tests Predetermined Frequencies 25 - 470 MHz
- Portable . . . Use It Anywhere

The FM-2400 is designed for testing and adjustment of mobile and base station transmitters and receivers at predetermined frequencies between 25 and 470 MHz. The FM-2400 provides an accurate standard frequency signal to which the transmitter can be compared. This same signal is applied to the associated receiver(s), thereby assuring an accurate frequency adjustment on all parts of the communications system.

Up to 24 crystals may be inserted into the meter for the selection of the frequencies required for testing of the system transmitters and receivers. The frequencies can be those of the radio frequency channels of operation, and/or of the intermediate frequencies of the receiver between 100 KHz and 100 MHz. Self contained unit. Battery operated.

FM-2400 (meter only).....**$395.00**
RF Crystals with
temperature run.....**$23.50** ea.
IF Crystals
200 - 2,000 KHz .....See Catalog*
2,001 - 13,000 KHz.....See Catalog*

*WRITE FOR FREE CATALOG

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

THE AMERICAN RADIO RELAY LEAGUE, INC.,

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

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

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

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

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

Past Presidents

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

Officers

President . . . . . ROBERT W. DENNISTON,* WØDX
Box 73, Newton, Iowa 50208

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

Vice-Presidents . . . . . ROEMER O. BEST, W5QKF
P. LANIER ANDERSON, JR., W4MWH

Secretary . . . . . JOHN HUNTOON, W1LVQ

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

• • • • •

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

• • • • •

General Manager . . . . . JOHN HUNTOON,* W1LVQ

Communications Manager . . . . . GEORGE HART, W1NJM

Technical Director . . . . . GEORGE GRAMMER, W1DF

Assistant General Manager . RICHARD L. BALDWIN, W1IKE

Assistant Secretaries . . . . . PERRY F. WILLIAMS, W1UED
WILLIAM I. DUNKERLEY, JR, WA2INB
225 Main St., Newington, Connecticut 06111

• • • • •

General Counsel . . . . . ROBERT M. BOOTH, JR., W3PS/K4PS
1100 Vermont Avenue, N. W., Washington, D. C. 20005

Associate Counsel . . . . . ARTHUR K. MEEN, Q.C., VE3RX
Suite 2212, 44 King St. West, Toronto 1, Ont.

DIRECTORS

Canada

NOEL B. EATON*.....VE3CJ
Box 660, Waterdown, Ontario

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

Atlantic Division

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

Vice Director: Harry A. McConaghy.....W3EPC
8708 Fenway Dr. Potomac, Bethesda, Md. 20034

Central Division

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

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

Dakota Division

CHARLES G. COMPTON*.....WØBUO
Box 226A R.R. 1, South St. Paul, Minn. 55075

Vice-Director: John M. Maus.....WØMBD
Oakdale Addition, St. Cloud, Minn. 56301

Delta Division

PHILIP P. SPENCER.....W5LDH/W5LXX
575 Amethyst St., New Orleans, La. 70124

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

Great Lakes Division

ALBAN A. MICHEL.....W8WC
359 Bonham Rd., Cincinnati, Ohio 45215

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

Hudson Division

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

Vice-Director: Stan Zak.....K2BJO
13 Jennifer Lane, Port Chester, New York 10573

Midwest Division

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

Vice-Director: Ralph V. Anderson.....KØNL
528 Montana Ave., Holton, Kansas 66436

New England Division

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

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

Northwestern Division

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

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

Pacific Division

J. A. DOC GMELIN.....WØZRJ
10835 Willowbrook Way, Cupertino, Calif. 95014

Vice-Director: G. Donald Eberlein.....W6YHM
P. O. Box 475, Palo Alto, Calif. 94302

Roanoke Division

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

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

Rocky Mountain Division

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

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

Southeastern Division

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

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

Southwestern Division

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

Vice-Director: Thomas J. Cunningham.....W6PIF
1105 East Acacia Ave., El Segundo, Calif. 90245

West Gulf Division

RAY K. BRYAN.....W5UYQ
2117 S.W. 61st Terrace, Oklahoma City, Okla. 73159

Vice-Director:

*Member Executive Committee

"It Seems to Us..."

NOVICE RETREADS

The Federal Communications Commission has just issued a proposed amateur rules amendment which would modify the current prohibition against anyone's starting again at the bottom if he has ever held a ham license. The Commission would open Novice exam eligibility to any citizen who hasn't been under FCC license for a year or more. See "Haps" this month for details.

The proposal came in an action denying a number of requests concerning the Novice ticket from the Electronics Industries Association (initiated by its Amateur Radio Equipment Section). EIA wants to make it as easy as possible to start in ham radio, but FCC said nix on reducing the code speed below 5 w.p.m., on retaining 2-meter voice, on establishing new 10-meter phone privileges, and on making it a 5-year renewable license. Most of these concepts have already been considered, and rejected only recently, FCC said in effect; and in other cases they are not consistent with the Novice objectives

We second the motion. While most everyone wants to encourage entry into ham radio, lowering standards may attain more quantity than quality. There's another radio service which went down the wrong path on just such a basis.

But the Commission did, and we think wisely, show a sympathetic reaction to EIA's proposal, filed earlier this year, to give previous ham licensees a chance to come back via the Novice route. Anyone who's been a non-ham for twelve months could try again as a Novice, if the proposed rules are adopted. At maximum, then, an individual could be licensed as a Novice for two-thirds of his life (omitting license-processing time).

The basic concept is certainly sound. The same general view has already been expressed by the ARRL Board, acting on recommendations of its Planning Committee (which thinks presently-licensed Technicians should also be given a Novice opportunity). The only question would seem to concern details. Is one year the proper period for being on the bench—or should it be two, or three? Give it some thought, kick the idea around at the next club meeting, and then let your director know your view.

DELIVERY COSTS

Last year your League spent more than $50,000 to ship its publications (aside from *QST*) to members and other "customers". This was appreciably more than in 1966—and already the 1968 figure is soaring even higher. The reason is, of course, increased Post Office, Railway Express, trucking and other rates.

Actually, the most economical form of distribution is through radio distributor stores, because shipments are made in bulk and the per-copy transportation cost is comparatively small. Direct orders to Hq., on the other hand, show the highest per-copy costs.

Suppose a ham in California orders two ARRL logs. Each costs us roughly 20 cents for production, or 40 cents for both; the postage is 80 cents, for a total cost of $1.20 (disregarding labor for wrapping, labels, etc.). Since we receive only $1 we obviously can't come out ahead in such situations.

Of course not all transactions are so unfavorable. On two logs to the east coast, we come out even! Logs are a somewhat special case, actually, where the retail price has been kept lower than sound economics would ordinarily prescribe, simply as a service to the fraternity. This principle has applied to our *License Manual*, too, but the facts of life are catching up (it's been the same 50-cent price for nearly twenty years) and we'll have to do something about it shortly. In addition, some of the other publications will have to go up 50 cents or so during the next year, to cover the skyrocketing transportion costs.

There is the alternative of charging each addressee extra for postage. To be completely fair, each publication would need its own added "postage and handling costs" for every one of the parcel post zones. Confusion would be rampant. Even "slightly higher west of the Rockies" would be sticky. An average cost of distribution, tacked on to the publication price, is the only practical approach.

Yes, even *QST* mailing rates are being upped by the Post Office, on a schedule of continuing increases for the next several years. Your pocketbook should be able to rest easy on that score, however, since the dues rise last year was prompted in part by the knowledge that such additional costs were coming and thus we're covered in advance. QST

League Lines . . .

FCC recently stated -- and QST so reported (p.68 July) -- that Technicians who had never held any other ham ticket would be eligible to apply for a Novice license. Now they've shied off, saying that no such Novice licenses will be issued to Tech holders at least until action on a new proposal (see "Haps" this issue) is completed, granting eligibility for a Novice ticket to anyone not under license for 12 months.

Some 400 of you -- pleasingly more than we'd expected -- have applied for 25-year continuous membership pins (plus several for 50 years!). About 90% of the requests check out with our records. Emblems themselves are on order but, like so many things these days, will take some weeks for actual production. Patience, please!

A special working group of directors (W4KFC, W3YA, W2TUK) is setting up procedures for the new Advisory Committee structure (Board meeting minute 27, July QST). Hq. will turn over to them any comments and suggestions already sent to Newington, but they'd like to have any additional ideas as input prior to their final report. Write Director Clark (address P.8).

After some months of doldrums, League publications sales are up noticeably, and frankly we've been caught out of stock on some items. Our "Handbook" supply will be about exhausted by the time you read this, despite a 10% increase in the press run, although a few dealers may still have copies on their shelves for another month or so. Otherwise you'll have to wait until February for the 1969 edition -- for which another extensive revision is now in process by W1CER and our technical crew.

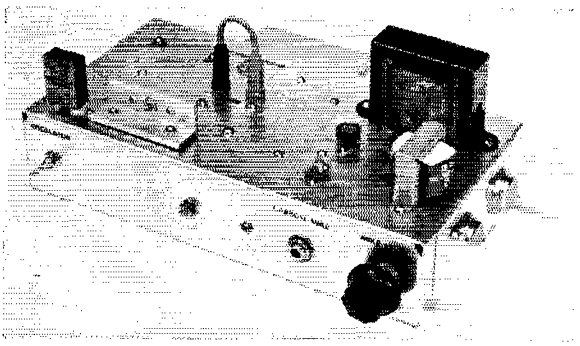
Don't get swept up in some of the over-enthusiasm of others who conclude that recent FCC actions in the "Carterphone" case (see "Haps" this month) have automatically okayed amateur phone patches. It is reasonably certain that some kind of approval will eventually come, but there's a lot of red tape still to be unraveled. E.g., just at press time the Commission issued a stay order on the effective date of one of its rulings.

We've recently made a couple of mailings to addresses provided by the Call Book. Some 14% of the envelopes were returned as "unknown," "moved -- left no address," or similar. Come now, fellers -- we're supposed to keep our addresses current on FCC records (the source of CBook material). A Form 610 will do it -- plus two bucks fee (can that be the reason?).

Every so often someone comes up with a "new and easier" approach to learning code -- usually based on pictorial association, opposites, a mechanical sequence (NDB6), etc. It's never new, and seldom easier except in the earliest slow-speed stages. There's absolutely nothing like straight aural practice -- W1AW, that is.

Loyola University has established a new four-year scholarship in communications, as a memorial to attorney Paul M. Segal, ex-3EEA, long-time general counsel of the League.

November 22 is getting mighty close. Don't get caught short -- right now is about the last time you can take one of the higher grade exams to get your ticket in time for the new band setup.



Front view of the 12-volt 160-meter transmitter. The oscillator transistor is under the chassis near the crystal socket. The driver stage is just to the right of the crystal, mounted in its heat sink. All of the modulator components are located above and below the chassis at the right; Q_7 and Q_8 are mounted on a heat sink on the right-side apron of the chassis. The meter jacks and jumper cable are visible at the top center.

A Transistor Phone Rig for 1.8 Mc.

Plus Some Solid-State Transmitter Design Tips

BY DOUG DeMAW,* W1CER

THERE are many applications in which a low-power 160-meter phone rig can be used to advantage. The transmitter to be described operates from 12 volts d.c., making it useful for mobile, portable, or fixed-station work. Although the input power to the final stage is only 7–8 watts, and it won't make you the 160-meter DX czar of your call area, some mighty respectable distances can be spanned if a good antenna is used. The writer has used comparable power for 160-meter mobile operation, and with an 8-foot base-loaded whip has had Q5 contacts as far as 1000 miles away.

Ordinarily, one can expect reliable ground-wave communication (mobile to fixed station) on this band to be between 30 and 60 miles, depending upon atmospheric conditions and QRM. It is not unusual for two mobile units to have solid communication over a 25-to-30-mile distance during daylight hours. Hills and tall buildings have little effect on 160-meter signals, hence the fading and flutter caused by such barriers in mobile operation on the higher frequencies is not a problem. Many transatlantic and transcontinental contacts have been made in the 160-meter band with fixed-station power levels of 10 watts or less. With patience and operating skill, this transmitter should be capable of providing plenty of long-haul contacts.

* Assistant Technical Editor, *QST*.

Most vacuum-tube techniques do not apply when working with transistorized transmitters, and a number of unique problems must be faced and solved if a high-quality signal is to be achieved. Some of these are discussed here, with satisfactory solutions represented in the final design of this mobile/fixed-station 160-meter transmitter.

The R.F. Circuit

For oscillator use, it is a good idea to select a transistor whose f_T (the frequency at which the common-emitter current gain drops to unity) is well above the operating frequency. For this reason, an RCA 2N2102 was chosen for the crystal oscillator, Q_1, Fig. 1. It has an f_T of 100 Mc., costs less than $1.50, and has a 5-watt dissipation rating. It is used in a Pierce arrangement with C_1 helping to regulate the feedback. In order to assure quick starting it may be necessary to experiment with the value of C_1, which should be between 100 pf. and 0.001 μf. depending on the crystal activity and the h_{FE} (forward current-transfer ratio) of the particular transistor. The setting of the slug in L_1 also affects the operation of the oscillator. A high-C collector tank is used in order to get the high operating Q needed to reduce the harmonic output from Q_1.

Driver stage Q_2 operates more or less in Class C (actually somewhere between Class B and Class C because it is just beyond cutoff) and gets its drive from Q_1 by means of L_2, a five-turn link over the cold end of L_1. Q_2 is also a 2N2102, used as a driver because of its power rating and f_T. In r.f. amplifier service, it is desirable to pick a transistor whose f_T is at least 10 times higher than the desired operating frequency; this assures that the stage will have a useful power gain. If f_T is near the operating frequency or only slightly higher, there will be no gain — and possibly even a loss — through the transistor. On the other hand, if f_T is a great deal *more* than 10 times the operating frequency — say, 500 Mc. for use at 2 Mc. — the low-frequency gain would be extremely high and

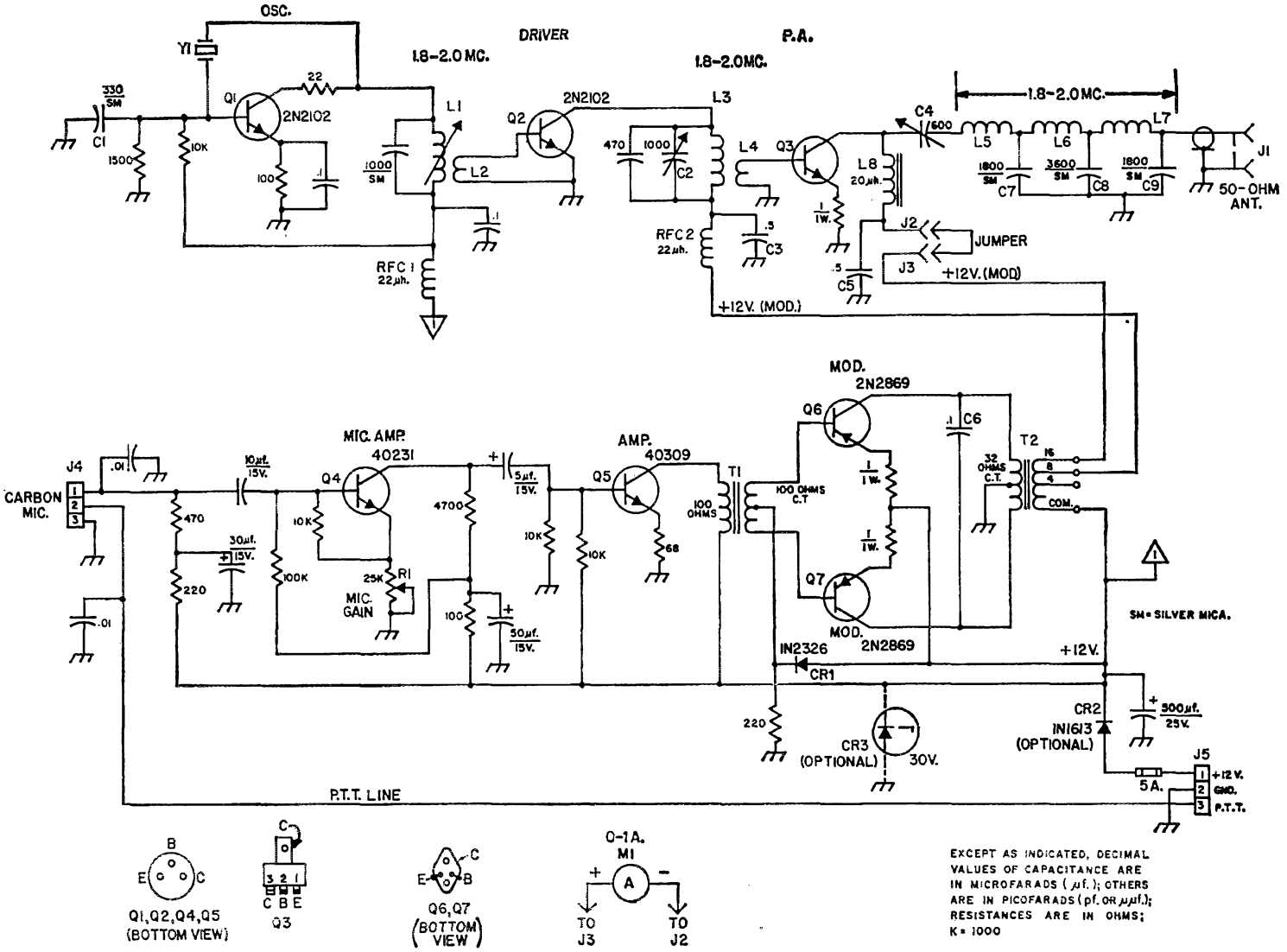

OSC.
DRIVER
1.8-2.0 MC.
P.A.
1.8-2.0MC.
1.8-2.0 MC.
Y1
Q1
2N2102
Q2
2N2102
L1
L2
L3
L4
Q3
L5
L6
L7
L8
20 μh.
C1
C2
C3
C4
C5
C6
C7
C8
C9
J1
50-OHM ANT.
J2
JUMPER
J3
+12V.(MOD)
RFC1 22 μh.
RFC2 22 μh.
+12V. (MOD.)
MOD. 2N2869
Q6
Q7
MOD. 2N2869
MIC. AMP. 40231
Q4
AMP. 40309
Q5
T1
T2
J4
CARBON MIC.
MIC. GAIN
R1
100 OHMS C.T
32 OHMS C.T.
SM = SILVER MICA.
IN2326
CR1
+12V.
CR2 IN1613 (OPTIONAL)
CR3 (OPTIONAL) 30V.
J5
5A.
+12 V.
GND.
P.T.T.
P.T.T. LINE
Q1,Q2,Q4,Q5 (BOTTOM VIEW)
Q3
Q6,Q7 (BOTTOM VIEW)
0-1A. MI
TO J3
TO J2
EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μf.); OTHERS ARE IN PICOFARADS (pf. OR μμf.); RESISTANCES ARE IN OHMS; K = 1000

Fig. 1—Schematic of the 160-meter transmitter. Fixed capacitors are disk ceramic unless otherwise indicated; capacitors with polarity marking are electrolytic. Fixed-value resistors not otherwise specified are ½-watt composition.

C_1—For text reference.
C_2—1000-pf. compression padder (J. W. Miller * 160-A or equivalent).
C_3, C_5—0.5-μf. 200-volt tubular.
C_4—200-600-pf. compression padder (J. W. Miller 160-C).
C_6-C_{11}, incl.—For text reference.
CR_1—1N2326 (RCA) diode.
CR_2—Silicon diode, 5 amp. 100 p.r.v. rating (see text).
CR_3—30-volt 1-watt Zener diode (1N3031B or similar); see text.
J_1—SO-239 coax connector.
J_2, J_3—Insulated banana jacks (E. F. Johnson 108-902, red, 108-903, black).

* J. W. Miller Co., 5917 S. Main St., Los Angeles, Calif. 90003.

J_4—3-terminal microphone connector (Mallory SCA-2B or equivalent).
J_5—4-terminal connection strip (Millen E-304); one terminal reserved as spare.
L_1—3.6 to 8.5 μh., slug tuned (J. W. Miller 21A686RBI).
L_2—5 turns small-diameter insulated hookup wire wound over bypassed end of L_1.
L_3—10 μh.; 20 turns No. 28 enam. wire space-wound on Indiana General** CF-111 (Q_2) toroid core.
L_4—8 turns insulated hookup wire spaced over entire L_3 winding on toroid core.
L_5—25 μh.; 55 turns No. 24 enam. wire close-wound over 2-inch length of ¼-inch diam. ferrite rod (see text).
L_6, L_7—4 μh.; 10 turns No. 16 enam. wire, close-wound on 1-inch length of ½-inch diam. ferrite rod (see text).
L_8—20 μh.; 50 turns No. 24 enam. wire, close-wound over 2-inch length of same type material used for L_5 (see text).
M_1—0-1 ampere d.c.
Q_1-Q_7, incl.—For text reference. Q_3 can be any type specified in the text, but Texas Instrument TIP-14 may be easiest to locate (Allied Radio Corp., $1.50 ea.).
R_1—25,000-ohm linear-taper carbon control.
RFC_1, RFC_2—22-μh. r.f. choke (Millen 34300-22).
T_1—Transistor driver transformer, 100-ohm primary to 100-ohm c.t. secondary (Stancor TA-58).
T_2—10-watt transistor output (Triad TY-64X).
Y_1—1.8-Mc. fundamental crystal. (JAN Crystal Co.)

** Indiana General Corp., Electronics Div., Keasbey, N. J. 08832. Att.: Product Mgr. Ask for Bulletin 101 and price list. Order core from Permag Corp., 8803 Van Wyck Expy., Jamaica, N. Y. 11418.

could cause incurable low-frequency oscillations. Altogether, it is best to stick pretty close to the 10-times-f_T rule. A heat sink is used on Q_2 to keep the transistor temperature within its safe range.

An additional reason for choosing the 2N2102 for Q_1 and Q_2 is its V_{CEO} rating (maximum safe collector-to-emitter voltage with the base open-circuited) of 65 volts. The oscillator collector voltage r.f. swing from 12 volts (the supply voltage) to almost 24 volts at the peak of the cycle is well within ratings. In the case of the driver, we must allow for as much as a 4-times-supply-voltage swing because the audio swing caused by 100-percent modulation must be added to the r.f. peak swing. (In practice, the actual voltage swing rarely gets much beyond a three-times increase, but theoretically it could rise to four times the supply voltage). For this reason it is wise to pick a transistor having a V_{CEO} rating at least twice the supply voltage for oscillators and unmodulated amplifiers, both r.f. and audio. If an r.f. amplifier is to be modulated 100 percent, V_{CEO} should be at least four times the supply voltage. These rules assume that the stage in question is terminated in a proper load. Damage is certain to occur if the stage is lightly loaded, even when the rules are followed.

A high-C tank is used for the collector of Q_2 to get rid of some of the harmonic energy developed there. A toroidal tank is used at L_3 because the self-shielding property of toroidal tuned circuits practically eliminates stray interstage coupling, a common cause of instability.[1] An air-wound or Miniductor coil of suitable inductance (approximately 10 μh.) can be used in place of the toroid if desired, but some interstage shielding may be required.

Several types of transistors were tried as power amplifiers (Q_3). A few bargain-house mesa-type power transistors[2] gave good results; some were 40-watt 40-Mc.-f_T n-p-n units, others were 85-watt 25-Mc.-f_T mesa transistors, and some were 85-watt 10-Mc.-f_T types. All performed satisfactorily, but the 40-Mc. types exhibited a tendency toward instability when C_4 was not tuned for the best match to the 50-ohm load. A swamping resistor, 15 to 56 ohms, can usually be connected between the base and ground (across L_4 in this instance) to help correct this type of instability. It will, however, result in some loss of driving power. A low-cost regularly available transistor — Texas Instruments TIP-14 — was also tried at Q_3 and performed well. The TIP-14 has an f_T of 40 Mc., is rated at 10 watts collector dissipation, and has a V_{CEO} of 70 volts. It costs $1.50. Some of the bargain types mentioned are available at two for $1.

The 1-ohm 1-watt resistor in the emitter of Q_3 serves as a protective device should thermal runaway occur. It also biases Q_3 farther into the Class C region for better efficiency. The

[1] "Toroidal-Wound Inductors," *QST*, January, 1968.
[2] Poly Paks, Box 942M, Lynnfield, Mass. 01940. Send 10 cents for catalog. Also, see *QST* ads.

stage is slightly degenerative because no bypass capacitor is used across the 1-ohm resistor. Adding a 0.5-μf. bypass capacitor had no significant effect on the operation other than a minuscule increase in output power, and for this reason it was omitted.

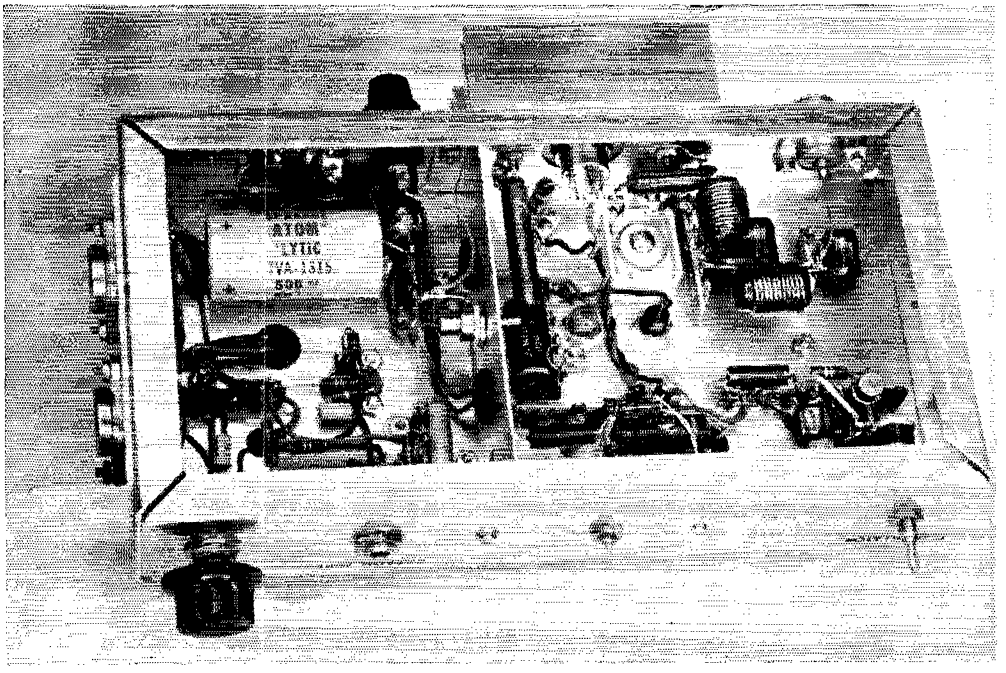
In designing the tank circuit for a solid-state power amplifier the matter of impedance matching becomes somewhat more "hairy" than when working with vacuum-tube circuits. This results from the unusually-low impedance levels encountered in power-handling transistor amplifiers. The formulas for calculating the precise values of the tank components, C_4, C_7, L_5, and L_8, are given in the *RCA Silicon Power Circuits Manual*, Technical Series SP-50, page 257. (In the interests of conserving space they will not be repeated here. The book itself would be a useful addition to the experimenter's library.) C_4 is tuned for optimum power transfer once the transmitter is connected to its 50-ohm load.

L_8 must carry the 600-ma. collector current, so fairly heavy wire must be used. To keep the size down L_8 was wound on a piece of ¼-inch diameter ferrite rod taken from an old transistor broadcast-radio antenna. This provides the required 20 μh. of inductance with considerably fewer turns of wire than would be needed for an air-wound inductor. The same general technique is used for L_5, L_6, and L_7.

Transistorized amplifiers tend to generate considerably more harmonic output than vacuum-tube amplifiers, because of nonlinearity in the transfer characteristics of the transistor, including a nonlinear variation in interelement capacitances with changes in element voltages. The harmonic currents approach the fundamental current in amplitude, so a highly-selective collector tank circuit is an absolute essential. The combination of C_4, C_7, L_5 and L_8 is a simple tank circuit which meets this requirement to a degree, but the second and third harmonics are down only some 20 decibels without additional selectivity. If the transmitter is intended primarily for mobile operation, no real problem exists because the selectivity of the mobile antenna is high. However, since the transmitter is designed for fixed-station use as well as for mobiling, a "Harmonicker-type" filter network, composed of C_7, L_6, C_8, L_7, and C_9, has been added. With this filter in the circuit the second and third harmonics dropped to more than 50 db. below the fundamental.

Banana jacks, J_2 and J_3, permit inserting a 1-ampere meter, M_1, in the collector lead during tuneup. A jumper shorts the jacks out in normal operation.

Stage decoupling in the transmitter is effected by RFC_1, RFC_2, and their associated bypass capacitors.

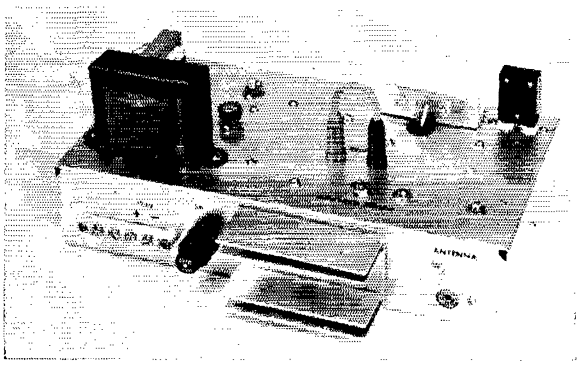


Looking into the underside of the transmitter, the audio section is in the compartment at the left. The oscillator stage is at the lower right. Driver stage Q_2 is at the lower center (obscured by the chassis wall), and the p.a. circuit is along the upper half of the right-hand compartment. The four amplifier tank inductors are mounted at right angles to one another to minimize coupling effects. The p.a. transistor (Q_3) protruding into the r.f. compartment at top center is an 85-watt, 10-Mc. bargain-house mesa type. The polarity-guarding diode, CR_1, is mounted on the divider strip at the center of the chassis. The shield serves as a heat sink for the diode, which is electrically insulated from it by a mica washer.

Audio Circuit

The audio circuit is conventional in most respects and needs little explanation. A carbon microphone was handy, so the circuit was arranged at Q_4, Fig. 1, to accommodate it. A decoupling network consisting of a 220-ohm resistor and a 30-μf. capacitor is used in the microphone-voltage supply line to prevent motorboating. The 30-μf. capacitor also helps to filter the d.c. to the mike. Q_4 is RC coupled to Q_5, the second audio amplifier stage. A driver transformer, T_1, connects Q_5 to the Class B modulator stage, Q_6Q_7. To prevent crossover distortion in the modulator a small amount of forward bias is applied to the bases of Q_6 and Q_7. The required amount of bias is obtained from the voltage drop across a 220-ohm resistor in the center-tap lead. The resistor is connected to the positive end of the supply through CR_1, a special temperature-sensitive diode. CR_1 should be clamped to the chassis between Q_6 and Q_7. As the temperature of the two output transistors rises their collector current increases, in turn increasing the temperature still more and leading to "thermal runaway" if not controlled. Because CR_1 is close to Q_6 and Q_7, its temperature also rises, causing the junction resistance of the diode to decrease. The resulting increase in current through CR_1 causes a larger voltage drop across the 220-ohm bias resistor, lowering the forward bias on Q_6 and Q_7. This reduces the collector current, thereby protecting the transistors from damage. It should be noted that CR_1, by virtue of its normal conduction characteristic, establishes a fairly constant level of forward bias for the modulator stage despite supply-voltage variations. It is this bias voltage that determines what the no-signal idling current of Q_6 and Q_7 will be. Additional overload protection is offered by the 1-ohm resistors in the emitter leads of the output transistors.

It is not an easy matter to obtain a modulation transformer for use in transistorized transmitters.[4] Ordinarily one must wind such a transformer by hand, or make do with makeshift components. In this instance, T_2 happens to be fairly close in characteristics to what is needed. It is a Triad TY-64X[5] and has a 32-ohm center-tapped primary. It will handle 10 watts. The primary impedance is fairly close to the required value for the collectors of Q_6 and Q_7, and a tapped secondary winding provides for load impedances of 4, 8, and 16 ohms. The modulating impedance presented by the p.a. stage is approximately 20 ohms, and with the 16-ohm tap a slight mismatch exists, but it is not serious enough to be of any consequence. In fact, the audio quality is very good with this circuit and there is considerably more audio power available than is needed for 100-percent modulation. C_6 is used across the primary of T_2 to get rid of some of the high-frequency audio response.



A look at the rear side of the transmitter. Power connections are made at the terminal block at the far left. A homemade heat sink consisting of two aluminum channels is used for the p.a. transistor, Q_3. It projects from the wall of the chassis, just left of the coax connector. It is insulated from the main chassis by means of a double thickness of meat-wrapping paper coated with silicone grease. Other insulating materials can be used. In this low-impedance circuit, dielectric material is not an important consideration.

The 8-ohm tap on T_2 furnishes modulation to the driver stage, Q_2. Somewhat less audio voltage is needed for the driver, although it is *necessary* to modulate the driver stage of an a.m. solid-state transmitter in order to secure 100-percent modulation of the output signal. This is because a portion of the driving signal feeds through the amplifier and appears in the output of the transmitter; the situation can be compared to that in a grounded-grid vacuum-tube amplifier, where a significant portion of the driving power appears in the output. With transistors this is partly caused by the normally-high value of base-collector junction capacitance, which makes it difficult to isolate the input of a stage from its output. Precise adjustment of the modulation percentage of the driver stage is often helpful in securing the best modulation waveform in the output. A degree of negative-peak limiting is sometimes helpful in preventing downward modulation. The limiting is usually applied to the driver stage only, and should be adjusted experimentally for the best output waveform and operating conditions. An example of this technique can be seen on page 310 of the *RCA Silicon Power Circuits Manual*.

CR_2 is intended solely as a polarity-guarding diode to prevent transistor damage if the transmitter is incorrectly connected to its power source. It must be able to handle the total current drawn by the transmitter. It will conduct only if a positive voltage is applied. CR_3 is a 10-watt Zener diode which will conduct when transients of 30 volts or more occur on the supply line; transients of this kind are not uncommon in automotive systems. The Zener diode will protect the transmitter from such peaks, but is shown only as an option in Fig. 1.

[4] When working with solid-state transmitters, low values of collector and base impedance are the rule more often than not. Also, high values of collector current are common — often an ampere or more — requiring transformer windings that are capable of carrying high current. For these reasons, modulation, driver, and interstage transformers have characteristics that differ markedly from those used in vacuum-tube equipment. Unfortunately, standard transformers of the type required are not commercially available.

[5] Available from Newark Electronics or Arrow Electronics.

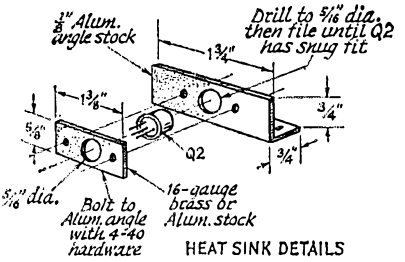


Fig. 2—Details of the homemade heat sink for Q_2. The assembly is mounted on insulating washers or rubber grommets to prevent a short circuit from collector to chassis. The hole in the angle stock is just large enough to permit Q_2 to fit snugly. A thin layer of silicone grease will help transfer heat from case of Q_2 to the heat sink.

Construction Data

The accompanying photos quite likely tell a better story about the assembly techniques than can be told with words. A standard 5 × 9½ × 2-inch aluminum chassis serves as a foundation for the transmitter. (The partition which divides the modulator from the r.f. section was put there for isolation purposes when an experimental 2-meter r.f. section was being used. The shielding is not required for the 160-meter band.)

A homemade heat sink is used on Q_2; the details are given in Fig. 2. Similar sinks were made for the modulator transistors, Q_7 and Q_8, and for the p.a. transistor, Q_3.[6] The details are reasonably clear in the photographs. Their dimensions are not critical. Actually, they could have been made somewhat smaller and would have still offered sufficient heat radiation.

L_6 and L_7 are wound on ¾-inch lengths of ½-inch-diameter ferrite rod. The rod was obtained from Lafayette Radio Electronics and was supplied in a 7½-inch length for $0.65. It is hard material, and in order to cut it to the desired length one must cut a groove around it with a hacksaw, then carefully break the desired section off. The butt ends can then be smoothed down with a file or grinding wheel. After the windings are in place, they should be secured to the ferrite with Duco cement or coil dope.

[6] Homemade Heat Sinks, "Hints & Kinks," *QST*, September, 1966.

Testing and Operation

Without the microphone being plugged in at J_4, apply power (dummy load attached to J_1) and peak all r.f. stages for maximum transmitter output. This can be done by observing forward power on an s.w.r. meter, or by observing the S meter on a communications receiver. Cycle the transmitter a few times to make sure Q_1 starts rapidly. If it does not, adjust the slug in L_1 for a setting that assures quick starting of the oscillator. With M_1 plugged in at J_2-J_3, the reading should be approximately 600 ma. The collector current will vary somewhat, depending upon the transistor type used at Q_3. A low reading indicates low base drive or a particularly low-beta transistor at Q_3. Because of nonuniform production, several transistors of the same manufacture and type number may give different results, and for this reason it is impossible to specify an exact value of collector current.

In checking out the modulator, make absolutely certain that the dummy load is connected to J_1. If the transmitter has an improper load, "blam" goes the junction of the p.a. transistor the moment you speak into the mike. *Always make sure that the transmitter has a proper load!* It is common practice to provide some type of no-load protection in commercial solid-state transmitters. An example of that kind of circuit is given in Fig. 3 and on page 294 of the RCA book mentioned earlier. An s.w.r. detection de-

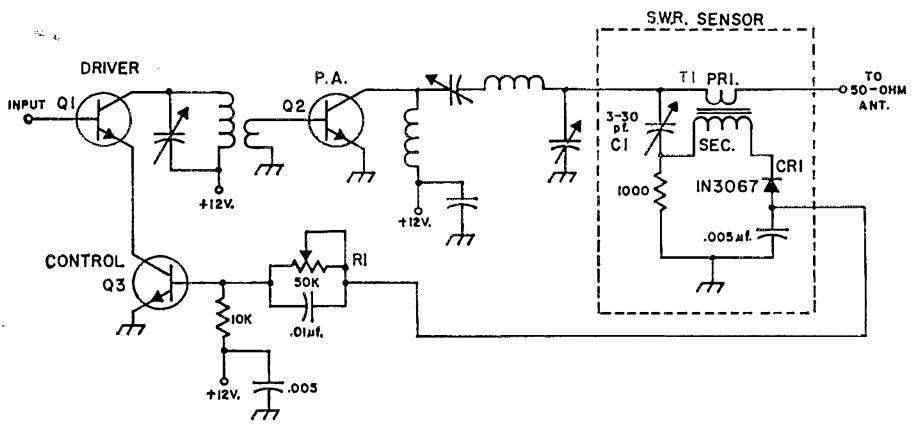


Fig. 3—Circuit of a typical protective arrangement. It detects an antenna mismatch, rectifies some of the reflected power, then uses the d.c. voltage as reverse bias to control the drive to the p.a. stage. The reverse bias is applied to Q_3, a control transistor which varies the gain of driver stage Q_1. This a.g.c. control circuit should be applied to an early stage of the transmitter, preferably ahead of the driver, but after the oscillator. R_1 is set for a rapid-enough attack time to protect the p.a. transistor, Q_2. T_1 is a toroidal transformer which can be wound experimentally, using the smallest number of primary turns possible for the operating frequency. C_1 is adjusted for proper balance of the bridge circuit. See text for additional information.

vice is connected to the output of the transmitter, and if the antenna loading changes because of a mismatch, the reflected power on the line increases. The reflected power is sampled, rectified, and fed to the base of a control transistor which is connected in series with one of the driver stages. As the reflected power increases, so does the level of the rectified voltage. This d.c. voltage reverse-biases the control transistor toward cutoff, thus lowering the output from the driver stage. Such a system is practical when applied to c.w., f.m., or s.s.b. transmitters. For a.m. operation, provision could no doubt be made to apply some of the control bias voltage to one of the low-level audio stages as well. This would lower the drive to the modulator output stage, thus protecting the modulated amplifier from high audio peaks when the modulator had an improper load.

A check on modulation quality can best be made with the aid of an oscilloscope, following the procedures given in Chapter 8 of *The Radio Amateur's Handbook*. Some control over the audio quality can be had by experimenting with the settings of C_2 and C_4. It is best to observe the transmitter output waveform on a scope when making these adjustments. Rough adjustments can be made while monitoring the signal on the station receiver, or by having a ham friend check your on-the-air signal. Although a carbon microphone is used with this transmitter, the audio quality compares favorably with that of most transmitters that use communications-quality crystal or ceramic mikes. There is plenty of audio, too — far more than is needed for full modulation of the carrier. R_1 needs to be set at approximately midrange when adjusting for 100-percent modulation.

A solid-state 160-meter mobile converter is described in the 1968 edition of the *ARRL Handbook*. A new solid-state 160-meter mobile converter will appear in a subsequent issue of *QST*. The only other accessory needed for mobile operation is a base- or center-loaded whip antenna. For operation at 1800 kc. an inductance of approximately 345 μh. is needed for base-loading an 8-foot whip. For center loading, approximately 700 μh. will be required. The author uses a commercial center-loaded whip, a Webster Big K, available with loading coil for 160-meter operation.

In closing, it would be proper to point out that this transmitter should be regarded primarily as a representative circuit of a working unit. There is much room for experimentation, and because the transmitter is designed for operation on the "top band," the physical arrangement and lead lengths are not critical. There are many possibilities when it comes to transistor types which can be used. Air-wound inductors can be used in place of the toroid and ferrite-rod core inductors, provided space isn't an important consideration. Similarly, it is not imperative that the commercial components specified for T_1 and T_2 be used. Homemade transformers can be built on the cores from old tube-type radio output transformers if the constructor has had experience along these lines.

It is hoped that this article may inspire some heretofore undecided experimenters to take the plunge into transistor equipment design. Some, of course, may just wish to build a similar transmitter for purely practical reasons; if so, it should fill the need for a reliable low-power portable, mobile, or fixed-station rig for the 160-meter band. QST

Strays

The Lawrence High School (N. Y.) Amateur Radio Club will be operating portable from Liberty Island, the site of the Statue of Liberty, on Columbus Day weekend, October 12 and 13. The club was granted permission by the U. S. Department of the Interior to operate WB2EJZ on these dates between the hours of 1300 and 2100 GMT. Look for the group on or near 3.9, 14.3, and 21.4 MHz. Special QSL cards will be sent to those working the station. Be sure to include a s.a.s.e. with your card and all times and dates should be in GMT.

—•••—

Radio amateurs interested in the reception of weather satellite pictures will be glad to know that new ATS satellites have been launched and are transmitting picture information using the same standards as earlier APT systems, thus making existing equipment compatible.

The ATS-1 is positioned in a synchronous orbit over the Pacific at 151 degrees west. Although considered to be experimental, the ATS-1 is working on a general schedule transmitting WEFAX material at 1300Z to 1400Z, 1810Z to 1835Z, and 2330Z to 2400Z on 135.60 MHz. The ATS-3 at 47 degrees west over the Atlantic will not be operating until sometime around the middle of August, at 135.60 MHz. More information on the APT system can be found in the article by Anderson in *QST* for November 1965.

—•••—

The Totah ARC of Farmington, New Mexico will hold their annual 4-Corners Field Day at the 4-Corners Monument. This is a point of three call areas as well as a common point for four states! The event is planned for September 21 and 22 and the Club will be working 80, 40, 20, and 15 meters, s.s.b. and c.w. The club station, K5WXI will send out special "5 Ø 7" awards for working the station.

—•••—

New visiting hours have been announced for radio stations WWV, WWVB, and WWVL at the National Bureau of Standards' field station near Fort Collins, Colo.[1] The new hours are from 1:00 P.M. to 4:00 P.M. local time on Wednesday each week. The gate to the site will be closed at all other times.

Groups or individuals who wish to visit the site during the open hours, should call the station (Fort Collins, 484-2218) and make arrangements for the visit. Groups or individuals wishing to visit at times other than Wednesday afternoon must make arrangements in advance through the Technical Information Office, NBS Boulder Labs., Boulder, Colo. 80302, Tel. 447-1000, ext. 3244.

[1] "WWV Moves to Colorado," *QST*, Jan. and Feb. 1967.

600 to 20,000 Meters

A V.L.F. Converter for Communications Receivers

BY WILLIAM H. FISHBACK,* W1IKU

Although not relating to amateur-band activities, previous articles on v.l.f. reception in QST have generated a surprising amount of interest among hams. This converter, designed to work into a receiver covering the 80-meter band, is capable of producing good l.f. signals with an antenna as short as 35 feet.

HAVING been exposed to it while working at it for a living, what's down below the broadcast band has always held more than passing interest for the author. Wanted, was something, not too elaborate, that could be dusted off occasionally, and fired up to listen to 600-meter ship-shore stuff, or to run down to v.l.f. to see what the various megawatts boys were up to.

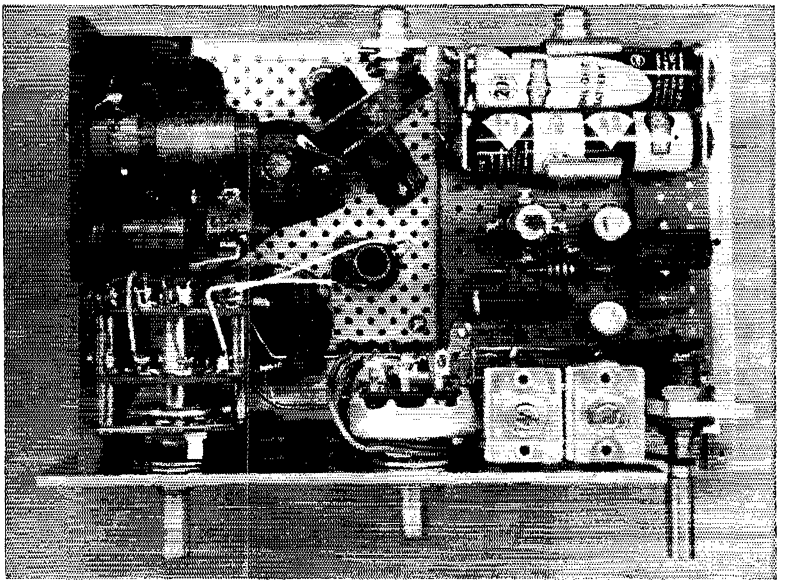
The simplicity of W3NNL's coilless v.l.f. converter circuit[1] was appealing. A trial of the arrangement proved it to be quite effective in picking up low-frequency signals. However, it was found that it was also responsive to h.f. signals in sufficient numbers to be bothersome in serious l.f. reception. There was also a tendency for the oscillator to quit occasionally. Oscillation could be restored only by periodic readjustment of the output coupling of the converter, as the receiver into which the converter was working was tuned through its range.

In the circuit of Fig. 1, the oscillator problem was overcome by using two transistors, and separating the functions of oscillator and mixer. A selective circuit at the input of the mixer was effective in reducing the high-frequency responses. In connecting up various input circuits experimentally with clip leads, the arrangement shown was hit upon more or less by accident, but some really hot signals resulted when the receiver was turned on, although the antenna was (and still is) only 35 feet of wire 20 feet off the ground. It will be noticed that this input circuit has the configuration of a pi network.

A crystal frequency of 3500 kc. was chosen so that the converter would work into the 80-meter range of a communications receiver. Using the sum frequency output from the mixer, a receiver tuning the range of 3500 to 4000 kc. will cover a l.f. signal range of 0 to 500 kc. Input-coil dimensions are included that will extend the range up to 1100 kc. if the receiver has coverage up to 4600 kc. The coverage with

* Old Comers Road, Chatham, Mass. 02633

[1] Hints and Kinks, *QST*, February, 1965.



Bottom view of the v.l.f. converter. The input coils and range switch are at the left. The batteries, transistors, and oscillator coil are to the right.

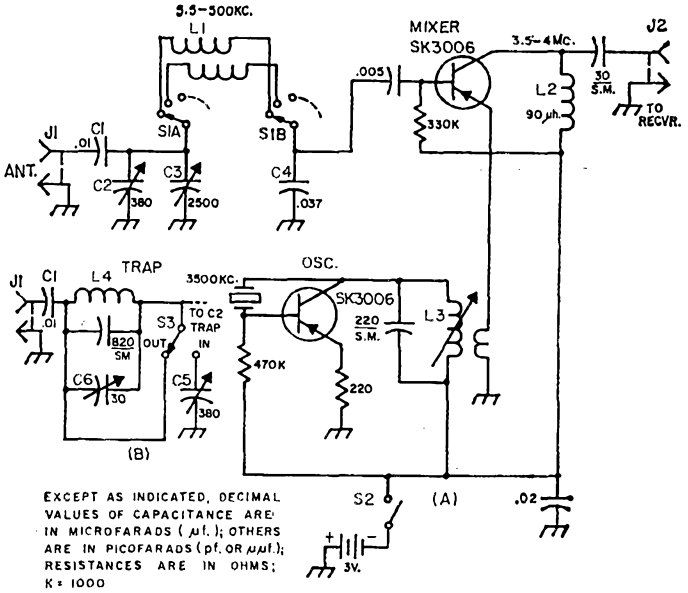


Fig. 1—A—W1IKU's low-frequency converter circuit. B—Optional input trap. Fixed capacitors are disk ceramic, except where SM indicates silver mica. Resistors are ½-watt.

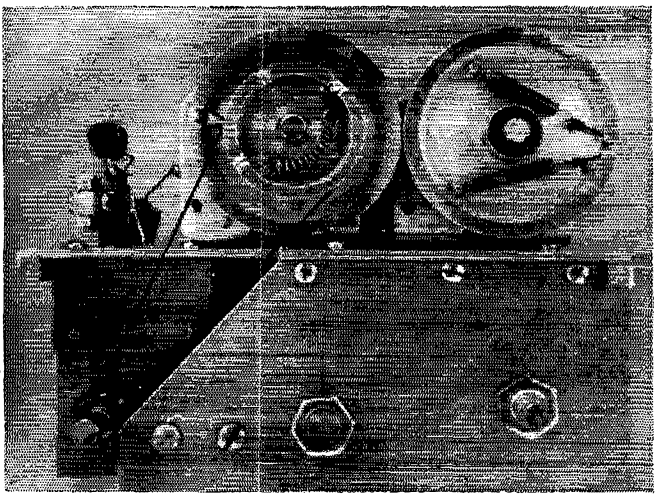
C_1—0.01-μf. ceramic disk.
C_2, C_5—50-380-pf. mica trimmer (Arco-Elmenco 465).
C_3—Two triple-section "t.r.f." variable capacitors, 425 pf. per section, all sections in parallel, total approx. 2550 pf. (trimmers removed).
C_4—Combination of disk ceramic capacitors to total indicated value.
C_6—3-30-pf. mica trimmer.
J_1, J_2—Phono jack.
L_1—Approximate inductances (see text)
5.5-11.5 kc.—0.28 henry
9.5-20 kc.—95 mh.
18-38 kc.—25 mh.
31-65 kc.—9.4 mh.
50-105 kc.—3.4 mh.
90-200 kc.—1.02 mh.
160-340 kc.—330 μh.
270-560 kc.—120 μh.
540-1100 kc.—29 μh.
L_2—Approx. 90 μh. (TV peaking coil, or Miller 70F104A1 r.f. choke).
L_3—Approx. 9.5 μh., slug-tuned (Miller type 4406, or similar), 5-turn link added.
L_4—To suit frequency (160 μh. for 436 kc.).
S_1—2-section 2-pole 9-position (or more) rotary switch.
S_2—S.p.s.t. switch, any type.
S_3—S.p.d.t. rotary switch.

receivers of limited tuning range may be extended upward in frequency by switching to a lower-frequency crystal in the converter. A 3000-kc. crystal, for example, will provide a signal-range coverage of 500 to 1000 kc. with receivers restricted to the range of 3500 to 4000 kc.

A large tuning capacitance is required in the input circuit if this wide frequency range (100 or more to 1) is to be covered with a reasonable number of coils. The situation is aggravated to a considerable degree by the fact that the antenna capacitance shunts the tuning capacitor. This capacitance (which appears to be about 200 pf. for the 35-ft. antenna used) limits the ratio of minimum to maximum circuit capacitance obtainable with any given tuning capacitor, and thus the ratio of maximum to minimum frequency tunable with a given coil. The capacitor used consists of two triple-section t.r.f. type variables, 425 pf. per section, all six sections in parallel, making the total maximum capacitance 2550 pf. This capacitor will cover a frequency range of slightly more than 2 to 1 for each coil, with a circuit minimum capacitance (including antenna capacitance) of about 650 pf. Tuning capacitors having the more usual maximum of 365 pf. per section will give this same tuning ratio if the circuit minimum capacitance does not exceed 550 pf. Each coil, however, will have to have slightly more inductance.

The two tuning capacitors were ganged as shown in the photographs. They may also be ganged by means of a right-angle drive, such as the National RAD. Ganging might be avoided, at a sacrifice in convenience, by using a single three-section variable, and providing a fixed mica capacitor of about 1200 pf. that could be switched in parallel with the variable. The dial of the variable would then be calibrated in two ranges for each coil, one range with the fixed capacitor switched in, and the other range with the capacitor switched out.

An even larger tuning capacitor could be used, if one is available, with a consequent reduction in the number of coils, since the tuning rate with the capacitor used by the author is



Front view with panel removed, showing method of ganging capacitors. The pulleys were turned out on a lathe. The 436-kc. input trap is at the upper left. The unit is inverted in this view.

more than adequately slow, even at the high-frequency end of the range covered.

It was found that a second variable, at the output of the pi network, was not necessary. The fixed value shown for C_4 was selected as the best compromise for the frequency range covered. At these low frequencies, and with no extremes of temperature to be expected, a combination of ceramic disk capacitors to yield the desired value has been entirely satisfactory.

C_2 is included to permit compensation for a limited change in antenna length, so that a calibration of the C_3L_1 circuit can be maintained. C_2 is set near maximum capacitance for a short antenna. Then, if an antenna of larger capacitance is used, the value of C_2 is reduced accordingly to keep the same capacitance across C_3. Based on a capacitance of 200 pf. for a 35-ft. antenna, C_2 should have sufficient range to compensate for longer antennas up to a maximum of about 100 ft. Antenna lengths within this range are capable of producing highly satisfactory results with this converter. Longer antennas would require a reduction in coil inductance to maintain the same frequency. A larger antenna capacitance would also reduce the frequency coverage per coil, making more coils necessary for complete coverage. In reference to the antenna lengths mentioned, it is assumed that the antenna will be a single wire connected directly to the antenna terminal of the converter, and kept in the clear as much as possible. The capacitance of other forms of antenna will usually be far greater than can be tolerated without a serious reduction in tuning range.

The real function of C_1 is not understood. With it out of the circuit, there was a lot of a.c. hum; with it in, everything cleared up nicely.

Fig. 1B shows an optional input trap that was found necessary to suppress "monkey chatter" from WCC, when listening on 500 kc. This station operates on 436 kc., and is only 3 miles away. A like condition on another frequency could be treated similarly by using the same capacitance, and adjusting L_4 to resonate the trap to the frequency of the offending station. Again, C_5 is for the purpose of compensating for the reactance change when the trap is switched in, thus preserving the calibration of the tuned input circuit.

Coils

The author has found that various types of iron-core inductors from the junk box make excellent l.f. coils and, of course, are far more compact than other types. No specific dimensions will be given, since they will depend on what you may have on hand, or can easily obtain. The approximate inductance values used in the author's converter are given under Fig. 1.

From 550 down to about 300 kc., the well-known loopstick (possibly with a few turns added) serves extremely well. Below 300, down to 20 kc., TV width coils do fairly well. However, what the text books say about Litz (fine, stranded) wire is noticeably true. Coils wound with this wire are quite superior to coils wound with solid wire, from the broadcast range down to at least 150 kc. So, if the junk box has any pie-wound coils of Litz wire, by all means try to incorporate them. This applies especially to the coil in the trap circuit.

For the 9.5–20-kc. range, an 88-mh. telephone toroid, with both sections is series, and about 30 turns added, was used with excellent results. (Without the added turns this coil covers 10–20 kc. One section of the toroid — 22 mh. — tunes from 19 to 38 kc., thus giving a small overlap around 20 kc.)

For the range of 5.5 to 11.5 kc., part of a pie from a flyback transformer was used. To increase the inductance, core material from the transformer was used to form a closed core consisting of two L-shaped pieces. The core material can be scored with a file, broken off

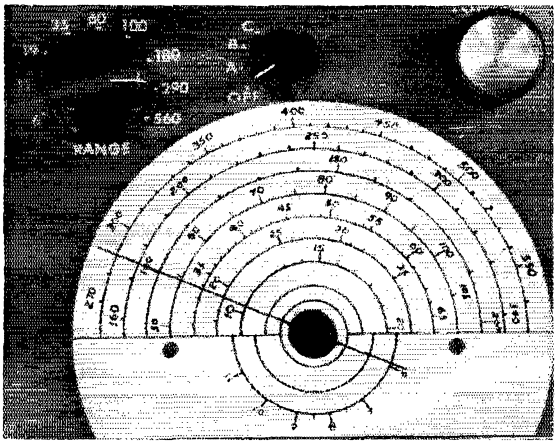
to rough dimensions, and then ground off square. After installing the two pieces, they were cemented together with epoxy to prevent changes in air gap.

L_3 and the 220-pf. capacitor shunting it should be tunable to the crystal frequency. This coil should be adjustable so that it can be tuned for most reliable operation of the crystal. The best point will be found slightly to the high-frequency side of resonance.

The value of L_2 is not critical, but it should resonate, with stray circuit capacitance, somewhere near the tuning range of the receiver. The value of the output coupling capacitor may have to be changed for best results, depending upon the characteristics of the receiver input circuit.

Assembly

The photographs show most of the details of construction. The arrangement of components is not highly critical, so the assembly can take almost any form desired. However, L_2 should



Main dial with typical calibration. The range switch is at upper left, vernier tuning control at upper right. The knob at the center controls the trap switch, in this instance combined with the power switch.

be reasonably well isolated from the input coils and tuning capacitors to minimize direct feedthrough of high-frequency signals.

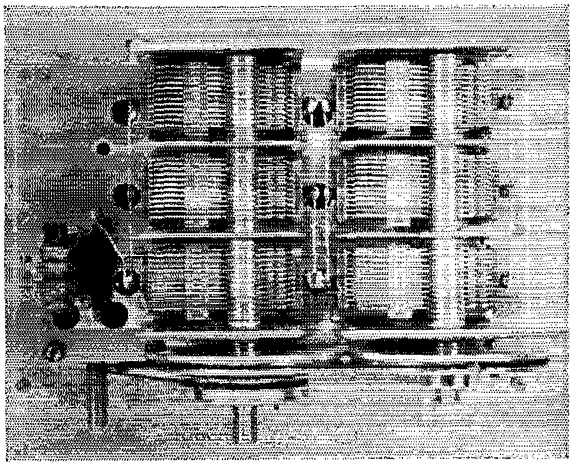
Calibration

The author used the low-frequency range of a BC-221 (LM) frequency meter as a signal generator in calibrating the input circuit, coupling the signal into the converter through a "gimmick" capacitor of a few pf. For frequencies below the range of the BC-221, signals from the BC-221 and a 100-kc. calibrator were fed simultaneously to the input of the mixer, each through a "gimmick" capacitor. The second harmonic of the crystal calibrator and the fundamental from the BC-221 (the latter tuned to the vicinity of 200 kc.) combine in the converter mixer to produce good difference beats, at 100-cycle increments, down to 5 kc.

To avoid interference from outside signals while calibrating, the antenna should be disconnected. To simulate the capacitance of the antenna, a capacitor of value equal to the antenna capacitance should be temporarily connected across the input. For the range of antenna lengths mentioned earlier, this capacitance should be about 200 pf. C_2 should be set at maximum capacitance.

Set the signal generator to the desired frequency at the high-frequency end of one of the ranges. Set the receiver to 3500 kc. plus the signal-generator frequency. Then adjust the coil until the generator signal peaks with C_3 set near minimum capacitance. Now decrease the frequency of the signal generator, retuning the receiver to keep it at 3500 kc. plus the generator frequency, and readjust C_3 for the peak in signal strength. Continue this process until the generator-signal peak is found near maximum capacitance of C_3. Check the frequency of the signal generator, and compare it with the frequency at the start of the series. If the ratio of maximum to minimum frequency is less than 2 to 1, reduce the capacitance of the capacitor simulating the antenna, and repeat the process. Once the temporary capacitor has been set to give a tuning ratio of slightly more than 2 to 1 (to provide a little overlap), the individual coils can be adjusted to cover the desired segments. The setting of this capacitor should not be disturbed while making subsequent adjustments.

The remainder of the adjustment consists of pruning each coil to cover the desired frequency segment. In the case of each coil, set the signal generator to the high-frequency end of desired segment, and the receiver to 3500 kc. plus the generator frequency. Then adjust the inductance of the coil until C_3 peaks the signal near minimum



The ganged tuning capacitors are mounted on top of the chassis. The input trap circuit is to the left.

Table I

Some Low-Frequency Stations and Their Approximate Frequencies

Freq. kc.	*Call*	*Location*	*Remarks*
10.2 12.75 13.6		Trinidad Hawaii Panama New York	Omega Navigation Spaced dashes
15.4	NWC	N.W. Cape, Australia	
15.72			TV-sweep frequencies
16	GBR	England	Time ticks
16.2	RCC7	U.S.S.R.	
16.8	FUB	Paris	Time & Coded Groups
17.4	NDT		
17.8	NAA	Cutler, Maine	
18	NBA	Canal Zone	Time
18	FUB	Paris	Time
18.5	NLK	Jim Creek, Wash.	
18.5	NPG	San Francisco	
19	GQD	Anthorn, England	
19.6	GBZ	Criggen, Wales	
20	WWVL	Boulder, Colo.	Standard frequency
21.4	NSS	Annapolis, Md.	
23	NKA	Asmara, Ethiopia	
24	NBA	Canal Zone	
26.1	NPM	Hawaii	
50		Czechoslovakia	Standard frequency
60	WWVB	Boulder, Colo.	Standard frequency
60	MSF	England	Standard frequency
89	NSS	Annapolis, Md.	
110	CKN	Vancouver, B. C.	
113	WSL	New York	Press to ships 0300 GMT 25 w.p.m.
114.5	CFH	Halifax, N. S.	
114.95	NPG	San Francisco, Calif.	
115.3	CFH	Halifax, N. S.	
121.95	NSS	Annapolis, Md.	
129.95	GKU	England	
131.05	NPM	Hawaii	
131.8	FYA31	Paris	Weather, facsimile
133	CFH	Halifax, N. S.	
136.5	FYA36	Paris	Weather, facsimile
147.5	WCC	Chatham, Mass.	Press to ships 0300 GMT 26 w.p.m.
162	NSS	Annapolis, Md.	
164		Radio Luxembourg	A3, 1 megawatt
233		Radio Luxembourg	A3, ½ megawatt

capacitance. With the tuning ratio already set, the desired frequency at the low frequency end of the segment should automatically peak with C_s near maximum capacitance.

What You Can Hear

The accompaning table lists some of the stations that are in more or less regular operation on the lower frequencies. Many of these transmit c.w. in code groups or plain language at speeds of 13 to 35 words per minute for long periods of time, and are therefore very useful for code practice. There is also quite a bit of narrow-shift RTTY and other types of activity. If the receiver has a Q multiplier or other form of high selectivity, it should be possible to crawl underneath NAA and other "locals," and pull out weak signals for good copy. QST

The C-Line Matcher[1]

Simplified Impedance Matching in the V.h.f. Range

BY WILLIAM L. SMITH,* W3GKP/A3GKP

IMPEDANCE matching problems have always been with us, but in the v.h.f. range they tend to be meaner and more persistent. Take receivers, for instance. On lower bands it doesn't make much difference whether you match the receiver input circuit to the antenna line or not, but at v.h.f. it can make all the difference in the world. If you buy a receiver or converter you may find no provision at all for matching, and if you build your own you will burn your fingers while soldering and unsoldering taps on those little coils.

Antennas are not exactly the acme of convenience, either, as you discover 60 feet in the air, moving clips up and down on a stub. Then, like as not, after you solder the jumper in place you will find that "something has changed" and the s.w.r. is pretty bad, after all. I think that many a v.h.f. beginner has overlooked such problems, and has concluded that v.h.f. simply does not work. Probably some of the more experienced have been dissuaded from extensive experimentation with matching by the thoughts of labor involved.

Most of this grief could be avoided if we had a handy-dandy little box that would match anything to anything. Ideally, this would be easy to make and adjust, flexible as to input and output impedances, be of such design that it would be inexpensive and make use of standard parts, and be adaptable to a variety of shapes and sizes to fit individual preferences. The conventional antenna-coupler type of balun comes mighty close.[2] Unfortunately, it works between coax and balanced line, and under extreme conditions may require some tap soldering to attain a match. The device described here meets all the requirements to an adequate degree.

To understand how the C-line matcher works, let us regress for a moment to open-wire line. A standard method of matching open-wire line is the use of a stub adjustable in length and position, as shown in Fig. 1-A. Such a stub may be either open or shorted at the bottom end, but for purposes of explanation we will use an open stub. The theory of this stub is explained in many handbooks, so I will not go into it here, except to note that an open-end stub of an electrical length of 70 degrees will match an s.w.r. of as high as 10 to 1.

A similar stub can be made for coax, as in 1-B, but most of us would regard it as a machinist's nightmare. But the open stub acts just like a capacitor, so the same result could be obtained with a variable capacitor of adjustable position, as in 1-C. This gets us part way out of the machine shop. We can get all the way out with something like 1-D.

This could be a section of line built in a box or can, and equipped with a large number of variable capacitors. We set them all to minimum capacitance except the one at the right point, and we adjust that one until it shunts the line with the desired reactance. Fortunately, this can be simplified. If we space the capacitors along the line, we may not always have one at the optimum position, but we can get the same results by using a little of each of the ones on either side of that position. A little thought will show that one-eighth wavelength is a suitable maximum spacing between capacitors. If we make the whole line

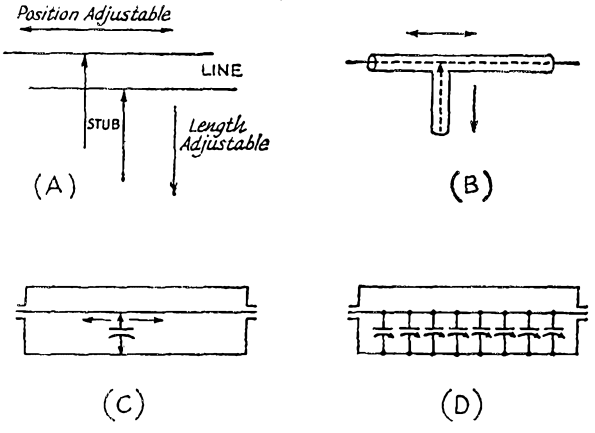


Fig. 1—Derivation of the C-Line Matcher begins with the open-ended stub, A. If this is adjustable in length and position on the open line, it can be used to tune out reactance. A similar arrangement for coaxial line is shown at B. A somewhat more practical method involving a variable capacitor is shown at C. At D we see many capacitors which can simulate, through adjustment, the effect of moving the position of the capacitor along the line.

* 1525 Spencerville Road, Spencerville, Md. 20868

[1] From a paper presented at the Roanoke Division ARRL Convention, Spartanburg, S. C., Nov. 5, 1967. Information also distributed through Army MARS channels.

[2] For information on antenna couplers, see *The Radio Amateur's V.h.f. Manual*, ARRL, Chapter 8.

section a half-wavelength long, we can introduce our shunt reactance at any point needed. Thus, we arrive at a final circuit like that shown in Fig. 2. From the dimensions given in terms of wavelength, we see that this is quite practical for any frequency from 144 Mc. up.

How To Build It

The design is simple, electrically and mechanically. A 70-degree stub of 50-ohm line has a reactance of 18 ohms, corresponding to a capacitance of about 20 pf. at 432 Mc. or 60 pf. at 144. These are the approximate maximum capacitor values needed for these bands. The inner conductor of the line can be anything which, when combined with the wall of the enclosure, will approximate normal coaxial-line impedances.

My matcher for 432 Mc. is built in a 12 by 2½ by 2¼-inch Minibox (Bud CU-3014-A), with connectors attached to the box ends. The inner conductor is made of thin copper sheet, bent into U shape, 1 inch wide and ¼ inch high. The 4 capacitors are APC-type trimmers spaced at 3⅞-inch intervals. This makes the end sections a little under the 1/16-wavelength figure, but this does not matter. The capacitors are about one inch deep, so soldering the line to their stator-support bars places it quite close to the middle of the cross-section of the box. That there is nothing magic about this configuration is shown by the fact that I bent up the line sides mainly to add rigidity, and selected the dimensions "to look about right."

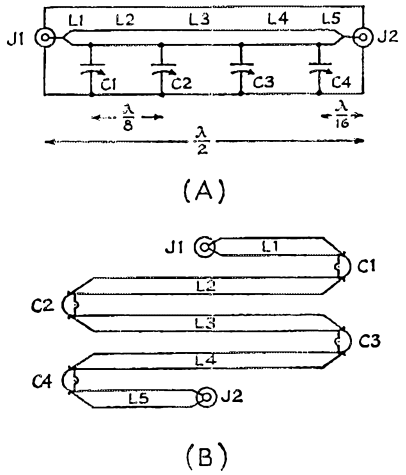


Fig. 2—Practical versions of the C-Line Matcher. Here four variable capacitors are placed at ⅛-wavelength intervals along a half-wave line section, with 1/16-wavelength sections at the ends. Maximum value of the variable air capacitors, C_1–C_4, is 20 to 30 pf. for 432 Mc., and 60 to 100 pf. for 144. Line sections L_1 and L_5 are 1 to 2 inches for 432 Mc. and 4 to 6 inches for 144. L_2, L_3 and L_4 are 3 to 4 inches for 432 and 8 to 12 inches for 144. Line material is thin copper sheet, bent into U shape, 1 inch wide and ¼ inch high in the 432-Mc. version, A. The 144-Mc. model, B, has the line arranged in zig-zag fashion, and the conductor is ½ inch wide and ¼ inch high, with tapered sections at the capacitors and at the line ends.

Models for 432 and 144 Mc. are shown in Fig. 3. The latter was crammed into an available 7 by 11-inch chassis, which is inverted and used merely as a shield. The parts are all attached to a matching top plate. The line was folded zig-zag fashion to fit in the box, and there are no internal shields between sections, though originally it was thought that these might be necessary. The half-inch lip around the chassis reduces the useful area to about 6 by 10 inches. The capacitors are only 8 inches apart, so the "eighth-wave" line sections are only about 8½ inches long. The end sections are 5 inches, so the overall length is several inches short of a half wavelength.

Capacitors in the 144-Mc. model are APC-100 trimmers. Their greater depth puts the line pretty close to the bottom of the box. To reduce capacitance to ground and to minimize coupling between line sections where they approach one another at each capacitor, I made them only ½ inch wide and ¼ inch high. In addition, it was necessary to taper the ends of the line sections to avoid mechanical interference. In building these devices, be sure that the capacitor rotors are solidly grounded. Mark the rotors so that each can be set to minimum capacitance from the outside of the case.

Adjustment and Use

Before using the matcher, adjust the system for best performance without it. Then with all capacitors in the matcher set at minimum, connect it in the line between the transmitter and its load. There should be little change in performance. When the matcher is connected in an already-matched line the effect on s.w.r. is slight, but noticeable. This is taken to mean that the matcher has an impedance of near 50 ohms, or is close to an electrical half-wavelength long, or both.

If the matcher is connected into a mismatched system (receiving or transmitting) the capacitors should be adjusted one at a time for lowest s.w.r. or best receiver sensitivity, going through the sequence several times, until no further improvement can be observed. Capacitor adjustment is more critical in high-s.w.r. applications, and it may be necessary to explore the minimum-s.w.r. position on each capacitor before getting started in the right direction.

Tests made on 144 Mc. indicate that the device will handle mismatches of 10:1 or more with ease. The following loads have been matched to show 1:1 s.w.r. on the line between the power source and the matcher:

25 feet of RG-58 cable, open or shorted at at the far end. The s.w.r. on this line section is so high that even 15 watts produces noticeable cable heating.

A rod antenna 5 inches long.

A 100-watt 115-volt lamp.

A particularly convincing demonstration uses a 144-Mc. transmitter capable of 150 to 200 watts output. First, this is adjusted for maximum

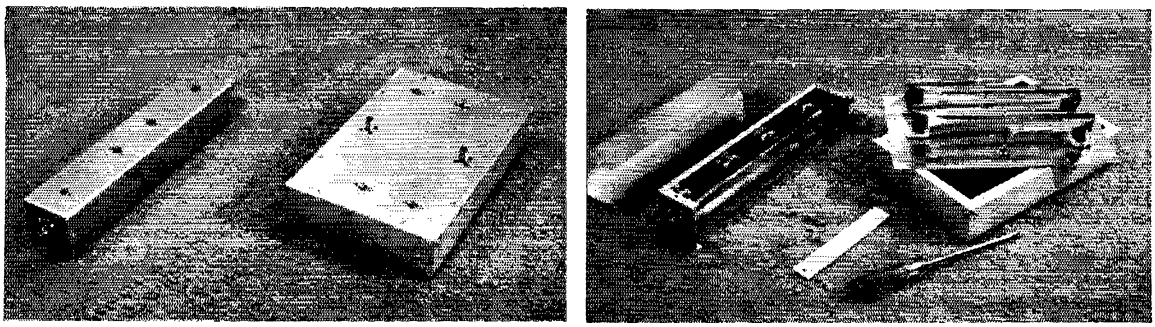


Fig. 3.—Working models of the C-line Matcher for 432 and 144 Mc. are built in standard cases. The 2-meter version is only 7 by 11 by 2 inches, overall.

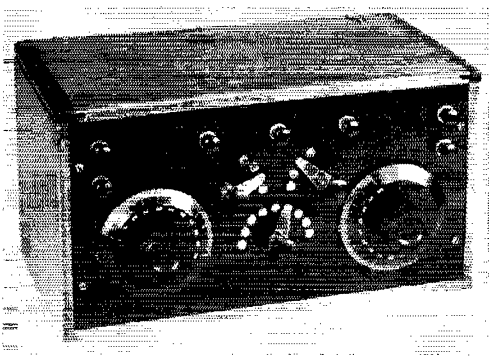
output into a 50-ohm dummy load. Then the transmitter is connected through 25 feet of RG-8 cable to a 100-watt lamp. The lamp gets slightly warm to the touch, but shows no glow in a lighted room. Next, the matcher is connected between the power source and the 25-foot line, and adjusted for minimum s.w.r. Now the lamp glows at perhaps one-third brilliance. Finally, the matcher is connected between the cable and the lamp, and adjusted while watching the lamp. As the adjustment approaches the 1:1 condition, the lamp brilliance increases rapidly — so rapidly that the test has to be terminated to prevent burnout!

In addition to showing the effectiveness of the matcher, this demonstration dramatizes a fact about matching devices all-too-often ignored by amateurs: the place to connect a matching device is at the *load end* of the line, not at the transmitter end. If the transmitter "sees" a bad mismatch initially, putting the matcher into the system at the transmitter end will make some improvement in performance, but the effect is the same as that of pruning the line for length. It will facilitate loading, and may improve reception, but it will not reduce line loss resulting from s.w.r., or improve the antenna performance. If the line is not properly matched to the antenna, putting the matcher between them and adjusting it properly will do both.

Both units shown have been tested at 500 volts d.c. without breakdown. The 432-Mc. matcher has not been operated above the 10-watt level, as my present "final" for that band is a varactor multiplier. The 144-Mc. model has handled 150 watts of r.f. power in a flat line, and 100 watts with considerable s.w.r., without breakdown or signs of heating. Insertion loss has not been measured accurately, but it is small, even in a perfectly matched system. In a mismatched system there is likely to be a marked "insertion gain."

It is customary for one or two of the capacitors in the matcher to produce all the improvement, while others do little, if anything. If the matcher makes no improvement, when used at the load end of the line, the system was pretty well matched already. But now you *know*! QST

From the Museum of Amateur Radio



Reinartz Tuner. This model of the "advanced" design of this famous tuner was built by K. B. Warner, W1EH. There is not much inside the cabinet except the all-important spider-web coil and the many taps leading to the switches, as well as the two variable condensers. This writer made one of these peachy rigs as soon as they were originally described. The regeneration control was smooth as silk. It covered from well below two hundred meters up through most of the broadcast band. With it, the fellows at 2BML, Harold Beverage's station at Riverhead, L.I. picked up the "George Washington," inward bound and with phone, long before it could be heard at all on an experimental superhet. Must have been plenty the matter with that bureau full of gear over in Weagant's shack!—*W1ANA*

A Tester For Crystals And Transistors

BY A. M. WILSON,* W1NPG

THERE is frequently a need for a test unit that will tell the constructor whether a transistor from the junk box is in good condition. Also, with surplus computer boards — many of which contain high-quality switching transistors — so readily available these days amateurs sometimes find themselves in a quandary when trying to determine the characteristics of such transistors; most computer-board semiconductors lack conventional identification numbers.

For these reasons the experimenter should have at least a simple "go no-go" tester similar to the one described in the 44th and 45th editions of *The Radio Amateur's Handbook*. Such a unit will show whether the transistor in question is an n-p-n or p-n-p type and whether it is leaky, open, or shorted, and also will give a relative indication of current gain. Unfortunately, these testers can only be used to determine d.c. characteristics. It would be handy to have a test unit that would give some indication of the r.f. capabilities of nondescript transistors.

The equipment described here will enable the experimenter to plug in any small-signal transistor, once its type is known (n-p-n or p-n-p), and get a rough check on how high in frequency it can be made to oscillate — up to, say, 30 Mc. If a transistor will oscillate readily at 25 or 30 Mc., it will probably work all right as an r.f. amplifier up to at least 3 or 4 Mc., or even higher. If it stops operating as an oscillator at, say, 4 Mc., chances are that it won't be effective as an amplifier much above 455 kc. Ordinarily, for best results, a transistor should have an f_T rating [1] of at least ten times the proposed operating frequency when it is to be used as an amplifier, but it usually will oscillate up to nearly its f_T. This tester will get the experimenter into the ball park as far as the usable operating frequencies of unknown transistors are concerned.

A tester of this kind is also useful for checking quartz crystals for activity. It will check both fundamental and overtone crystals. The more active the crystal, the higher the tester's meter reading. No meter deflection will usually mean that the crystal is defunct or extremely sluggish.

The tester can also be used as a signal generator for aligning receivers and wavemeters. All that is necessary is a number of spot-frequency crystals that will fall into the desired tuning range. By using the proper crystal frequencies, the unit can also be put to work as a band-edge spotter.

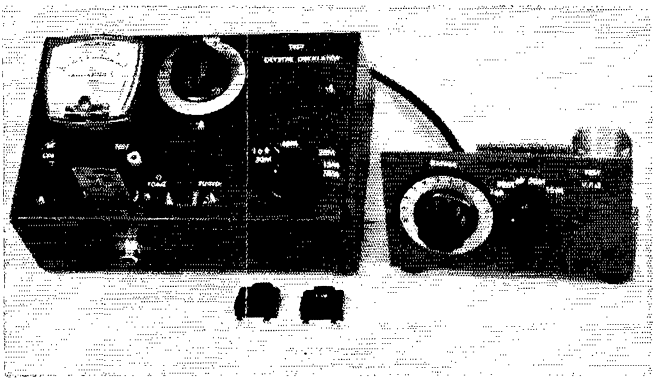
The Test Circuit

The test circuit is shown in Fig. 1. Various transistors, crystals, or tuned circuits can be plugged in for combinations appropriate to the type of test. A milliammeter, M_1, is used to measure the collector current of the transistor; changes in collector current as the tester controls are operated will cause corresponding fluctuations in the current registered by the meter. For checking crystals, the crystal is plugged into X_1, a crystal socket at Y_1 and S_1 is thrown to the indicated position for fundamental- or overtone-type crystals. For collector tuning, the proper frequency range is selected by S_3, while actual tuning is done with C_1. The behavior of the reading on M_1 as the tuning is varied is an indication of crystal activity.

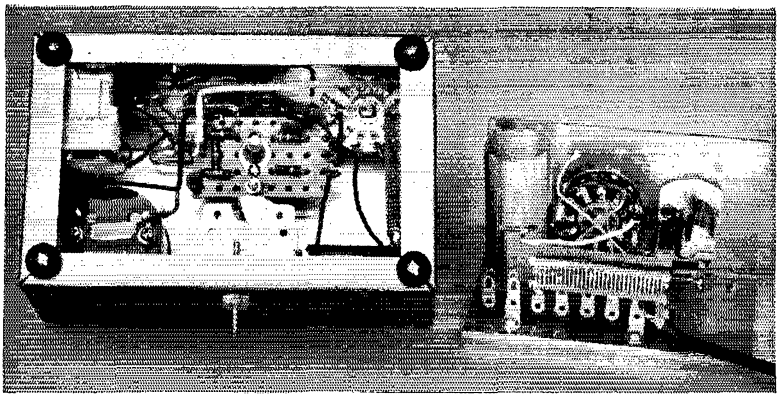
Unknown transistors are tested by plugging them in in place of the 2N706A used for crystal testing, and plugging a tunable circuit into J_1. This converts the oscillator into the self-controlled type so the highest frequency at which the transistor will oscillate can be determined.

* ARRL Technical Staff.

[1] The f_T rating of a transistor is the frequency at which the current gain in the common-emitter circuit is unity.



The crystal test oscillator, left, is converted into a self-excited oscillator circuit by plugging in the outboard tuned circuit at the right. This makes it useful for determining the maximum operating frequencies of transistors of unknown characteristics. Small capacitors mounted in 300-ohm line plugs (foreground) replace the crystal when the circuit operates as a v.f.o.



The internal layout of the oscillator. The transistor socket and associated resistors are on the small punched board in the center. Two crystal sockets are wired in parallel to take both the large and small crystal holders. The arrangement of the external tuned circuit is shown at the right.

For receiver alignment, output from the collector circuit is taken from the crystal oscillator through the 15-pf. capacitor shown in Fig. 1.

Construction

The photos can be used as a general guide when laying out the chassis. A 4 × 6 × 2-inch chassis was used for the model shown here. Other chassis sizes can be employed provided the leads in the r f portions of the circuit are kept short and direct. The layout is not particularly critical as far as the remainder of the wiring is concerned.

A 1¼ × 2-inch piece of perforated, unclad circuit board is used for mounting the socket for Q_1. It also contains the resistors and disk ceramic capacitors that are used in Fig. 1. The 9-volt battery, BT_1, is clamped to one end of the chassis, just above M_1. A small feed-through bushing is mounted on one wall of the chassis and is connected to the stator of C_1 by means of a 15-pf. capacitor. A short length of wire can be connected to the outer terminal of the bushing when the unit is being used as a signal generator. The wire will act as a small antenna so that the signal can be heard in a nearby receiver.

The external tuned circuit for v.f.o. operation

(Continued on page 150)

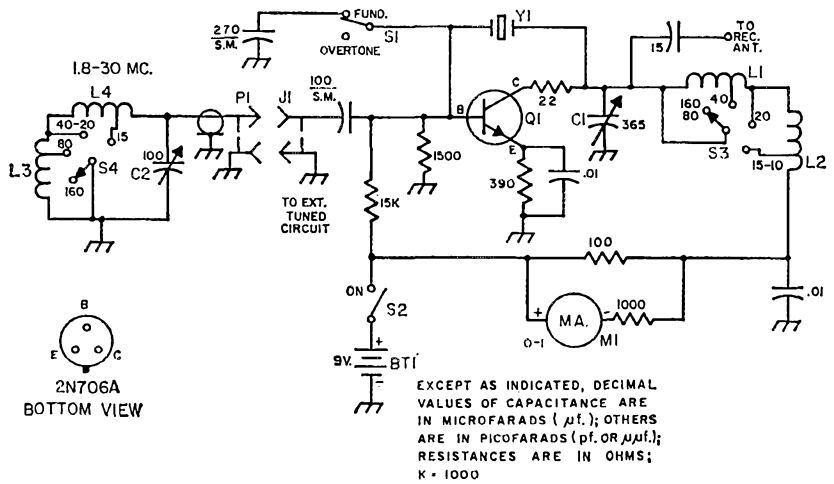


Fig. 1 — Circuit of the transistor test oscillator. Resistors are ½-watt composition. Except as indicated by S.M. (silver mica) fixed capacitors are disk ceramic.

BT_1—9-volt transistor battery.

C_1—365-pf. miniature variable, t.r.f. type.

C_2—100-pf. midget variable (Hammarlund APC-100B or equivalent).

J_1—Phono jack.

L_1—51 turns No. 24, ¾ inch diam., 32 turns per inch (B & W 3012 or equivalent); tapped 16 turns from L_2 end.

L_2—31 turns No. 20, ½ inch diam., 16 turns per inch (B & W 3003 or equivalent); tapped 8 turns from bottom (supply) end.

L_3—72 turns No. 24, 1 inch diam., 32 turns per inch (B & W 3016 or equivalent); tapped 32 turns from ground end.

L_4—31 turns No. 20, ½ inch diam., 16 turns per inch (B & W 3003 or equivalent); tapped 7 turns from C_2 end.

M_1—0-1 d.c. milliammeter.

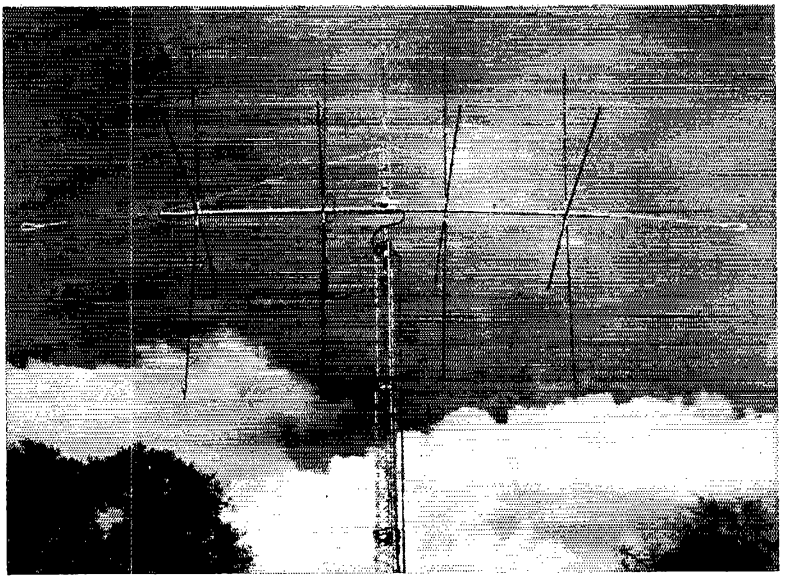
P_1—Phone plug.

Q_1—2N706A for testing crystals; otherwise, transistor being tested.

S_1, S_2—S.p.s.t. slide switch.

S_3, S_4—Single-pole phenolic rotary, 4 positions used (Centralab PA-6001 or equivalent).

Y_1—Crystal under test.



Simple extensions and loading coils convert the quad boom into a rotatable dipole for 40 meters.

The Two-Tailed Monster

Forty for Free

BY JOHN G. TROSTER,* W6ISQ

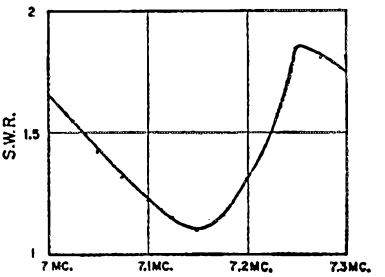
Here's an easy way for quad owners to work on 40 meters. Normal operation of the quad is in no way hampered.

THE "Monster" four-element triband quad shown in the picture is mounted on a motorized self-supporting tower which is run up above the 40-foot tree level when in use. After the operation, the Monster is snuggled back down inside its lair among the trees, where it is hidden from the menacing glances of the neighbors. Such now-you-see-it-now-you-don't tower transport, however, does not augur well for the permanent installation of an 80- or 40-meter wire antenna, such as the popular inverted-vee dipole, using the tower as the support.

Although operation on 10, 15, or 20 is preferred here, there are times, such as in a DX contest (for the glory of the Northern California DX Club) when it is fun to get on 40. So, an interesting challenge developed: how to add a simple 40-meter antenna to the existing quad structure?

In this particular case, there were certain requirements: the 40-meter antenna must not interfere with the normal operation of the quad, the turning radius must be less than 25 feet (because of surrounding trees), and it had to be lightweight, cheap, and simple to build and install.

Actually, it was the physical size of the Monster itself which suggested the possibility of loading the boom. And so the "Two-Tailed Monster" evolved — a 48-foot rotary dipole made resonant at 40 meters by adding loading coils and lineal extensions at each end of the boom. Such an arrangement is feasible because the boom is in a position looking "right down the bore" of the quad elements, at right angles



S.w.r. curve taken by the author.

*45 Laurel Ave., Atherton, California 94025.

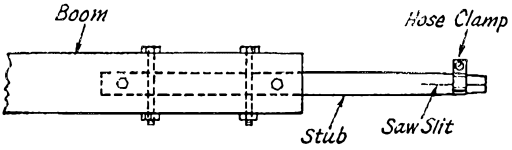


Fig. 1—A method of fastening small-diameter extensions to large-diameter booms. If the difference in diameters is not too great, a single bolt in each direction will suffice.

to the quad conductors. Furthermore, there is no electrical connection between the boom and the quad elements.

The center of the boom is grounded, of course, so an omega (or gamma) matching system is used to feed the dipole.

There is no reason why the same principle may not be applied to the shorter booms of two- and three-element quads. Similar loading to 80 meters is also a possibility.

Tail Construction

Details of construction will vary, depending on the dimensions of your boom, how much "tail" length you can afford to add, and what materials may be available to you. Of course, if it is possible to extend your boom to about 66 feet, no loading coils will be necessary for 40-meter operation. In making the tails, wind resistance should be minimized by using tubing no larger than is necessary to limit the sag to a reasonable dimension. Smaller-diameter tubing can be coupled to booms of large diameter by the method indicated in Fig. 1, and further reduction in weight and resistance may be gained by telescoping successively smaller diameters toward the ends of the tails. The annular space between the boom and the extension should be taped over to keep out rain (and snow, for you lucky fellas outside of W6-land).

Loading Coils

It is assumed, however, that the restrictions of space or mechanical strength will require the use of loading coils in most cases. But the longer the tails can be made, the smaller will be the loading coil required.

One method of mounting loading coils using standard available material is shown in Fig. 2. Here the boom stub is coupled to the boom in the manner shown in Fig. 1. The stub is a length of aluminum tuning 1⅛ inch o.d. with 0.058-inch wall. The stub is coupled to another section of tubing having the same o.d. and wall thickness by a length of 1-inch polystyrene rod (or paraffin-treated wood dowel), which provides the necessary insulation between the ends of the loading coil. The insulating rod can be about 6 inches long, inserted 2 inches at each end into the adjacent tubing. The end of each tubing section is split with a hacksaw, and the joints secured with stainless-steel hose clamps. It may be necessary to sand the insulating rod down a bit.

Following the loading-coil assembly, the diameter of the tail can be reduced to ¾ or ½ inch by the method shown in Fig. 1, and reduced still further by conventional telescoping. The diameters and approximate lengths used by the author are shown in Fig. 3. The last section is a loop of aluminum clothesline (or ground wire) bent into a loop. It is secured to the ¼-inch rod by means of a standard ¼-inch brass shaft coupling.

Matching Section

Fig. 4. shows two views of the omega matching section, and the connections to boom, gamma rod and coaxial line. The capacitors are mounted in a 6 × 6 × 6-inch utility box fastened to the boom mounting plate using a pair of right-angle brackets. A coax receptacle for the line connection is mounted in the bottom of the box, and a feed-through insulator for the gamma-rod connection in the front side of the box.

The gamma rod is supported from the boom in conventional style, using an insulated clamp near the box end, and an adjustable shorting clamp at the other end. The clamps are set at an angle of 45 degrees so that the rod will clear both the capacitor box and the quad spreaders since, in this instance, the quad elements have the "diamond" orientation. (With the "square" element orientation, the clamps would be set at right angles to the mast.)

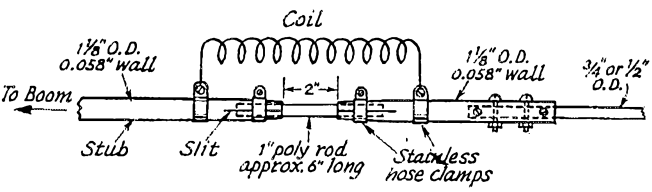


Fig. 2—A section of polystyrene rod or weatherproofed wood dowel can be used as an insulating section across the loading coils. The tails can be continued at smaller diameters as shown.

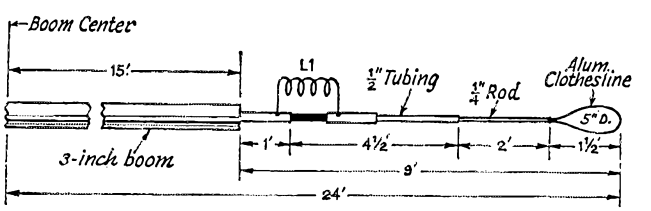


Fig. 3—Approximate dimensions used with the author's 30-foot boom for an overall length of 48 feet (24 feet each side of center). L_1 in this case is 21 turns No. 10 aluminum wire, 2½ inches in diameter, turns spaced to make the coil length 5 inches.

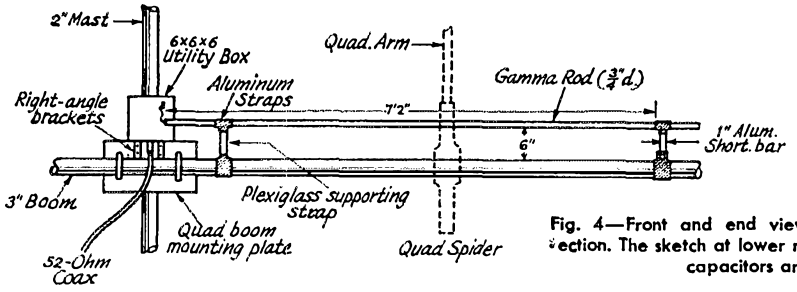
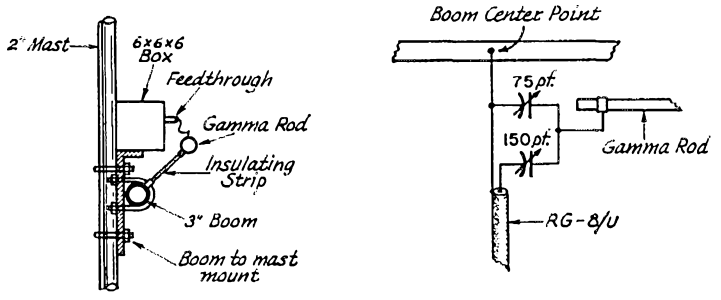


Fig. 4—Front and end views of the omega matching section. The sketch at lower right shows how the matching capacitors are connected.



Adjustment

After tails of the desired length have been added to the boom, place shorts across the coil insulators, and check the resonant frequency with a grid-dip oscillator. To get an indication, it was necessary to connect a wire from one end of the boom proper to the other, and make a two-turn g.d.o. coupling loop at the center of the wire. This may sound like an unorthodox way of doing it, but it did the job.

Checking resonance without the coils will give you a rough idea of how much coil you will have to add on each side. Then remove the shorts and try a pair of experimental coils, and check the resonance again. One or two coil changes should put you in the ball park. Final adjustment can be made by changing the lengths of the tails slightly. Then adjust the omega match for minimum s.w.r.

In the author's case, all adjustments were made with the boom atop a 6-foot stepladder, with only the quad spiders mounted. The match was adjusted by connecting an s.w.r. bridge directly at the omega input. The bridge was then fed with a low-power signal at the resonant frequency through a short length of 52-ohm line. The two capacitors and the shorting clamp on the gamma rod should be alternately adjusted to obtain minimum s.w.r. at the resonant frequency.

After the quad elements were completely assembled, raised and tuned (this took several months, if the truth were admitted), the 40-meter tails and matching system were reassembled on the boom according to the measurements previously made on the ground. In repeating the tuning procedure at a height of about 25 feet, only minor adjustments were found to be necessary. The tails were each shortened by an inch or two (not actually necessary), but the gamma-rod clamp had to be moved out about another foot, and the setting of the omega capacitor (connected to the coax shield) had to be increased by about 25 pf.

The fact that only minor adjustments were required from the initial test stage on the ground to the tower-mounted position is significant. It means that the builder may simulate the dipole (with wire or smaller-diameter tubing to represent the boom) and experiment on the ground with the coils, extensions and matching system with considerable confidence that these preliminary adjustments will hold reasonably close for the final arrangement on the tower. This could be important if your quad is now up in the air, and you don't want to take it down to experiment with such a system.

The dipole may be fed directly with 52-ohm coax, or through a relay which switches the line between the dipole and the quad driven elements.

Performance

The shortened dipole has been checked in contests, such as the VE/W, CD and DX contests, as well as in ragchews. It gives every indication of being competitive with any dipole, flat-top or inverted-vee variety. As with any 40-meter dipole, height above ground is probably a key factor. The higher it is, the better the performance to be expected.

The important consideration for an owner of a 2-, 3- or 4-element quad is that for the price of a little experimentation with available junk-box parts, a very competitive 40-meter antenna can be put together "for free" without sacrificing performance of the quad. QST

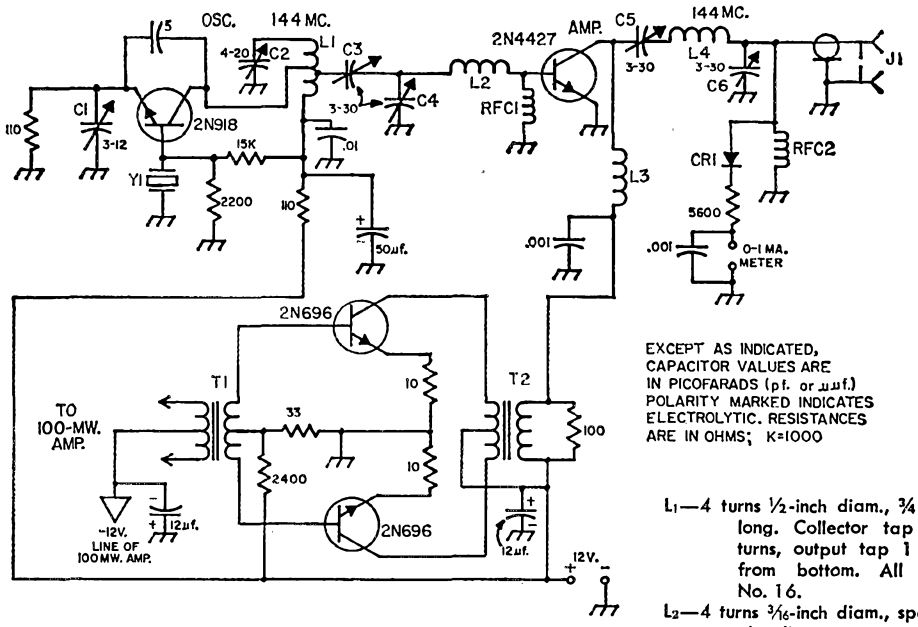
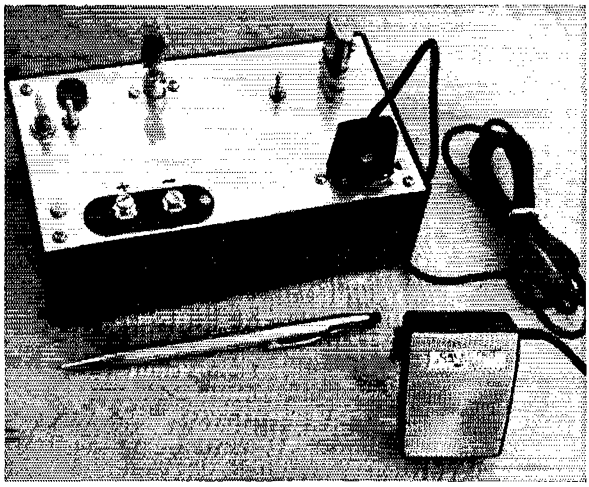


Fig. 1—Schematic diagram and parts information for the K6LZM transistor transmitter. The modulator stage shown is driven by a 100-mw. module, obtained ready-made.

C_1—3–12-pf. ceramic trimmer.
C_2—4–20-pf. ceramic trimmer.
C_3, C_4, C_5, C_6—3–30-pf. mica trimmer
CR_1—1N51 or similar v.h.f. diode.
J_1—Coaxial output fitting.
L_1—4 turns ½-inch diam., ¾ inch long. Collector tap 1½ turns, output tap 1 turn from bottom. All coils No. 16.
L_2—4 turns 3/16-inch diam., spaced wire diam.
L_3—2 turns ¼-inch diam., ¼ inch long.
L_4—4 turns ⅜ inch diam., ⅜ inch long.
RFC_1, RFC_2—2.2-μh. r.f. choke.
T_1—Primary 1000 ohms, secondary 500 ohms. Replaces 100-mw. output transformer.
T_2—Modulation transformer, ½-watt rating or more. Primary 1000 ohms, secondary 500 ohms.
Y_1—Ninth-overtone 144-Mc. crystal.



The K6LZM 2-meter transmitter, in its black plastic meter box, ready for use with only the addition of a 12-volt battery and an antenna. Tip jack, upper left, is for connection of a 1-ma. meter for monitoring relative output.

The 2T/2M

2 Transistors on 2 Meters

BY R. J. SCHLESINGER,* K6LZM

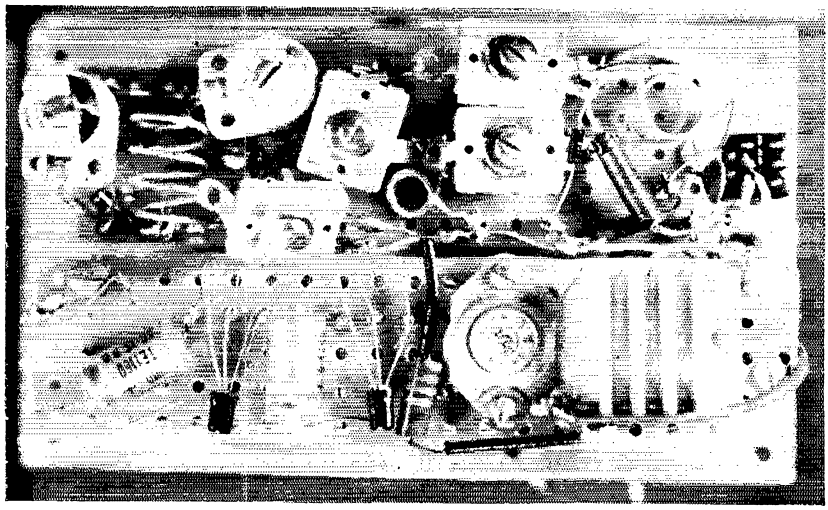
OVER the years, the author has experimented with low-power transmitters.[1] This latest consists of a two-transistor r.f. unit, running 1.2 watts input on two meters. It works so well, and is so easy to construct and adjust that it was thought worthy of a short article, for experimenters interested in the use of transistors on the higher frequencies.

Referring to Fig. 1, a 2N918 transistor operates as the oscillator using a ninth-overtone crystal[2] and delivers approximately 50 milliwatts directly on 144 Mc. This drives the 2N4427 as a straight-through amplifier. The final runs 100 milliamperes

* 5108 Melvin Ave., Tarzana, California 91356.

[1] Schlesinger, "A One-Tube Two-Meter Rig with Transistor Modulator," *QST*, June, 1957.
K6LZM's Transistor Station, "Strays," *QST*, January 1967, p. 96.

[2] Ninth-overtone crystals for this operation can be supplied by Midland-Wright Corp., 3151 Fiberglas Road, Kansas City, Kansas 66115.



Interior of the 2-meter transistor rig, with the modulator of Fig. 2 installed. Oscillator portion of the upper left.

at 12 volts. The transistors sell for approximately $3.00 each and are capable of good performance up to 500 Mc. A 2N706 will also work well in the oscillator circuit and is inexpensive and universally available.

The 2N4427 was used for a while as a modulated oscillator for ATV (amateur TV) transmissions on 440 Mc., and it worked well at this frequency. This is mentioned to point out that another 2N4427 operating as a tripler could be driven by the circuit shown, to provide a three-transistor 432-Mc. signal. It could then be modulated by video for amateur television transmission, or by the modulator shown, for a.m.

Any transistorized amplifier capable of delivering 500 milliwatts into approximately a 100-ohm load will serve as a modulator. Two different modulator schemes were tried by the author. In one, a transistor amplifier capable of 100 milliwatts output was modified by the addition of push-pull 2N696 transistors, to raise the power level to the required value. This approach was used since these amplifiers are inexpensive and obtainable almost everywhere. Only the 2N696 stage is shown in Fig. 1. The original output transformer in the amplifier had an 8-ohm secondary, meant to drive a speaker. This was replaced with one more closely matching the input base impedance of the 2N696s. If a total modulator is built from scratch, push-pull 2SB56s, as used in most 100-milliwatt amplifiers, are not needed to drive the 2N696 modulators to the 500-milliwatt output required, but the approach taken here was quick and simple. It is better to have a little extra audio power available than not enough!

The second modulator was designed from scratch and a minimum number of transistors was employed. The schematic for the audio amplifier designed specifically to modulate this r.f. deck is shown in Fig. 2. This unit worked extremely well in this application. Adequate modulation percentage was obtained with only collector modulation on the 2N4427. Since it was desired to maintain maximum crystal control stability, the base of the 2N4427 was not modulated, to reduce the chance of any undesirable frequency modulation resulting from coupling back to the oscillator stage. The photograph shows the final unit employing the 2N1183 modulator system.

Either transmitter will fit in a 6 × 4 × 2-inch Bakelite meter case and can be slipped into a briefcase for trips, or placed in the glove compartment of a car for mobile work. QST

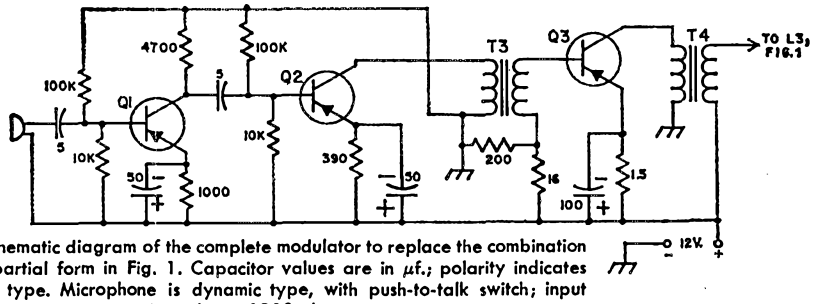


Fig. 2—Schematic diagram of the complete modulator to replace the combination shown in partial form in Fig. 1. Capacitor values are in μf.; polarity indicates electrolytic type. Microphone is dynamic type, with push-to-talk switch; input impedance 1300 ohms.

Q_1, Q_2—2N133 or 2N1414.
Q_3—2N1183, in heat sink.
T_3—Primary 10,000 ohms, secondary 1000 ohms. Center taps, if any, not used.
T_4—Primary and secondary 100 ohms, ½-watt rating or more.

Notes on the "Vacation Special"

A Tunable I.F. Filter for the BC-454 And An Improved 50-Watt Transistor Modulator for the BC-696

BY R. F. LATTER,* W2YFM

THIS article describes two improvements which have greatly extended the usefulness of the "Vacation Special."[1] A simple tunable i.f. filter was added to the BC-454 receiver to increase the set's selectivity, and modifications were made to the transistor modulator to increase the output from 30 to 50 watts so that the Vacation Special would have a greater range on a.m. phone.

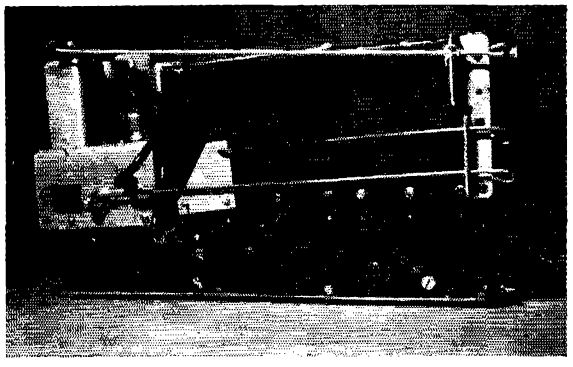
Tunable I.F. Filter

Fig. 1 shows the circuit of the i.f. filter and the modifications necessary to the BC-454 receiver. S_{10}, a d.p.d.t. slide switch, determines whether the secondary, L_{11}, of the third 1415-kHz. i.f. transformer is connected in its normal fashion or to the filter. When the filter is switched in, the receiver's 1415-kHz. i.f. signal is converted to 455 kHz. in V_{1A} and then passed through crystal filter Y_1Y_2 to a 455-kHz. i.f. amplifier, V_{2A}. The signal is detected by CR_{13} and CR_{11}, and the resulting audio is amplified by V_{2B} and fed to the grid of the 12A6 audio amplifier. S_{11} is used to remove power from the filter when the circuit is not needed.

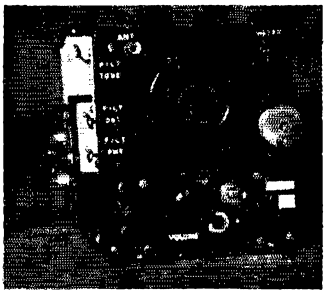
Fig. 2 and the photographs show the location of the filter's major components and the control linkages. The filter fits in the space formerly occupied by the dynamotor, and power for the modified BC-454 is supplied through the socket in the back of the receiver. A simple lever was made from a 1½-inch length of scrap aluminum, and one end was secured with two 6-32 nuts to the slug in T_8. A hole was drilled in the lever's opposite end to accommodate a length of heavy steel wire from a clothes hanger. The wire was secured to the lever, and then it was extended beyond the front panel through an L-shaped aluminum bracket that had been drilled to fit under the existing machine screws that fastened the aluminum cover to the front panel. A simple loop handle was made at the free end of the wire.

*179 Pittsford Way, New Providence, New Jersey 07974.

[1] Latter, "The 'Vacation Special,'" *QST*, May, 1967.



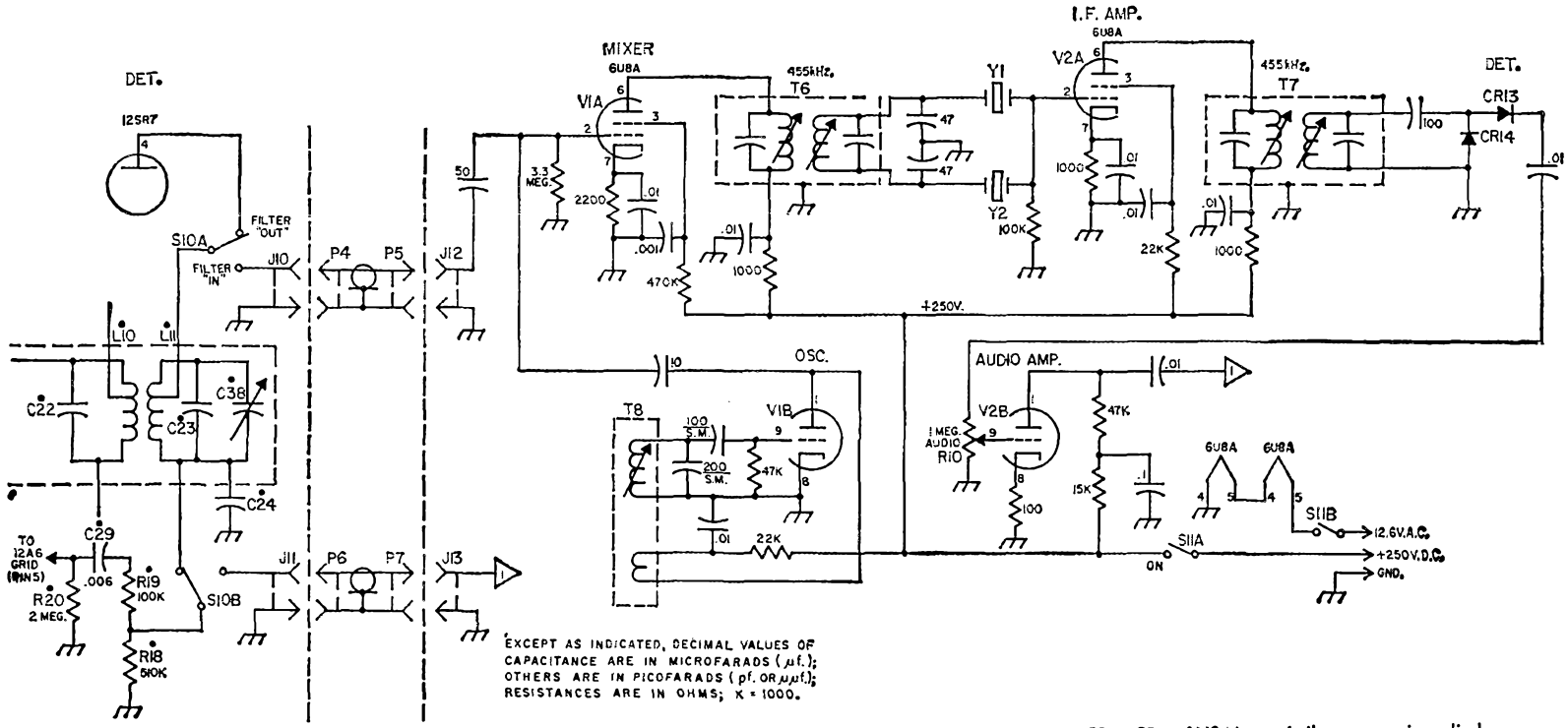
Side view of the BC-454 showing the tunable i.f. filter at the rear of the unit and the mechanical linkages used to operate the filter.



A look at the front panel of the modified BC-454. As the labels at the left indicate, the top linkage (T_8) tunes the filter, the middle linkage (S_{10}) switches the filter in and out of the circuit, and the bottom linkage (S_{11}) controls power to the filter.

Similar arrangements were used to extend S_{10} and S_{11} so that they would be accessible from the front panel. In order to transform the vertical action of S_{10} to horizontal motion, the small triangular aluminum bracket shown in the side-view photograph was attached to the cabinet in such a way that the bracket could use a convenient cover-fastening machine screw as a pivot. A short piece of coat-hanger wire was bent around S_{10} and connected to the bottom of the bracket, and a longer section of the wire was extended from the bracket to the front panel. The coat-hanger linkage for S_{11} was simply bent around the ball handle with a pair of long-nose pliers. J_{10} was mounted on one side of the receiver near J_{12} (Fig. 2), and J_{11} was mounted on the other side near J_{13}.

It is best to initially aligned the unit with a signal generator. After T_8 is adjusted so that V_{1B} oscillates at about 965 kHz., feed a 1415-kHz. unmodulated signal in J_{12}. With the b.f.o. turned on, adjust T_6 for best skirt selectivity, tuning the set first to receive upper sideband and then lower sideband. If possible, before a final section is made, try different sets of crys-



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μf.); OTHERS ARE IN PICOFARADS (pf. OR μμf.); RESISTANCES ARE IN OHMS; K = 1000.

Fig. 1—Partial diagram of the BC-454, and the schematic of a tunable i.f. filter for the receiver. Components marked with a black dot are original parts and bear original identification numbers for ease of following the circuit. Capacitors marked SM are silver mica; others are disk ceramic, except a 0.1-μf. capacitor which is paper. Resistors are ½-watt composition. RG-58/U, RG-59/U, or low-capacitance audio cable can be used between P_4 and P_5 and between P_6 and P_7. Mechanical linkages from the front panel of the receiver tune T_8's primary and switch S_{11} and S_{11}.

CR_{13}, CR_{14}—1N34A or similar germanium diode.
J_{10}, J_{11}, J_{12}, J_{13}—Phono jack.
P_4, P_5, P_6, P_7—Phono plug.
R_{10}—1-megohm audio-taper control.
S_{10}—D.p.d.t. slide switch.
S_{11}—D.p.s.t. toggle switch.
T_6, T_7—455-kHz. i.f. transformer (Lafayette 32 H 0946).
T_8—965-kHz. oscillator coil (Miller A-320-C).
Y_1—448.666 kHz. (Channel 323 surplus l.f. crystal).
Y_2—450.000 kHz. (Channel 324 surplus l.f. crystal).

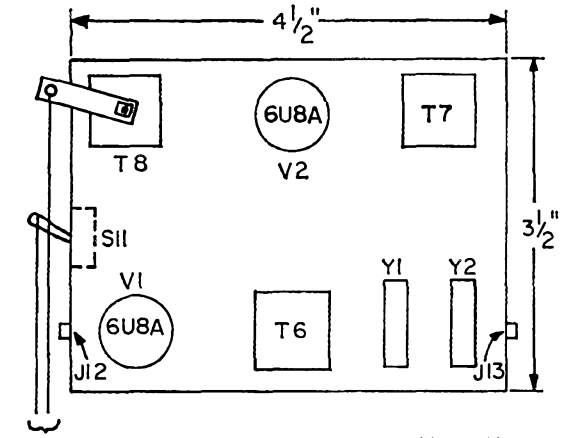


Fig. 2—Parts layout of the tunable i.f. filter.

tals and note the performance of the filter when s.s.b. signals are tuned in. Be sure to adjust the mechanical linkage to T_8 so that the tuning range is optimum, and adjust control R_{10} so that signal levels are nearly the same with the filter in the circuit as with it out. Finally, label the front panel controls as shown in one of the photographs.

When the set is properly aligned, single-signal reception is possible; however, for best results, since ARC-5 receivers do not have a.g.c., manually reduce the receiver gain when loud signals are present.

Modulator Modifications

In response to a conviction that increased audio power would extend the range of the Vacation Special, tests were made which showed that the Class B 2N174s overloaded at a measured output level of 25 to 30 watts. Each of the existing 2N174s was then paralleled with another 2N174, and a 2.5-volt, 10-ampere filament transformer substituted for the original modulation transformer. These changes resulted in good waveform at 50 watts or so output measured across a 5000-ohm resistive load.

The modified modulator was connected to the Vacation Special, and the BC-696 transmitter loaded up to 75 watts; however, the results were little better than before, and the waveform was oddly unsymmetrical. Realizing that this might be due to d.c. saturation of the modulation transformer, I added C_{10} and L_4 (Fig. 3), and the problems described disappeared. Further improvement was made by substituting a 1000-μf. filter capacitor, C_9, for a 50-μf. unit in the original circuit. This eliminated a small amount of hum from a battery charger when the Vacation Special was used as a standby emergency rig. CR_{15} was added to eliminate the undesirably

(*Continued on page 160*)

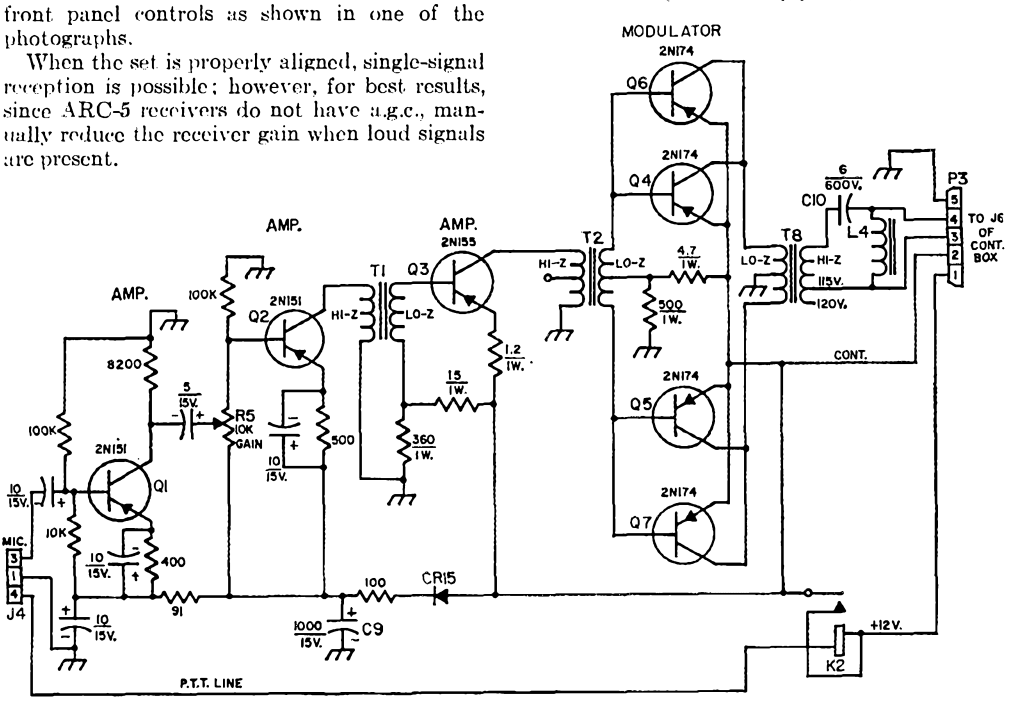


Fig. 3—Circuit of the modified solid-state modulator. Capacitors are electrolytic, except C_{10} which is oil filled. Capacitance is in μf. Resistance is in ohms; K = 1000. Resistors are ½-watt unless otherwise noted.

C_{10}—For text reference.
CR_{15}—Silicon, 50 p.i.v., 750 ma.
J_4—3-terminal microphone jack.
K_2—12-volt d.c. relay, s.p.s.t. with 10-amp. contacts.
L_4—8-henry 150-ma. filter choke.
P_3—5-pin male plug (Amphenol 78RS5).
R_5—10,000-ohm audio-taper control.
T_1—Driver transformer, 10,000-ohm primary to 1000-ohm secondary (Lafayette 99 H 6124 suitable).
T_2—Driver transformer, 48-ohm primary to 16-ohm secondary (Thordarson TR-61 or equivalent).
T_8—Modulation transformer, 115-volt primary, 2.5-volt at 10-amp. secondary (Stancor P6454 filament transformer or equivalent).

Inductance And Q of Modified Surplus Toroidal Inductors

BY EDWARD E. WETHERHOLD,* W3NQN

The inexpensive 88- and 44-mh. toroidal inductors that have been so widely used in amateur RTTY filters are useful in other filter applications, too, because of their small size, negligible external field, and high Q. They can be easily modified to obtain a considerable range of inductance values for particular filter designs, as described in this article.

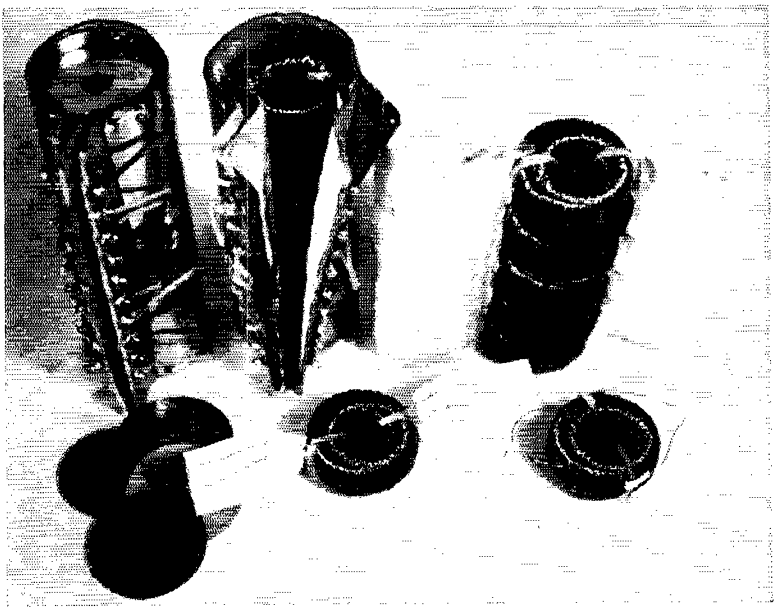
THE modern network synthesis[1] method is capable of producing filter designs which in many ways are superior to those produced by the usual image-parameter design method. Of the several modern filter types available, such as the Butterworth, Chebishev, elliptic-function (also known as Chebishev-Cauer), and others, the elliptic-function type appears to be best suited for amateur radio applications because of its sharp selectivity and because it is possible to predetermine the passband and stopband attenuation response so that it does not exceed a specified maximum value in the passband and does not drop below a specified minimum value in the stopband[2]. However, to realize the optimum performance possible with the elliptic-function filter, it is necessary that high-Q (50 or more) inductors be used. In the r.f. range, where air-core inductors are generally used, there is usually no problem in obtaining the required inductor Q; however, in the audio range, special and costly toroidal or cup-core inductors are necessary. Fortunately, surplus 44- and 88-mh. toroidal inductors are available to the amateur at reasonable prices. These unpotted toroidal inductors have acceptable Q above 1 kc. for application in elliptic-function filter designs and, in addition, by the simple removal of turns, these inductors can provide any value of inductance less than 88 mh.

This article, in addition to discussing some of the surplus inductor characteristics, will provide a tabulation of inductance versus turns removed which will be useful in determining how the odd values of inductance required by the modern design of elliptic-function filters may be obtained easily and inexpensively.

* Honeywell, Inc., Annapolis Operation, Test Instruments Div., P.O. Box 391, Annapolis, Maryland 21404.

[1] Wetherhold, "An Amateur Application of Modern Filter Design," *QST*, July, 1966.

[2] Since a specific minimum stopband attenuation is required in most filter applications, any excess attenuation in the filter performance is obtained at the expense of the filter performance in the remainder of its frequency range. In the design of the elliptic-function filter, it is possible to control the stopband attenuation to meet the specific minimum attenuation desired and thereby obtain a theoretically optimum response. This reasoning has been substantiated by analysis and experimentation and is discussed in the article "Elliptic-Function Low-Loss Filter to the Rescue!" by Rubinstein and Sleven, *Microwaves*, December, 1966.



The inductor package as received, top left, and steps in removing one inductor from the package. The two coils have been connected in parallel in the inductor assembly at the lower right. Note that the two leads with sleeving are connected together, as are also the two leads without sleeving.

Preparation of Toroidal Inductors

The toroidal inductors used by the author for this study were obtained from Buchanan[3] at the relatively low price of $1.50 postpaid for a package of five inductors of a single type of either the 44- or 88-mh. value. The accompanying photograph shows the inductor package as received and illustrates the steps that are required until one inductor is ready for use. After the cylindrical metal protective cover is removed, the adhesive tape backing is cut to remove one inductor from the stack. The tape is then carefully pulled off from the four leads and the inductor is then ready to have its leads tinned. If an inductance value other than the unmodified value is desired, turns must be removed until the desired value is reached.

The author has noted three different types of insulation used on the windings of the many inductors purchased over the past two years, and each type of insulation responds best to a particular removal procedure. The green-colored insulation appears to be unaffected by either heat or the standard corrosive stripping paste, and the most convenient removal procedure is that of scraping the insulation off with a razor blade. The bronze-colored insulation is conveniently removed with General Cement's "Strip-X," No. 26-2 (2 oz. bottle for $0.78). The third insulation type, a reddish-bronze shade, is easiest of all to strip since all that is required is heating the wire to be tinned with a hot soldering iron while flushing with a little solder. The insulation vaporizes, leaving the wire tinned and ready for connection.

[3] Elliott Buchanan & Associates, Inc. 1067 Mandana Boulevard, Oakland, California 94610. On the East Coast, the inductors are obtainable from L. S. Van't Slot, 302Z Passaic Ave., Stirling, N. J. 07980. A number of additional sources of supply can be found in "Ham-Ads" each month in *QST*.

TABLE 1.

Tabulation of Inductance vs. Turns Removed For 88/22 mh. And 44/11 mh. Toroidal Inductors

Number of Turns Removed		*Inductance in Millihenrys*			
		Connection of 22-mh. Windings (on 88-mh. Inductor)		*Connection of 11-mh. Windings (on 44-mh. Inductor)*	
From Each Winding	*From Inductor (Total)*	*Series*	*Parallel*	*Series*	*Parallel*
0	0	88.0	22.0	43.6	10.9
10	20	83.6	20.9	40.4	10.1
20	40	79.2	19.8	37.4	9.35
30	60	74.8	18.7	34.4	8.60
40	80	70.6	17.7	31.6	7.90
50	100	66.4	16.6	28.8	7.20
60	120	62.2	15.6	26.2	6.55
70	140	58.2	14.6	23.8	5.95
80	160	54.4	13.6	21.4	5.35
90	180	50.8	12.7	19.2	4.80
100	200	47.2	11.8	17.1	4.28
110	220	43.8	11.0	15.2	3.80
120	240	40.6	10.2	13.4	3.35
130	260	37.6	9.40	11.6	2.90
140	280	34.6	8.65	10.0	2.50
150	300	31.8	7.95	—	—
160	320	29.0	7.25	—	—
170	340	26.4	6.60	—	—
180	360	23.9	5.98	—	—
190	380	21.5	5.38	—	—

Inductance Versus Turns Removed

Each 44- and 88-mh. inductor has two separate windings which are separated by two spacers visible on the toroidal inductors shown in the photograph. The two windings may be connected either in parallel or series aiding. One inductor type provides 44 mh. with series connected windings and 11 mh. with parallel connected windings; the other provides 88 and 22 mh. for the series and parallel connections, respectively. (Note that when the effective inductor turns are reduced by ½ by changing from the series to the parallel winding connection the inductance is reduced to ¼ of its original value since inductance varies as the square of the turns.)

Very seldom will the inductance requirements for a filter design be the convenient values of 88, 44, 22, or 11 mh. unless special efforts are made to control the design results. More likely, odd values greater than 8 mh. will be required if a standard termination impedance of 500 or 600 ohms is desired[4]. In these instances, the odd inductance values can be obtained from the surplus inductors simply by removing the proper number of turns. The relationship between inductance and turns removed for both the 44/11 and 88/22 mh. inductors is given in Table I for either the series or parallel connections. If an inductance between two tabulated values is desired, the corresponding turns removed can be obtained by simple straight-line interpolation. For example, for an inductance of 60 mh. the number of turns to be removed from each 22-mh. winding of an 88/22 mh. inductor with series-connected windings is 65.5 turns. Since the removal of ½ turn is not convenient, 65 turns should be removed from one winding and 66 turns from the other winding. It is recommended that the same number of turns be removed from each winding to maintain balance, although for the series winding connection the desired inductance probably could still be obtained if the total number of turns were removed from only one winding.

Using Table I, the filter designer is able to obtain any inductance value between 2.5 and 88 mh. with only one toroidal inductor. Of course, inductance values greater than 88 mh. can be obtained simply by adding additional inductors in series; however, this becomes increasingly impractical as the desired inductance values become larger. Two 88-mh. inductors can be conveniently stacked vertically and held together with a single 2-inch 6-32 machine screw in a minimum of mounting area to make a 176-mh. inductor. In the author's opinion, this is the largest value that should be used in a filter design requiring two or more inductances; otherwise, too much space will be required for the entire filter. If the results of the initial filter-design calculations require inductance values too large to be practical because of space limitations, the filter source and load resistance values can be reduced and the inductance design values will be reduced in the same proportion to a more convenient value, preferably (for example) to 88 mh. Of course, the capacitance values will be increased by the inverse proportion but this may or may not be more of a problem than obtaining the inductance values. There are many variables to consider in realizing a practical and optimum filter design and the data of Table I is presented in the hopes of simplifying this task.

All inductances were measured to an accuracy of ± 1% with a Hewlett-Packard 4260A Universal Bridge. There should be no difficulty in obtaining any inductance value within the limits of the tabulated data to an accuracy of better than 3 percent, which will be adequate for the use of these inductors in a modern-design filter.

Q Versus Inductance

As previously stated, the use of high-Q inductors is necessary in constructing the elliptic-function filter if the calculated performance characteristics are to be achieved. Consequently, some knowledge of how the inductor Q varies with inductance is useful. The relationship of Q versus inductance of the 88/22 and 44/11 mh. inductors in the series and parallel winding arrangement was measured and the results are shown by the curves in Fig. 1. From these curves and by following the shift from one curve to the next as indicated by the arrows joining the curves, one can quickly determine how to obtain the highest value of Q for a particular inductance value. Note that a Q at 1 kc. of better than 30 is possible over the inductance range of 4.4 mh. to 88 mh. by using either the 44/11 or 88/22 mh. inductors in their optimum inductance range. This value of Q, 30 or more, should be adequate to produce satisfactory performance in the average elliptic-function filter design where the nearest stopband frequency is separated from the

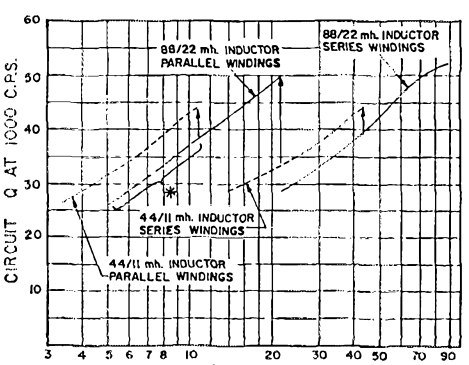


Fig. 1—Circuit Q versus inductance, for series and parallel arrangements of both 44- and 88-mh. inductors modified as described in the text. The portion marked with an asterisk was extrapolated from the upper part of the 88/22 mh. curve.

[4] For example, see the low-pass filter design on page 51, *QST*, November 1967, or the bandpass filter design on page 23, *QST*, August 1967, where the standard termination values of 500 and 600 ohms were used.

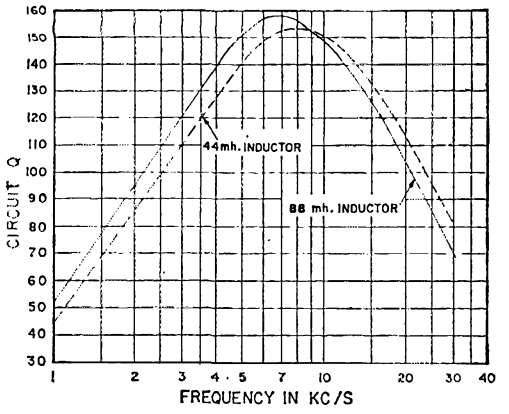


Fig. 2—Circuit Q versus frequency, for unmodified 44- and 88 mh.-inductors. The series connection was used in both cases

cutoff frequency by about one octave. As a matter of fact, an inductor Q of even 20 will still be adequate for this particular attenuation response slope, but the attenuation peaks probably will be quite rounded or even missing. If a steeper attenuation response slope is desired, correspondingly higher inductor Q will be needed to achieve the desired response.

An interesting fact, obvious from Fig. 1, is that a distinct but not substantial increase in Q is possible in the 3- to 11- and 22- to 44-mh. ranges by changing from the 88/22 mh. inductor to the 44/11 mh. inductor. Before the comparative evaluation was made between the two inductor types, the author incorrectly assumed that a substantial increase in Q would result by using the 44/11 mh. inductor instead of the 88/22 mh. inductor over these ranges, but this was determined not to be the case. The 44/11 inductor Q is higher than the 88/22 inductor Q only by a factor of about 1.15 in the inductance ranges mentioned — not a sufficient increase to warrant the separate purchase of the 44/11 mh. inductor if extra 88/22 mh. inductors are on hand. The latter can be easily modified by removal of turns to cover the 5.4- to 88-mh. range and still provide a value of Q that generally will be adequate. Nevertheless, the 44/11 mh. inductor does provide an inexpensive and convenient way of improving inductor Q and should be used whenever possible.

Only one winding of either the 88/22 or 44/11 mh. inductor may be used to obtain 22 or 11 mh., respectively; however, if this is done, the inductor Q will be approximately only one-half the value possible with the parallel winding connection. As compared to the use of only one winding, the use of two windings in parallel reduces the inductor resistances by half although the effective number of turns (which determines inductance) is not changed. The lead connections for the parallel winding connection are shown in the photograph.

Q Versus Frequency

The Q versus frequency of the two inductors in the series winding connection was evaluated from 1 kc. to 30 kc. and the results are shown by the curves of Fig. 2. Both inductors have Q's above 40 between 1 and 40 kc., with the Q peaking at about 150 between 5 and 10 kc. The Q-curve for the parallel winding connection of both inductors was essentially the same as for the series connection.

Therefore, if it is desired to apply these inductors in the construction of a modern-design filter where high Q is important, the significant frequency parameters of the filter, such as the cut-off and peak attenuation frequencies, preferably should be chosen to be greater than 1 kc. and less than 40 kc. If this is done, the expected and desired roll-off and sharp attenuation peaks in the filter response will generally result. For example, note the relative attenuation response of the previously mentioned references,[4] where the critical frequency parameters are all above 1 kc. except in one instance where the low-frequency peak attenuation of the bandpass filter is at 632 c.p.s.

Procedure Used in Measuring Inductor Q

The inductor Q for the curves of Figs. 1 and 2 was measured with a Type 260-A Boonton Q-meter, using auxiliary resonating capacitors (Heathkit Capacitance Decade, Model DC-1 with additional outboard mylar capacitors when necessary) and an external audio oscillator. The Q-meter operates on the principle of comparing the resonant-frequency voltage peak, E, (measured across the resonating capacitor in series with the inductor being evaluated) with the voltage, e, induced into the series resonant circuit. The circuit Q is then equal to E/e and is essentially the inductor Q if resonating capacitors of low dissipation relative to the inductor dissipation are used. The fact that circuit Q is actually being measured accounts for the vertical axis label of "Circuit Q" on the two curve sheets. Although the Boonton Q-meter is optimized for use between 50 kc. and 50 Mc., it is possible to determine Q below 50 kc. if the proper correction factor is applied to the indicated Q. For example, the correction factor employed at 1 kc. was 1.23.

Conclusion

By using the data presented in this article, the reader will be able to apply the surplus low-cost toroidal inductors more intelligently in the construction of high-performance modern-design audio filters. The combination of Geffe's book[5] and the surplus toroidal inductors now makes it possible for the progressive radio amateur to design and construct audio filters (above 1 kc.) which will provide state-of-the-art performance. QST

[5] Geffe, "Simplified Modern Filter Design," John F. Rider Publisher, Inc., New York City, 1963.

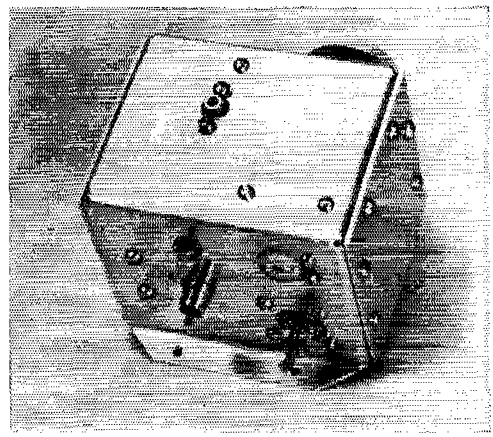
A General-Purpose V.F.O.

THE v.f.o. described here is capable of delivering approximately 3-volts peak output into a low-impedance load. It can be fed into a vacuum-tube or transistor amplifier stage if additional output is required. Coil data is given for the popular tuning ranges used with most modern communications equipment.

Circuit Details

Two bipolar transistors, Q_1 and Q_2 (Fig. 1), are used. Q_1 is used in a Colpitts circuit; Q_2 performs as an emitter-follower for purposes of isolation. R_4, a parasitic-suppressor resistor, was required to clean up some random oscillation which resulted from the use of a high-beta transistor at Q_1.

Though the circuit is shown for use from a 150-volt d.c. line (VR-150 or 0A2 regulator line recommended) in the station receiver or exciter, it can be operated from a 12-volt source as well. If this is done, the 7500-ohm 10-watt resistor between the power supply and CR_1 should be changed to a 100-ohm 1-watt unit. Similarly, other operating voltages can be used if the dropping resistor is changed to a value that enables CR_1 to draw approximately 20 milliamperes of current. C_{11}, the feedthrough capacitor, should be mounted on the v.f.o. case and used as a B-plus connector, thus helping to filter the power lead at r.f. level.



View of the back side of the v.f.o. A phono connector is used as an output jack. A feedthrough capacitor is used as a B-plus connector, and is located just above the output jack. L_1 is mounted to the right of J_1, just below trimmer capacitor C_6. Trimmer capacitor C_7 is accessible from the top of the case.

Construction

Mechanical rigidity is always important if a v.f.o. is to be a useful unit. In the accompanying photos it can be seen that considerable attention has been given to the matter of

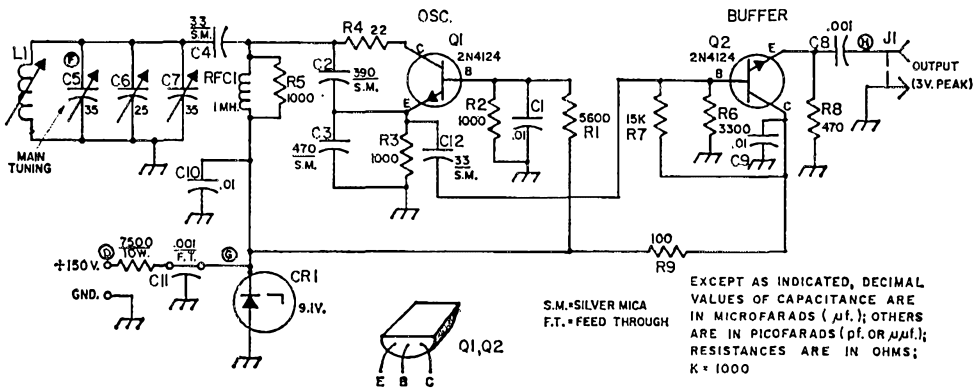


Fig. 1—Schematic diagram of the v.f.o. Fixed-value capacitors are disk ceramic except C_{11} which is a feedthrough type. Resistors are ½-watt composition unless noted otherwise. All parts carry numbers for identification purposes on the circuit-board template. Significant parts are listed below.

C_5—Miniature double-bearing 35-pf. capacitor (James Millen 21035 MK). See text.

C_6—5 to 25-pf. ceramic trimmer, type NP0. (Erie type 557).

C_7—Miniature 35-pf. variable (James Millen 26035).

CR_1—9.1-volt 1-watt Zener diode (GE Z4XL9.1 or similar).

J_1—Phono connector, chassis mounting.

L_1—See Table I.

RFC_1—Subminiature 1-mh. r.f. choke (J. W. Miller 73F103AF).

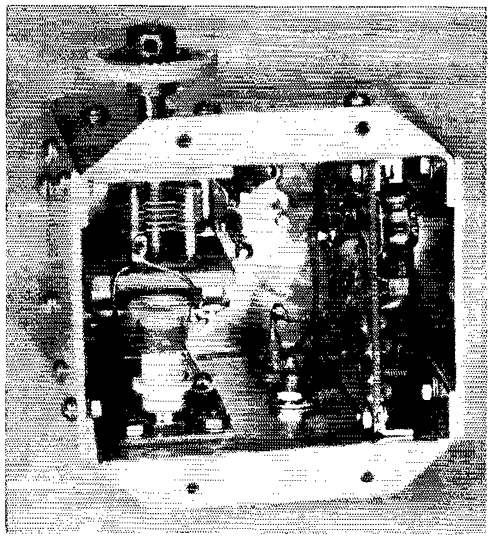
structural soundness. Aluminum sheeting, 1/16 inch thick, was used to form the chassis and side plates for the v.f.o. All bending was done on a sheet-metal brake, but the parts could have been formed by hand while using a rawhide hammer and a bench vise. A local machine- or sheet-metal shop will often bend a chassis for a couple of dollars or less if the stock is precut and marked when they receive it. Alternatively, a utility box can be used as a v.f.o. housing and its walls reinforced by adding thick aluminum covers in place of those supplied. The actual size of the v.f.o. case is not particularly important provided all of the parts can be installed conveniently. The box shown here is 2¾ inches high, 2½ inches wide, and 3½ inches long. The etched-circuit board measures 2½ × 2¾ inches.[1]

V.f.o. inductor L_1 is mounted on the rear wall of the box, but is insulated from the enclosure by a small piece of insulating board which is centered over a ⅝-inch diameter hole. This method of mounting prevents the slug of L_1 from being affected by chassis heating when the v.f.o. is used as an integral part of a vacuum-tube exciter or receiver. If the thermal path is not broken up in this fashion, a drift problem often results.

A James Millen 39016 anti-backlash flexible coupling is used between the shaft of C_5 and the dial mechanism to lessen stress on the v.f.o. box and main-tuning capacitor. A Millen 10037 slide-rule dial drive can be used with this v.f.o. as was done with the W2YM IGFET v.f.o.[2] A dial mechanism from a war surplus TU-17 tuning unit can also be used if a less-costly, more-compact dial is desired. A smoother tuning assembly will result if a Millen 28035 MKBB variable is used for C_5 in place of the less-expensive Millen 21035 MK which is shown in the photo. If the ball-bearing variable is used, slightly more space will be required inside the box.

[1] A scale-size template showing component placement is available from the ARRL for 25 cents. Send s.a.s.e. with order. The Harris Co., 56 E. Main St., Torrington, Conn. supplies etched-circuit boards for *QST* projects as does Mr. John Bolinger, 215 Fairfield Ave., Michigan City, Indiana 46360. Write these suppliers for estimates.

[2] Hanchett, "The Field-Effect Transistor as a Stable V.F.O. Element," *QST*, December, 1966.



Bottom view of the completed v.f.o. The circuit board is mounted by means of small aluminum L brackets (far right). L_1 is mounted on a small square insulating board (see text) at lower left. C_5 is directly opposite L_1. C_7 is to the right of C_5 but is mounted on the top wall of the box.

Testing and Use

Initial testing can be done before the circuit board is installed in the box. The board can be connected to the rest of the components, temporarily, by using short lengths of insulated wire for interconnection. With power applied, listen on a general-coverage receiver for the v.f.o. signal. It should be quite loud if a lead is run from J_1 to the antenna post of the receiver. If the v.f.o. is operating, mount the board permanently in the box. If not, check for shorts between the etched-circuit lines, and look for poor solder joints, or improper wiring. Make sure the rotors of C_5, C_6, and C_7 are grounded to the chassis.

(*Continued on page 158*)

TABLE I

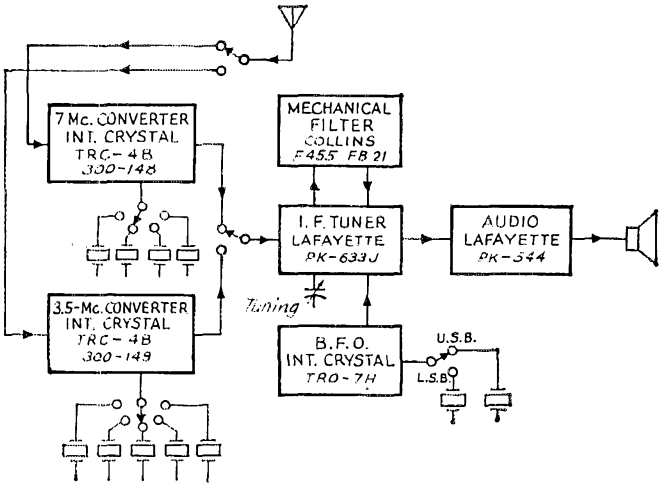
Freq. in MHz.	L_1 (*μh.*)	*Miller No.*	C_2 (*pf.*)	C_3 (*pf.*)
1.7 to 2.1*	54 to 125	42A104CBI	820	1000
3.0 to 4.0	50 to 95	42A225CBI	390	470
5.0 to 6.0	12.9 to 18.7	42A155CBI	390	470
6.5 to 7.5	6.05 to 12.5	42A105CBI	390	470
7.5 to 9.0	2.4 to 4.7	42A476CBI	390	470

Coil, capacitor, and frequency-range data for the solid-state v.f.o. Frequency can be extended beyond both the upper and lower limits given here for each range, by adjustment of L_1 and C_7. Ranges given include popular v.f.o. ranges for s.s.b. receivers and exciters using 455-kHz. and 9-MHz. filters. Data is also given for 160-, 80-, and 40-meter v.f.o. operation. The 7.5- to 9.0-MHz. range covers the common v.f.o. tuning range for v.h.f. operation (8 to 8.5-MHz.). *Use 2.5-mh. r.f. choke at RFC_1 for 160-meter operation.

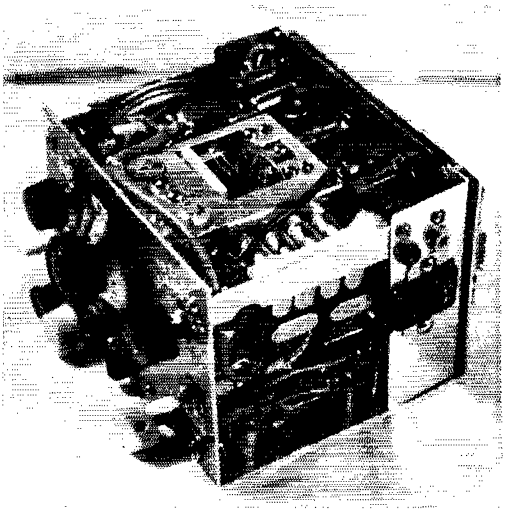
Prefabricated Portable

THE portable station shown above ready to go was built by Robert W. Vreeland, W6YBT, and Russell A. Ritschman, W6ASF, for taking on camping trips where everything has to be packed in, including the power supply. The receiver features an idea that deserves consideration—use of prefabricated modules, now available in manufactured form, to minimize assembly work and get the benefit of compact construction. As shown by the accompanying block diagram, all main sections of the receiver are units of this type, modified where necessary to get the desired ham-band performance. For example, the tunable i.f., a readily-available broadcast tuner, was modified by substituting a small tuning capacitor to tune an i.f. range of 100 kc. (810 to 910 kc.) The 455-kc. i.f. in the module was opened up to allow a mechanical filter to be inserted for good adjacent-channel selectivity. In the h.f. converters, separate crystals were used for 100-kc. ranges in the 80- and 40-meter bands, five being required for 3500-4000 kc. and three for 7000-7300. (A fourth crystal was added for 7300-7400 in order to bring in time signals). In each range padding capacitors are switched in to center the r.f. tuning in the range.

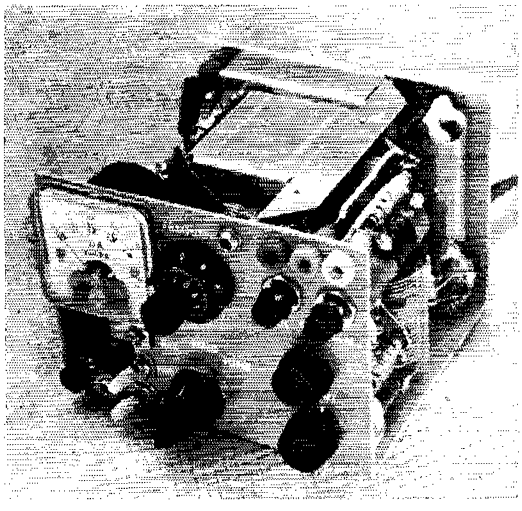
Although the transmitter does not use commercial modules it is equally compact. All solid-state, it has a v.f.o. covering 3500-3800 kc. (the transmitter is c.w. only) followed by a two-stage emitter-coupled buffer, two driver stages in cascade, and a 2N3879 final amplifier. With a 12-volt supply the power output is 5 watts on 80 meters and 3½ watts on 40; these outputs can be upped to 12 and 6 watts, respectively, by increasing the supply to 24 volts. There is also a built-in keying monitor and an r.f. voltmeter circuit for checking output. Burgess CD-208 nickel-cadmium batteries, weigh-



Block diagram of the receiver, showing the prefabricated modules used in the assembly.



Not a cubic inch wasted here! This is the receiver in its 3½ by 4½ by 4½-inch box with the cover removed. The tuning capacitor for the tunable i.f. is visible in the center, in line with the dial. Crystals for the 80-meter converter and the b.f.o. are at the near edge, and the speaker is on the far wall



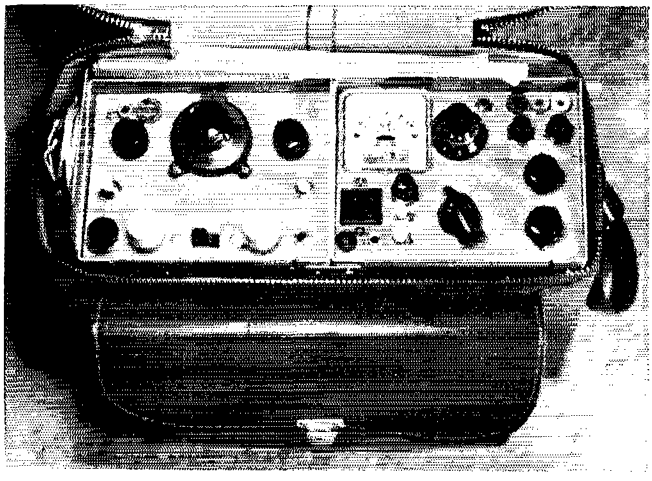
The transmitter is in the same size box as the receiver. Separate aluminum boxes house the v.f.o. (center) and the driver stages at the rear. The coil mounted vertically at the right center is the final tank coil; above it are the slug-tuned antenna coils. The coil at the rear right is a loading coil for 80 meters.

ing 3½ pounds each, are used for transmitter power, and are good for six to ten hours of operation without recharging.

Transmitter and receiver each weigh about 2½ pounds, and with the essential accessories the complete station weighs only 9½ pounds. However, the receiver and transmitter are ordinarily bolted together and carried in a camera gadget bag, making a 13-pound package, including extra antennas.

The 80-meter antenna ordinarily used is a 55-foot end-fed wire with eight 33-foot radials as a counterpoise. A 33-foot antenna is used on 40 with the counterpoise, and this same combination can also be used on 80 by cutting in the loading coil shown in the transmitter photograph. There is also provision for using a center-fed 66-foot dipole on 40.

Operating "on location", numerous 400-mile contacts have been made on 40 meters with this equipment, and it has reached out to 200 miles on 80 under similar conditions. QST



The receiver and transmitter fit side-by-side in a camera gadget bag, with a little room left for squeezing in extra antennas. Extremely compact construction such as this doesn't lend itself to ready duplication, obviously, but careful planning can crowd a lot of components into a small space.

The usual electronic experimenter's scrap box is an almost limitless source of resistors, capacitors, coils, tubes, meters and whatnot. Many of these components were probably salvaged from old radios, defunct TV sets, and discarded ham equipment, and have been saved with the assumption that they could be used again in some future project. However, scrap boxes are usually stored in radio shacks, or in damp cellars, or in unheated barns, and experience has shown that such components should never be used without first checking their electrical condition, no matter how favorable their outward appearance may be.

Beware the Scrap Box

BY MORTON H. BURKE,* K2ENU

USING salvaged components is both a convenience and a money saver to the electronic experimenter. But a faulty component can endanger the success of any electronic building or repair project. Completed equipment can't work properly with such things as leaky electrolytic capacitors, sticky meters, or shorted transistors. To make matters worse, one faulty component can cause the failure of other perfectly good parts, and many hours can be wasted in seeking out and replacing the responsible component. The purpose of this article is to point out the manners in which many of the common scrap-box items can be defective, and to describe methods of checking them before they are wired into equipment.

In the following procedures it will be assumed that the experimenter has an ordinary volt-ohm-meter that works on all ranges, and for all functions.

Resistors, Controls, Switches

The ordinary carbon composition resistor will change its ohmic value with time. The resistance value should be checked with an ohmmeter before the resistor is used. High-tolerance resistors, 5-percent types, after long periods in damp storage, may become 10-percent or 20-percent resistors. Cracked resistors should never be used because they are almost certain to be unstable when they heat up in normal circuit operation.

Wire-wound resistors are normally much more stable than composition resistors, but time and rough handling may have cracked their hard ceramic shell and broken the internal resistance wire. Usually when a wire-wound resistor is faulty, it's open. However, resistors having a slider for adjustment may develop shorts between turns, which reduce the resistance.

Deposited-film resistors of the older variety (carbon) suffer from aging; the newer metal-film units are much more stable. However, these resistors can be ruined by a scratch on the outside of the shell which interferes with the spiral grooving that is cut into the resistance coating and which determines the ohmic value.

Potentiometers are a favorite scrap-box component. Volume controls with switches on them should be completely checked. On/off switches on volume controls are notoriously poor performers after lying around a year or so. An ohmmeter should be used to check the switch to determine that the contacts close and open properly 100 percent of the time. Switch the control on and off at least five times. If it malfunctions once, it is unreliable and should not be used, because the switch section is either dirty or not making proper contact. (This applies to other types of switches also.)

The resistance element should be checked by placing the ohmmeter across the outer terminals of the potentiometer to make sure that it is not open and is of the correct resistance value. See solid lines of Fig. 1. Then place the ohmmeter probes between an outer terminal and the adjustable-arm terminal, as shown by the dotted line, to make sure that the movable contact is not open or intermittent. Rotate the potentiometer shaft slowly while watching the meter. If the pot is noisy (caused by excessive accumulation of dirt or corrosion particles under the wiper contact), the meter pointer will jump erratically, or may even show an open circuit over part of the rotation. If there is any sign of intermittency, discard the potentiometer. No one wants a noisy pot as a volume control, or as a jittery voltage adjuster for a power supply.

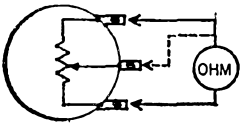


Fig. 1—Checking a potentiometer control. Connect an ohmmeter across the outside terminals to check resistance; connect the meter between one outside terminal and the center terminal to check the wiper contact.

*9 Greenbrier Road, Oakhurst, New Jersey 07755.

Capacitors

Capacitors usually fail because they have shorted internally. All capacitors that have seen lots of voltage and heat may have been on the verge of failure when they were salvaged. The experimenter must determine if his scrap-box capacitor is usable.

Mylar, paper, molded-paper, and ceramic capacitors can all be checked in the same manner with an ohmmeter. Set the ohmmeter on the highest resistance range and connect the meter probes across the capacitor being checked. Since these capacitors are nonpolarized, it makes no difference how the leads are connected. If the capacitor is normal, the meter pointer should suddenly deflect toward zero the moment the ohmmeter leads touch the capacitor, and then rapidly move back toward the high-resistance end of the scale as the capacitor charges up. A shorted capacitor will be indicated by the meter pointer staying at the low-resistance end of the scale. If the capacitor is open, the meter pointer will not deflect toward zero. The capacitor should be checked for leakage by noting the value of resistance after 5 seconds of charging. (Note: If it is necessary to repeat a check, the capacitor must be discharged before the ohmmeter probes are reapplied to the capacitor terminals. This can be accomplished by shorting the capacitor leads together.) The leakage resistance should be greater than 10 megohms if the capacitor is to be considered usable. It is difficult to check capacitors of less than 0.001 μf. by this method because the meter dips will be negligible. These capacitors usually do not change too much in value because of storage conditions, and a leakage test should be adequate.

The "wet" or "paste" type of electrolytic capacitor is the most notorious scrap-box villain. If kept in storage for a long period of time, say six months to a year, this component may dry out and become more of a resistor than a capacitor. When normal voltage is applied, a defective electrolytic may draw excessive current, heat up, short out, and destroy itself. To check an electrolytic capacitor, the d.c. voltage should be applied gradually, starting with a value equal to about 10 percent of the capacitor's voltage rating, and working up to the full rated voltage, while the leakage current is monitored. Because these capacitors are usually polarized, the test setup should be connected as shown in Fig. 2 with due respect to the indicated polarities. A 1000-ohm resistor is used to limit the charging current and also to provide a safe way of monitoring the leakage current without damaging the power supply or meter in the event that the capacitor shorts under voltage. The leakage current in amperes can be found by Ohm's Law, dividing the voltmeter reading by 1000. Or, the leakage current in milliamperes will be the same as the voltmeter reading in volts. (The latter, of course, holds true only if the test resistor has a value of 1000 ohms.) As the applied voltage is increased, the capacitor dielectric reforms, causing the leakage current to decrease. So, for best accuracy, start out with the voltmeter switched to a range corresponding to the voltage rating of the capacitor and, as the voltage falls off, switch to a lower range to keep the pointer in the readable part of the scale. For most applications, even where large capacitors of 50 to 100 μf. are checked, the leakage current at maximum working voltage should not exceed 5 ma. The exact allowable leakage current is a function of both the capacitance and the working voltage, but the 5-ma. figure is a good guide. Capacitors with a greater leakage current than this should not be used. After checking, be sure to discharge the capacitor by means of a short across its terminals before handling. Use a well-insulated wire for shorting. Under no condition should a voltage higher than the listed rated voltage be applied to any capacitor.

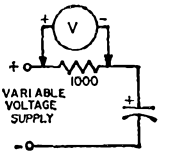


Fig. 2—In checking on electrolytic capacitor, the d.c. voltage should be applied gradually up to the rated voltage of the capacitor. (The voltage can be varied by using a Variac, or similar autotransformer, in the primary circuit of a high-voltage d.c. supply having a separate high-voltage transformer.) With a 1000-ohm resistor, the leakage current in milliamperes should be the same as the meter reading in volts.

"Dry" electrolytic capacitors of the tantalum type do not usually suffer from the aging problem; but high-capacitance high-voltage tantalum capacitors are expensive, and are not likely to be found in most scrap boxes. However, transistor equipments use may capacitors of this type in low-voltage applications. If you happen to have salvaged any of these units, they should be checked in the same manner.

R.F. Coils

Many of the r.f. chokes and slug-tuned coils often found in scrap boxes are wound with very fine wire, and can easily be damaged if they are simply thrown in a box along with other components. Also, in the process of unsoldering these coils to salvage them, quite frequently the ends of the winding become unsoldered from the terminals. So, if the ohmmeter shows an open circuit, check the terminal connections with a magnifying glass before discarding. The normal d.c. resistance of r.f. chokes is often given in catalogs. If the resistance measures more than 20 percent less than the rated resistance, the chances are good that there are shorted turns, which will ruin the performance.

Power Transformers and Filter Chokes

Iron-core transformers and chokes do not like humidity. Six months or so in a damp cellar can

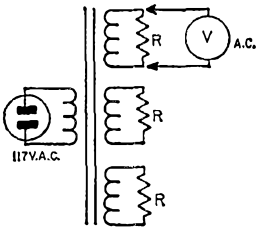


Fig. 3—The voltage of power transformers should be checked, preferably while loaded with resistance (R) to draw rated current from the windings.

cause the insulation to deteriorate. The windings should first be checked for continuity and for coil-to-core shorts with an ohmmeter. To eliminate moisture that might cause an insulation breakdown when power is applied, the unit should be baked in an oven (the kitchen stove will do) for four hours at approximately 180 degrees F. After the bake-out, the windings should be rechecked with an ohmmeter, and the insulation resistance between the windings and the core should be noted. This measurement should be taken on the high range of the ohmmeter, and the meter probes should be placed between each winding terminal and the metal case or frame. The insulation resistance should be greater than 50 megohms. A reading less than this indicates that the insulation has deteriorated to the point where the life of the unit may be shortened.

The final check for a power transformer is a voltage test where rated input is applied to the primary and all secondary voltages are read on the a.c.-voltmeter section of the meter. If it is at all possible, the secondaries should be "loaded down" with resistance that causes the rated current to flow through the winding. (Use Ohm's Law, $R = E/I$, to find the resistance required, and $W = EI$ to determine the wattage rating the resistor, or combination of resistors, should have. See Fig. 3.) Under no conditions should a transformer be overloaded.[1] Overheating as a result of overloading is the main cause of insulation failure in power transformers. Transformer checking with voltage applied should always be done with a fuse of appropriate size in the primary circuit.

Batteries

If a salvaged battery is of the common flashlight or transistor-radio type and is over six months old, it has a doubtful life expectancy. A simple check for this type of battery is to measure the output voltage before and during the application of a load. Flashlight batteries (zinc-carbon) are 1.5 volts nominal, while the transistor types are usually 9 volts. When the equivalent of a 10-ma. load (100 ohms per battery volt) is applied to the battery, the voltage should not drop below 70 percent of its nominal rating. Any battery that reads lower than this should be discarded.

[1] The point at which a power transformer becomes "overloaded" depends upon many factors, such as the type of rectifier and filter, and whether the operation is continuous or intermittent. A rough estimate of the overload point can be made by measuring the temperature of the core by means of a thermometer whose bulb is in good thermal contact with the core. In normal use, the temperature of the core should be allowed to rise no more than about 70 degrees F. above room temperature (to 140 degrees F. with a room temperature of 70 degrees). This will feel fairly hot to the touch. — *Editor.*

Silicon and Germanium Diodes

Both silicon and germanium diodes have good storage characteristics. An ohmmeter check will usually be enough to determine the usability of the unit. The diode should be checked in both the forward and reverse directions. In the forward direction the R × 1 or R × 10 scale should be used. The negative terminal of the ohmmeter should be connected to the cathode (the cathode end of small glass diodes is indicated by the multicolor bands), and the positive terminal should be connected to the anode. The ohmmeter reading in the forward direction should be in the order of 50 to 500 ohms. Reversing the meter leads checks the diode in the reverse direction. The reverse resistance should be greater than 1 megohm.

Should the need arise, a simple test can be made to distinguish a silicon rectifier from a germanium rectifier. When fully conducting, silicon diodes have a forward voltage drop of between 0.6 and 1.2 volts. Germanium diodes have a forward voltage drop of less than 0.5 volt (usually around 0.3). By using the simple circuit of Fig. 4, the voltage drop can be measured across the diode in question while it is conducting 10 ma.

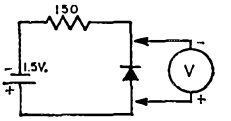


Fig. 4—Silicon diodes can be distinguished from germanium types by measuring the voltage drop across the rectifier, as described in the text. The 150-ohm resistor must be used to limit the current to 10 ma.

Meters

Meters are fragile devices that may suffer if not stored carefully. When a meter is salvaged, it should be checked for calibration and "sticking." Fig. 5 shows the simple setup required to check the action of a voltmeter (Fig. 5A) or ammeter (Fig. 5B). If the meter pointer appears to clear the dial face at all points in its travel, sticking is usually caused by dust or corrosion getting into the bearings, or by foreign matter between the coil and magnet in the case of moving-coil meters. Gradually changing the voltage in Fig. 5A, or the resistance in Fig. 5B, should cause the meter needle to vary smoothly. A sticky meter will suddenly "hang up" or stay at one spot, even though the current

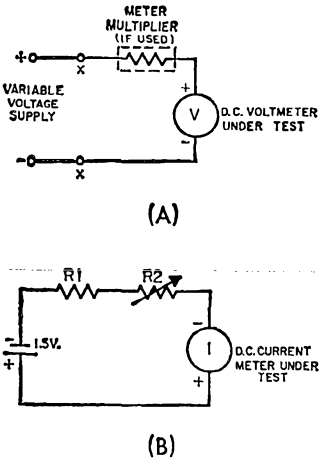


Fig. 5—Checking a d.c. voltmeter (A) requires a d.c. supply having an output voltage at least as great as the maximum-scale meter reading. The input voltage can be varied as suggested under Fig. 2. The calibration can be checked by connecting another voltmeter of known accuracy, and having a maximum-scale reading at least as great as that of the meter under test, at the points marked "X."

In checking a d.c. current meter (B) R_1 should have a value of 1.5 divided by the meter full-scale reading in amperes (or decimal part of an ampere). The variable resistor, R_2, should have a value of about 10 times R_1. Starting at maximum resistance, R_2 should be decreased slowly to determine the point at which the meter "sticks." If it is desired to check the calibration, another meter of known accuracy and having a maximum-scale reading at least as great as that of the meter under test can be connected in series. The two meters should read the same.

through the coil is changing. Tapping the meter face gently will usually cause the pointer to deflect to its proper position. Obviously, a meter that sticks is unreliable and cannot be depended upon to give an accurate indication. Since scrap-box meters are usually expendable, the cleaning job that should be done by factory-trained experts can be attempted by the experimenter. In fact, it should be a part of every experimenter's experience to at least try to fix a sticking meter.[2]

Vacuum Tubes

Salvaged vacuum tubes should always be tested before being used. The filament should first be checked with an ohmmeter to make sure it is not open. The pin connections can be obtained from a standard vacuum-tube manual. Persons not having a tube tester can take advantage of the free testers stationed at drug-stores and supermarkets in making emission tests and checking for shorted elements.

[2] Meter movements are highly delicate, and the chances of an amateur successfully disassembling and reassembling a meter mechanism are probably less than 50-50, unless he has the tools and touch of a jeweler. However, in the case of surplus or ordinary run-of-the-mill meters that are otherwise not usable, it may be worth a try, since the cost of professional repair usually comes close to the purchase price. — *Editor.*

Transistors

Transistors are sometimes marked with a standard EIA (Electronic Industries Association) number. This number is the key to the terminal configurations and the transistor type. Once the EIA number is known, complete specifications can be obtained by reference to transistor handbooks available on the market. Transistors are sturdy components that can take long-time storage in a scrap box. But it is recommended that each salvaged transistor be checked for opens or shorts before it is wired into equipment. Careless checks with an ohmmeter may destroy a transistor; the base-emitter junction is most susceptible to damage. However, measurements may be made on a transistor with an ohmmeter whose voltage between the probe leads is less than 4 volts. The R × 1 or the R × 100 resistance range on most ohmmeters meets this requirement.

Figs. 6 and 7 show how to connect an ohmmeter to a transistor to check both its forward and reverse condition. Since a transistor is somewhat similar to two diodes back to back, the criterion for operation is that the base should not be shorted to either the emitter or collector nor should there be an open circuit between these same terminals.

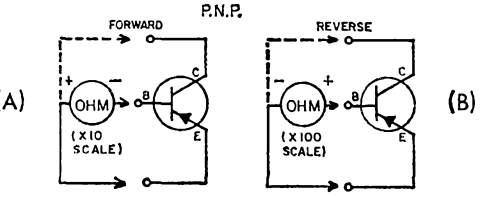


Fig. 6—Ohmmeter connections for testing p-n-p transistors, (A) for forward conduction, (B) for reverse conduction. In both cases, two checks are made by transferring one prod of the ohmmeter, as indicated by the dotted line. Notice the reversal of meter polarity in (A) and (B). See text for typical readings.

Fig. 6A shows the connections for checking the forward conduction of a p-n-p transistor. With the negative probe of the ohmmeter connected to the base, the positive probe should be connected first to the emitter, and then to the collector. With either connection, the meter should read 50 to 500 ohms. If the reading is much more than 500 ohms, the transistor is probably open.

Fig. 6B shows the connection for testing reverse conduction. It is the same as the circuit of (A), except that the polarity of the meter is reversed. With either connection, the meter should read

(*Continued on page 152*)

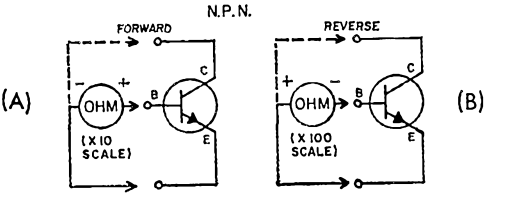
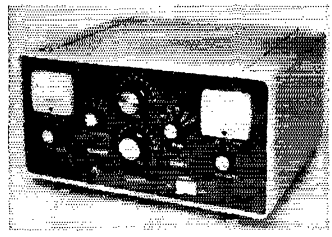


Fig. 7—Same as Fig. 6, but for n-p-n transistors.

Recent Equipment

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

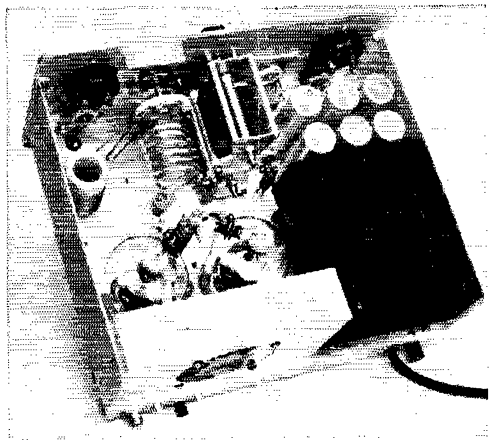
Hunter Bandit 2000C



BOTH linear amplifiers and kit equipment have been popular among members of the ham fraternity for quite some time. The Hunter Bandit 2000C falls into this category—a high power linear amplifier available in kit form. The 2000C is also available factory-wired. The Bandit 2000C is rated at 2000 watts p.e.p. input on single sideband or 1000 watts input on c.w. It is a band-switched unit covering the five popular low frequency bands, 80 through 10 meters.

The heart of the amplifier circuit consists of two Amperex 8163 tubes connected in parallel and operating in a grounded-grid configuration. These tubes feature instant filament heating, durable construction, and relatively low distortion products.

Drive from the exciter is applied directly to the cathodes of the amplifier tubes without the use of any tuned circuits. The drive signal is isolated from the filament supply by a bifilar-wound choke.



Top view of amplifier with cabinet and final amplifier protective screen removed. Power supply components are mounted on the right side of the chassis. The exhaust fan for the amplifier tubes is mounted on the rear wall of the r.f. enclosure. Parasitic suppressors are connected to the amplifier plate caps from the r.f. choke. Just to the right of the two large tuning capacitors is the auxiliary loading control with its associated capacitors located just below it.

Parasitic suppressors have been included in the plate leads of the amplifier tubes to help prevent v.h.f. oscillations. The output circuit of the amplifier is a pi network designed to work into 50- to 70-ohm loads with a two-to-one or less s.w.r. An auxiliary loading control is used to switch in additional capacitance—900 pf. total, in three steps—to supplement the 700-pf. regular loading control.

The self-contained power supply uses a single husky transformer. High voltage is obtained from a voltage doubler circuit which supplies about 2500 volts under load. Rather than using several diodes in series for each leg of the doubler, a single module-type rectifier is used, making for a rather compact supply. Six capacitors connected in series provide an effective high voltage filtering capacitance of 23 μf.

Two separate front-panel meters are included in the 2000C. One meter allows the measurement of either the plate current or plate voltage of the amplifier tubes. The second meter is connected to a directional wattmeter similar to the one described by Bruene[1] several years ago in *QST*. Either a 200-watt or 2000-watt range may be selected. Hunter rates the power reading to be accurate within plus or minus 20 per cent.

Receive-transmit switching is accomplished by two separate relays, both activated simultaneously by grounding one end of each of the relay magnets. It is suggested by Hunter that the grounding be accomplished through the driving transmitter's control circuitry. One relay transfers the exciter signal through the amplifier. During receive, the exciter is connected directly to the antenna. In the filament center-tap lead a cathode-bias resistor has been included to limit standby plate current. During transmit, a second relay shorts this resistor allowing normal plate current to flow.

Although the 2000C which we received at Headquarters for evaluation was factory

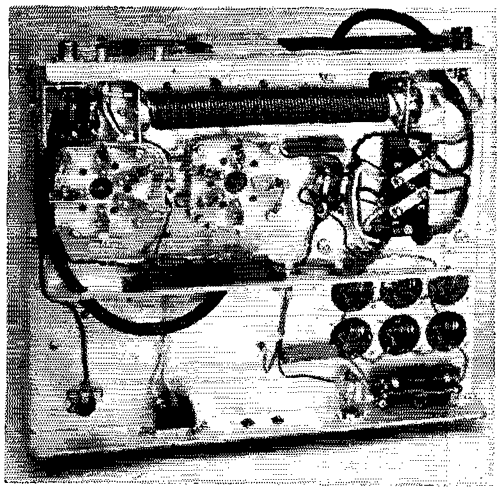
[1] Bruene, "An Inside Picture of Directional Wattmeters," *QST*, April, 1959.

wired, the assembly of the kit should pose no problems to all but the most inexperienced builders. A profusely illustrated and detailed 51-page instruction manual is supplied with the kit. One feature that should be helpful to any builder is that the schematic diagram is included in three places in the manual so that wiring progress can easily be checked.

Testing the Bandit 2000C revealed that it meets the manufacturer's specs. At the rated input of 2000 watts p.e.p. third-order distortion was 30 db. below p.e.p. and fifth order distortion was down 55 db. Care must be taken to carefully adjust the amount of excitation signal, as there is no a.l.c. circuitry in the **2000C.** We found that about 80 watts p.e.p. of driving power was required on all bands to obtain the rated input power. Harmonic suppression was quite good—2nd harmonic down 45 db., 3rd harmonic down 55 db. No particular TVI shielding is included, but little interference was experienced in our strong-signal location with the television set right next to the amplifier.—*K1TVF*

Hunter Bandit 2000C Linear Amplifier

Height: 9¼ inches.
Width: 15⅛ inches.
Depth: 13¼ inches.
Weight: 57 pounds.
Power Requirements: 115 volts a.c., 20 amp., 50–60 c.p.s. or 230 volts a.c., 10 amp., 50–60 c.p.s.
Price Class: $350 (kit form, with tubes) $500 (factory-wired, with tubes).
Manufacturer: Hunter Sales, Inc., P.O. Box 1128, Des Moines, Iowa 50311.



Bottom view of chassis. The large coil at the top of the photograph is the bifilar-wound filament choke. Connectors along the left of the rear chassis wall are from right to left: relay control, ground, input, and output. The antenna transfer relay is mounted near the coaxial output jack. The wattmeter components are visible directly to the left of the antenna relay on the side of the chassis. The large bar located on the chassis divider is the silicon high-voltage rectifier. The metering shunt and multiplier resistors are mounted on a circuit board located in the lower right corner of the chassis. The terminal board mounted at the upper right allows the amplifier to be set up for either 115 v.a.c. or 230 v.a.c. operation. Just to the left of this board is a relay and resistor, associated with the standby protective circuitry.

Strays

The Puget Sound Council of Amateur Radio Clubs will issue a Washington State Operating Achievement Award during 1968 Amateur Radio Week this year. The certificate will be signed by Governor Daniel J. Evans. Out-of-state amateurs must contact 10 Washington State hams, and Washington State amateurs must contact 20 other Washington State hams during the period September 1 to September 8. Send list of stations worked, dates, and QTHs to The Puget Sound Council of Amateur Radio Clubs, Drawer A, McChord AFB, Washington 98438. Be sure to include your own name, call and mailing address!

—···—

A new item joins the comprehensive list of ARRL operating aids. Op. Aid 14, now available without charge, includes the RST system, a time conversion chart, ending signals, the ARRL and ICAO phonetic alphabets, and steps to follow in an emergency. Send an s.a.s.e. to the ARRL Communications Department, 225 Main St., Newington, Conn. 06111 for your copy of Op. Aid 14.

Back Copies and Photographs

Back copies of *QST* referred to in *QST* issues are available when in print from our Circulation Department. Please send cash, money order or check—75¢ for each copy—with your order; we cannot bill small orders nor can we ship c.o.d.

Full size (8 by 10) glossy prints of equipment described in *QST* by staff members *(only)* can be furnished at $1.50 each. Please indicate the *QST* issue, page number, and other necessary identification when ordering, and include full remittance with your order—we do not bill nor ship c.o.d.

Sorry, but no reprints of individual *QST* articles are available, nor are templates available unless *specifically* mentioned in the article.

current to flow

Hints and Kinks For the Experimenter

GMT CONVERSION

For years I've listened to and read the continuing controversy concerning the hundreds of ways of modifying a clock face to simultaneously indicate local and GMT hours. Maybe I'm thickheaded, but I don't really understand why a fellow should go to the devious means of finding a face to replace the one already built into every clock ever made.

The solution is extremely simple:

1) Set the clock on GMT. Of course, this has to be done for 12-hour time. To arrive at 24-hour time, read the clock directly for the A.M. GMT hours, and add 12 hours to get the clock indication for the P.M. GMT hours. For example, when the hour hand is on 1 think 0100 GMT when it is evening in the EST zone and think 1300 GMT when it is morning in the EST zone.

2) Learn to make immediate correction for local time. This isn't difficult to do. The problem with setting the clock in local time and converting the reading to GMT is that it just isn't done often enough for a fellow to get it down pat. By doing the reverse every time — many times each day — you look at your watch, you can gain experience with the GMT to local time conversion for the procedure to become instantaneous and automatic.

For years I've been a private aeronautical pilot, amateur radio operator, and marine pilot. Although I used GMT every time I turned around, I found it difficult to make the normal conversion to GMT. Every time I needed the time in GMT, I had to stop, remember the factor and add. I was always searching for new articles like the one that recently appeared in "Hints & Kinks." [1] Now I laugh at them. I just look at my watch and read GMT directly. If someone asks what time it is, I automatically know, without even thinking about it; if in the afternoon the little hand is on the 9, it's 2 P.M. in Arizona. *Morris G. Miller, W5YDN/K7TQD*

RAISING PORTABLE ANTENNAS

The long-wire and dipole are popular antennas for portable use, but most amateurs find it difficult to raise either radiator to any significant height. Quite a few hours are usually spent at portable sites while the more nimble hams climb trees and secure the ends of the antennas.

One of the fastest and easiest methods I have found to put up a dipole or long-wire antenna is to use a bow and arrow. For less than five dollars, most department stores have available archery sets (for children) consisting of a bow and four arrows.

To make use of a set, attach a lightweight monofilament fishing line to the notched end of the arrow. Have an assistant hold the spool so that the flat edge of the spool will be facing the general direction of the arrow's flight. When you shoot the arrow, the line will unwind off the spool in the same manner it would on a spinning wheel.

Shoot the arrow through the branches of the desired tree and then attach the supporting line for the antenna to the fishing line. Pull the supporting line over the branches, untie it from the fishing line, and secure it. Then rewind the fishing line on the spool and make the next shot.

After a little practice, I've been able to reach heights of over 125 feet. This is, of course, quite a respectable height for a portable antenna. — *Michael M. Dodd, WA4HQW*

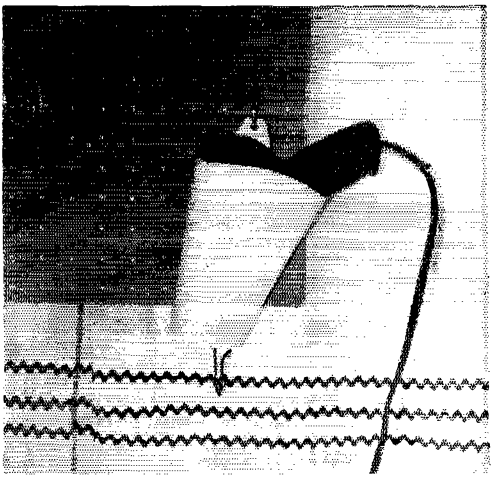


Fig. 1—A cut-down plastic bottle enables a soldering gun to be hung on a pegboard along with other tools.

SOLDERING GUN HOLDER

As shown in Fig. 1, a soldering gun holder can easily be made from a plastic bottle used to contain dishwashing detergent. The holder may be hung on a pegboard as illustrated or it may be attached to a tool board or workbench with a nail or screw. The bottom of the holder should be trimmed sufficiently to prevent the tip of a hot iron from melting the plastic. — *B. M. Augustyn, K2ZBO/4*

[1] Carruthers, "GMT Clock Face," *QST*, March 1968.

CLIP LEAD IMPROVEMENT

Clip leads are a vital part of every amateur and commercial electronics lab. However, because several leads frequently have to be connected to one point, such as ground, B-plus and so forth, the resulting jumble of clips may fall off the terminal or short to other parts of the circuit. To help alleviate this situation, it is suggested that some leads be made up with a clip in the middle of the wire as well as a clip on each end. In this way, one clip can feed two circuits instead of only one. — *Melvin Leibowitz, W3KET*

HW-12 A CARRIER NULL ADJUSTMENT

After making the carrier null adjustment to my Heath HW-12A outside the cabinet, I was quite satisfied that it was as low as possible. However, when the unit was placed in the case, the carrier level began to creep up somewhat, apparently due to the large amount of heat generated by the tubes. An inspection of the cabinet showed that there are three holes on each side of the case for mounting a mobile gimble bracket. By inserting a small screwdriver through the rearmost hole on the right side and making the tip of the screwdriver catch in the milled edge of the carrier null control knob, I found it was possible to adjust the control. Using this method, I can renull the carrier without removing the cabinet and invalidating the adjustment. — *Dave J. Crockett, WB4DFW*

PIPE SIZES

There is, I find, a considerable amount of confusion about the real sizes of iron pipe. For instance, one-inch pipe is not one inch in diameter, either inside or outside. Here is a little chart which sheds light on the situation. All sizes are in inches.

Nominal Pipe Size	*Outside Diameter*	*Inside Diameter*	
		Standard	*Extra Heavy*
¼	.54	.364	.302
⅜	.675	.493	.423
½	.84	.622	.546
¾	1.05	.824	.742
1	1.315	1.049	.957
1¼	1.66	1.38	1.278
1½	1.90	1.61	1.50
2	2.375	2.065	1.939

— *W1IKE*

DRILLING HINT

In modifying equipment, many hams drill holes without any concern for where the chips might fall. Then they wonder why their rigs don't work the same as usual.

Being blind, I have had to modify all my equipment so that I could use an audio comparator to read the meters. It has been necessary to drill two holes near each meter and install jacks for the meter reader. To prevent chips of metal from causing possible shorts, I made pockets of masking tape under where the drill would come through. Then when the holes were drilled, I turned the chassis upside down and pulled off the masking tape, chips and all. — *Horace R. Perry, W1AI*

USING THE HD-10 WITH AN EXTERNAL PADDLE

When using an external paddle with the Heath HD-10 electronic keyer, I found that the keyer had a tendency to make dots when dashes were called for. However, normal operation was obtained when using the internal paddle.

Checking the voltage at the base of the dash clamp transistor, Q_6, with an oscilloscope, I found that a large, rapid transient developed at this point whenever external dash contact was made. Normally, operation of the dash contact caused Q_6 to be turned off, thereby removing the clamp from the dash flip-flop, Q_4Q_5, and permitting dashes to be produced. With the transient present, Q_6 stayed on for the duration of the transient and kept a clamp on Q_4Q_5 during this time. However, since the dot clamp, Q_3, was also turned off by the dash contact, dots were produced instead of dashes.

The transient was eliminated by bypassing the base of Q_6 to ground with a 0.1-μf. capacitor. Several keyers using external paddles have experienced this same problem, but all have performed perfectly after this modification. The capacitor value doesn't seem to be very critical; values of 0.1 to 0.2 μf. have been used with excellent results. — *Fred Manganelli, Jr., W1TCJ*

INTEGRATED CIRCUIT HEAT SINK

When soldering semiconductor devices, it is good practice to use a heat sink on each lead. However, it can be a difficult and time-consuming job to connect an individual heat sink to each lead of an integrated circuit, especially when several modules are used. When an integrated circuit is contained within a dual in-line package, the problem is easily solved as shown in Fig. 2. Bend a small sheet of copper — say 2 × 2 inches — over a suitable drill bit or wooden dowel so that the heat sink formed will make firm contact with all the leads of the integrated circuit when the heat dissipator is force-fitted over the package. Of course, don't forget to remove the heat sink after the soldering is completed.

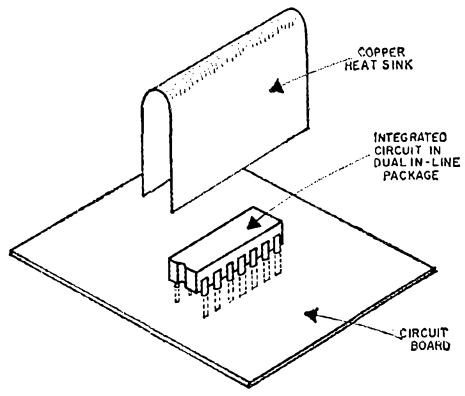


Fig. 2—Heat sink for integrated circuits that come in dual in-line packages.

Technical Correspondence

SOLAR PREDICTIONS

Technical Editor, *QST:*

Dr. Richard Head, Chief Scientist at the National Aeronautics and Space Administration's Electronics Research Center in Cambridge, Massachusetts, has for some years been doing research in an attempt to determine the mechanism of solar activity. His work has become centered around the curious correlations between planetary motion (and the resultant gravitational forces on the sun) and solar activity and has resulted, at this point, in a rather uncanny ability on his part to forecast major solar events up to several years in advance of their occurrence. The major U.S. solar observatories have been relying on his predictions for some time in order to adjust the sensitivity of their instruments for the prospective unusual activity.

Major Solar Event Forecast

Date 1968	*Importance*	*Proton Flux*	*Likelihood*
Aug. 27	2 plus	weak	moderate
Sept. 16	3 plus	10^8-10^9	high
Sept. 18	3	10^7 plus	high
Sept. 21	3	10^7 plus	high
Oct. 1	2 plus	weak	moderate
Nov. 11	3-3 plus	10^7-10^8	high
Nov. 25	2 plus	weak	moderate

Note: Subject to the existence of a large complex spot group on the sun, the probability values given can be updated from one to three months prior to the forecast date.

As it develops, this work will undoubtedly become of increasing interest to amateur radio operators. It may conceivably be of immediate usefulness in areas that you know of. To that end, the table above shows a few of the forecasts that Dr. Head has been able to make for the rest of the year. — *Michael R. Mitchell, K4CHK/1, 85 Munroe St., Somerville, Mass. 02143.*

I.F.-DERIVED HANG A.G.C.

Technical Editor, *QST:*

Among many descriptions of homemade receivers, one of the best appeared in the January issue, by W5OMX. As in many others, the a.g.c. is derived from the audio section.

I cannot see any advantage in this kind of circuit as compared with an i.f.-derived a.g.c., since the latter will always indicate on an unmodulated carrier, where the former will move the S meter only if an audio beat is obtained; i.e., when the carrier is tuned zero beat the a.g.c. is not operating, and the background noise is increased.

For over two years I have been using an i.f.-derived hang a.g.c. in a much-modified HRO, the circuitry of which was inspired by the audio-derived hang a.g.c. described in *QST* years ago. Since I haven't seen it published, I am enclosing a drawing of it (Fig. 1).

The advantages of this circuit are (1) no changes required from a.m. to s.s.b.; (2) fewer components; (3) no audio transformer; (4) *true hang* operation.

The operation is as follows:

The receiver has a diode a.m. detector on the 3rd i.f. transformer (the loading is of no consequence, in my opinion, since the selectivity is due to a mechanical filter in a previous stage). So the diode V_1 provides the a.m. output as well as the a.g.c. voltage, which is sent to the a.g.c. line via the diode V_2. So far, the a.g.c. line can only be charged. (For a fast attack, capacitors of no more than 0.01 μf. each must be used on the a.g.c. line.) The discharge can be only via the triode V_5. The audio from the product detector is amplified in V_4 and rectified in V_3 and then fed to the grid of V_5. When the b.f.o. is off, the output from the product detector is zero and V_5 is conducting. The circuit is then the classic a.g.c. used in any a.m. receiver.

If the b.f.o. is operating, the audio signal will block V_5 and the a.g.c. holds up. When the audio ceases or decreases, the negative voltage on the grid of V_5 will slowly decrease until conduction is reached, when the a.g.c. will suddenly decay to zero or a new lower level.

This operation on the S meter is really impressive. If the S meter is inserted in a bridge circuit between the cathode of an a.g.c. controlled tube (say, the first h.f. stage) and the cathode of the final audio amplifier, the triode often used as S-meter amplifier can be omitted and the S-meter scale linearity will surely be better. A tube such as the 6BA6 exhibits almost logarithmic current-vs.-a.g.c., so the S-point spacing is not crowded at the end of the scale as with a triode. Probably the 10-megohm resistor in the grid circuit of V_5 will require a little trimming to get the best hold time.

In a receiver such as the one by W5OMX, it is sufficient to substitute a triple diode-triode for the 12AX7 (V_4) and use V_{3B} for the tube shown as V_4 in my drawing. — *Francesco Cherubini, 1IZV, Via Flaminia 695, 00191 Rome, Italy.* QST

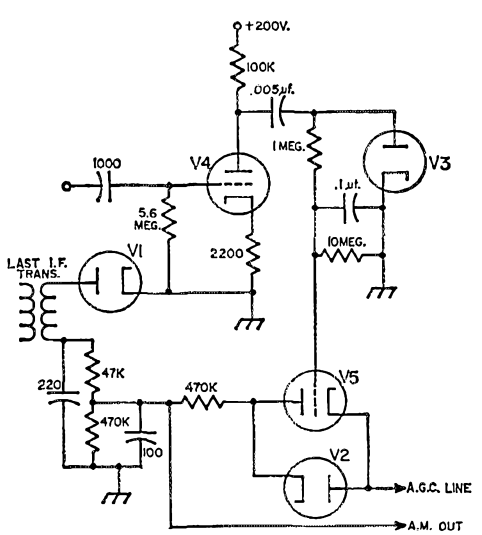


Fig. 1—Circuit of the i.f.-derived hang a.g.c. V_1, V_2 and V_3 are 6T8 diodes; V_3 and V_4 can be a 12AU7 or equivalent. Resistances are in ohms, capacitances are in pf.

Beat McCoy

BY JOHN G. TROSTER,* W6ISQ

"WHERE ya been? Haven't heard ya on lately."

"Aw, Charlie, I been building a new radio machine."

"What is it this time?"

"Well, ya know this fella Lew McCoy that writes them articles in *QST* about building simple, cheap rigs and antennas and things out of junk box parts and old TV sets?"

"Well, I got a little game here called 'Beat McCoy'. I build the same stuff he writes up, only build it better and bigger and cheaper for less money."

"Give me a for instance."

"Like that exciter he made out of old TV parts plus $6.07 cash. . . . I made it for only $4.83. And remember that 4-element 15-meter Yagi beam he said cost $4.67. Remember that? Well, I made 5 elements for only $2.89!"

"Maybe you got a well-stocked junk box. But how come ya play games to beat McCoy?"

"Well, it *used* to be a game. But now it's a grudge battle. Remember his article about the power supply made from an old TV set?"

"Sure, he gets them old sets for free from his friendly local TV repair man."

"Well, I ain't got nothin' but hostile TV fellas here 'cause I got QRTeed $5 for a rusty old chassis, and after I lugged it home, I found the transformer was burned out. That's enough to get anybody's oscillator vibratin' ".

"So you wanted to get even with McCoy because you got crummy TV stores?"

"You betchee, Charlie. I blew $5 on account a . . . oh well. So then he came out with that article about a QRP 700-watt triode final made mostly out of old surplus and TV and junk box parts . . . plus $100 cash outlay."

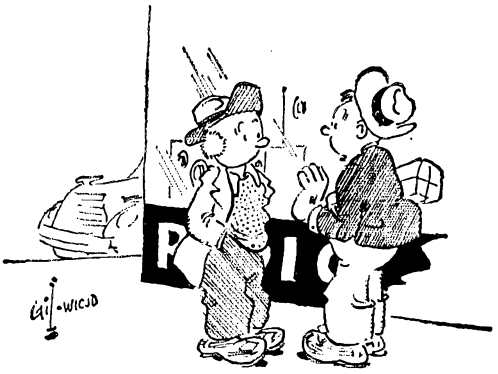
"Yeah. Might build that one myself."

"Well, save your cash, Charlie, 'cause I just built me a "*Real* McCoy" final . . . a *full*-sized, moderately-powered kw. for only $6.23. And I done it the hard way, as I shall soon relate."

"Okay, what's the gimmick in your game?"

"I thought that price would pin your needle! Ya see, McCoy always uses parts out of old TV sets and his junk box. But if he don't have a certain part, he goes out and buys it. Utter extravagance! Now my secret is this: if I need a part I don't have in the junk box, I just *trade* off my old obsolete and broken-down stuff from the junk box and around the shack for whatever I need. Swap, si . . . Cash, Caramba."

"Continue."



"I BEEN BUILDING A NEW RADIO MACHINE"

"You recall that old beat-up pair of 4-1000As I used in that old obsolete rig I threw in the junk box last year? Well, I found a sucker who'd take them old used tubes in trade for two only slightly used 811s. And he threw in the sockets, too. Pretty good start, eh?"

"For who?"

"Charlie, I want ya to know I beat McCoy fair and square. 'Course, I might of rounded off a corner there and here . . . but anyhow, then I swapped off my old surplus scopes and signal generators and that new v.t.v.m. I didn't use much . . . got some nice coils and a couple a condensers for that junk."

"I got a brand new 6L6 I'll trade ya for a *used* pair of 813s."

"And that's about all the parts I needed except for a filament transformer and some meters which I tore out of old obsolete rigs. And a choke and resistor or two which I conned a fella out of for a antique 4-400A . . . or sumpin . . . I forget."

"You should have run a.c. to your junk box and put *it* on the air."

"Don't ya see, Charlie. I got all the big parts and I didn't spend a penny yet. But finally I decided to give McCoy a break. I splurged $6.23 on a brand-new chassis and panel."

"And, pray tell, what parts did you ever get out of your bottomless junk box?

"Ohhhhh . . . wire . . . screws . . . knobs . . . nuts . . .lotsa things."

"So you got all the parts. Then what?"

"So, then I built this final in my usual superb manner. And, of course, I used McCoy's exact same triode grounded grid circuit so as to make our grudge battle legal and even. Except I got QRXed by a bit of hard luck when I dropped the filament transformer on one of the 811s. But my plate current was runnin' high for this battle, so I didn't let that tragedy stop me. I just built the kw. final with the single 811 that was left. Which puts me *way* out ahead of McCoy in the technical business, too."

(*Continued on page 160*)

* 45 Laurel Ave., Atherton, Cal. 94825.

DANGER! Electrical Shock

Safety Information With Notes on Artificial Respiration

BY MELVILLE M. ZEMEK,* K5CWE

It is not necessary to make bodily contact with a live insulated or uninsulated high-voltage conductor to receive a fatal electric shock. Obviously, there are many factors which govern the distance an arc will jump through air from a live uninsulated conductor to a person's body. Generally speaking, these factors can be listed in order of importance as follows:

1) Voltage level to ground
2) Shape, size, and arrangement of electrodes
3) Presence of other material in vicinity of arc gap
4) Temperature, pressure, and humidity of surrounding air.

Arcing distance. For a given voltage and common set of factors, exclusive of shape of electrodes, the arcing distance would be greatest between needlepoint electrodes, due to the high dielectric stress concentration at the points which causes ionization of the air, and the arcing distance would be least between sphere-shaped electrodes wherein the dielectric stress has a more even distribution. Handbooks usually give tables of sparkover distances in terms of crest voltage, size and shape of electrodes, and distance between electrodes. A modified table, Table I, shows the spark distance for various r.m.s. sinusoidal voltages in air, at 25°C, 760 mm barometric pressure, and 80 per cent relative humidity, for both the needle gap and sphere gap.

Under prescribed conditions, spark distances are reasonably accurate. Hence spark gaps are used for measuring or limiting high voltages during overpotential testing. Theoretically, for a given voltage, the arcing distance between conductor and one's body would fall somewhere between the maximum value given in needle gap column and minimum value shown in sphere gap column.

Safe minimum distances. To develop a safe minimum distance of approach to live circuits, a very generous factor of safety is applied to the known arcing distance. The data in Table II are suggested as a minimum distance of approach, unless such parts are adequately guarded.

* Associated Factory Mutual Fire Insurance Companies.

TABLE I

Voltage r.m.s. sinusoidal in kv.	*Needle Spark Gap No. 00 sewing needle points (inches)*	*Sphere Spark Gap sphere diam. 62.5 mm. (inches)*
10	0.47	0.157
10	0.725	0.26
20	1.0	0.346
25	1.3	0.441
30	1.63	0.543
35	2.01	0.65
40	2.44	0.764
45	2.95	0.885
50	3.55	1.03

TABLE II

751 to	3,500 volts	1 foot
3,501 to	10,000 volts	2 feet
10,001 to	50,000 volts	3 feet
50,001 to	100,000 volts	5 feet
100,001 to	250,000 volts	10 feet
250,001 to	500,000 volts	15 feet
500,001 to	1,000,000 volts	25 feet
1,000,001 to	1,500,000 volts	35 feet
1,500,001 to	2,000,000 volts	45 feet

Low voltage can be fatal. High voltage is by no means the major cause of fatal accidents. Statistics show that every year more than 700 persons are electrocuted in accidents involving less than 750 volts. Many of these fatalities are incurred from 110-volt lines. The factors which determine the severity of shock are the quantity, the path, and time of current-flow through the body.

The resistance to current flow through the human body varies widely from 100,000 ohms down to 1000 ohms or less, depending mainly on contact resistance. A value of 500 ohms is the commonly accepted average value for the resistance of the body between major extremities. Although high voltage often produces severe destruction of body tissue at high resistance contact locations, the lethal effects of the electric shock are the result of the current actually flowing through the body. Hence, the criteria of danger of loss of life from electric shock are based primarily upon magnitude and duration of current flow through the body or, in other words, watts-seconds of energy.

Research on animals. Low voltage experimentation has been carried on with animals to develop the intensity of current flow through a path in the body involving the chest, to produce a condition in the heart known as ventricular fibrillation, which is usually fatal. A theoretical criterion of danger for man has been developed from these experiments to predict the current and time duration to produce ventricular fibrillation in an average person. This theoretical data produced

a straight line graph on log-log paper, with an upper limit of 400 milliamperes for .005 seconds and a lower limit of 75 milliamperes at 5.0 seconds.

Electric shocks which produce respiratory inhibition, heart block and severe damage to the nervous system, other mechanisms of death, normally require currents of considerably greater magnitude than those which produce ventricular fibrillation.

Simple rules. When working near electricity, be careful to observe the following simple rules of safety:

1) *Observe the safe minimum distance as given above.*
2) *Do not use metallic rules, flashlights or pencils.*
3) *Do not wear finger rings, watches, chains or other objects having exposed conductive material.*
4) *Treat all electrical conductors as being alive until found dead by actual test.*
4) *Treat insulated conductors as bare conductors, since the insulation may be faulty.*

Artificial Respiration

Electricity causes shock by paralyzing the nerve centers that control breathing or by stopping the regular beat of the heart. Everyone should be prepared to save life by applying artificial respiration or external heart compression. Artificial respiration must be started at once. Time is the most important single factor and every second counts. The greater the delay, the less chance of successful recovery.

There are several acceptable methods of artificial respiration, but there is no single ideal method for all conditions. The victim's injuries may make any particular method unsuitable, or circumstances may not permit using any one method in its entirety. The choice depends on the situation at hand. Everyone should understand the basic principles of artificial respiration and the advantages and disadvantages of each method.

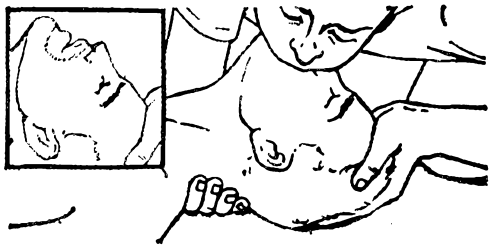
The preferred method for most situations is mouth-to-mouth (See Fig. 1) because it assures positive movement of air into the lungs. There are three prone methods which have been used successfully, the back pressure and arm lift (see Fig. 2). the back pressure and hip roll, and Schafer prone pressure. The modified Sylvester respiration method has also given good results.

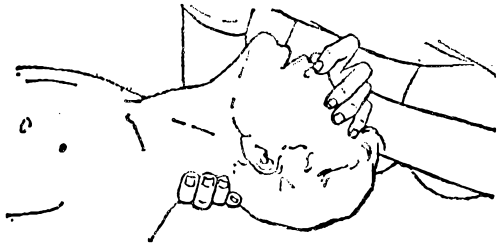
External heart compression (see Fig. 3) must be applied promptly to provide artificial circulation of blood if the victim's heart beat stops as a result of electric shock. This is in addition to artificial respiration on the unconscious victim.

Fig. 1 — Mouth-To-Mouth Method (Insufflation)

Tilt the head back with one hand on the forehead and the other hand under the neck. In most victims this tilting opens the mouth and the air passages, making mouth-to-mouth breathing easy.

Seal your mouth widely around the victim's, and prevent air leakage by pressing your cheek against the nose or by closing the nose with your fingers. **Blow air into the lungs** through the mouth until the chest expands.





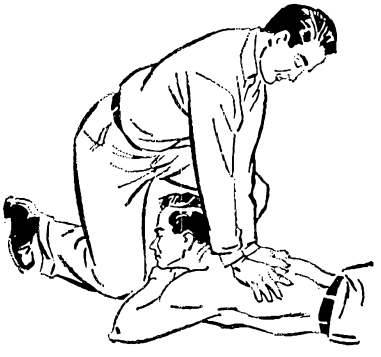
The first ten breaths for the victim must be given as rapidly as possible. Then continue breathing about 12 times a minute.

Fig. 2 — The Back Pressure-Arm Lift Method

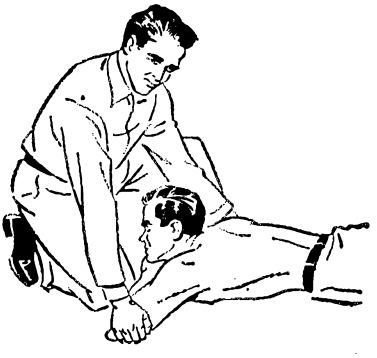
Place the subject in the face-down, prone position. Bend his elbows and place the hands one upon the other. Place the chin upon his hands, bringing the chin forward so as not to constrict the windpipe.

Kneel on either the right or left knee at the head of the subject facing him. Place one knee at the side of the subject's head close to the forearm. Place the opposite foot near the elbow. If it is more comfortable, kneel on both knees, one on either side of the subject's head. Place your hands upon the flat of the subject's back in such a way that the heels of the hands lie just below a line running between the armpits, with the tips of the thumbs just touching, and the fingers spread downward and outward.

Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward upon the hands. This forces air out of the lungs. Your elbows should be kept straight and the pressure exerted almost directly downward on the back. Exert only enough pressure to force the air from the patient's lungs; about 40 or 50 pounds pressure should be applied to the normal adult.



Release the pressure, avoiding a final thrust, and commence to rock slowly backward. Grasp the subjects arms just above his elbows.



Draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the subject's shoulders. Do not bend your elbows, and as you rock backward the subject's arms will be drawn toward you. Then lower the arms to the ground. This completes the full cycle. The arm lift expands the chest muscles, arching the back, and relieving the weight on the chest.

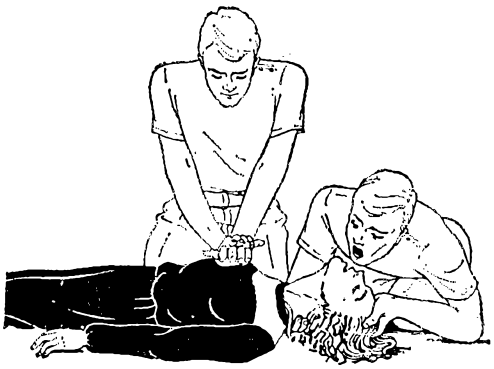
(*Fig. 2 cont.*)

The cycle should be repeated approximately 12 times per minute at a steady uniform rate. The compression and expansion phases should occupy about equal time, the release periods being of minimum duration. To continue resuscitation for some length of time, it may be necessary to change operators. This change should be made without losing the rhythm of respiration. This picture shows the position of the old and new operator just before the change. The new operator kneels with his knee next to that of the old operator. At a given signal (usually the count of 3) the old operator completes his cycle by lifting and lowering the arms; the new operator begins the next cycle by rocking forward and exerting pressure on the victim's back as described previously.

Fig. 3 — External Cardiac Compression

Place victim on his back on firm surface, clear air passage, and apply 4 or 5 quick breaths. Recheck for pulse. If none—then place heel of one hand on lower third of breastbone and the other hand on top. Depress chest with heel of hand only approximately 1½ inches, then release. Repeat 15 times. Repeat insufflation by applying 2 deep breaths. Repeat this cycle, alternating insufflation and cardiac compression. Compress heart approximately 60 times a minute. Insufflate approximately 12 times per minute. Use slightly higher rates for children, with less chest pressure. If assistance is available, one rescuer should apply insufflation while the other applies heart compression. The cycle now becomes one breath of air and 5 depressions of the chest. Do not delay or interrupt resuscitation to summon doctor. Both insufflation and cardiac compression should be continued until victim is transported to a hospital and a doctor takes over.

WARNING—**Cardiac compression should not be done if the victim has a pulse.**



Remember These Points

The victim must be freed from contact with the live conductor as promptly as possible. If the circuit cannot be immediately opened with safety, use a long dry stick or pole, or other nonconductor to free the victim. Every second's delay in removing a person from contact with an electric current lessens the chance of resuscitating him.

Be sure to protect yourself against electric shock while attempting to rescue. Wear rubber gloves if possible to do so.

If the victim is not breathing, or where breathing is very irregular and feeble, send for a doctor and begin artificial respiration at once.

Do not regard early rigidity as a sign of rigor mortis. Some degree of muscular tension is always present in electric shock cases. Continue artificial respiration rhythmically and uninterruptedly until spontaneous breathing starts or a doctor pronounces the patient dead. QST

Strays

I would like to get in touch with . . .

. . . anyone interested in forming a Novice worked all states net. — WA3JTD.

. . . hams in the glass and glass allied business. — W7JER.

. . . any ham who took the intermediate speed radio operator course at Fort Knox, Ky., during the summer of 1953. — WA9SMI.

. . . persons interested in electronic and radio astronomy. — K7CZT.

. . . amateurs on 75- or 20-meters interested in Numismatics. — WB2YEE.

. . . teenagers interested in forming a ragchew net on twenty meters phone. — WA5TSJ.

. . . any amateur interested in starting a v.h.f. net on 6- or 2-meters in the Aurora, Mo. area. — WAØURJ.

. . . anyone interested in forming a teenage 75-meter phone net. — WA3JAE.

. . . all radio amateurs who are also in the educational profession. — WA2AAO.

Hams Help on Election Returns

Amateur Radio Coverage of the North Carolina Primaries

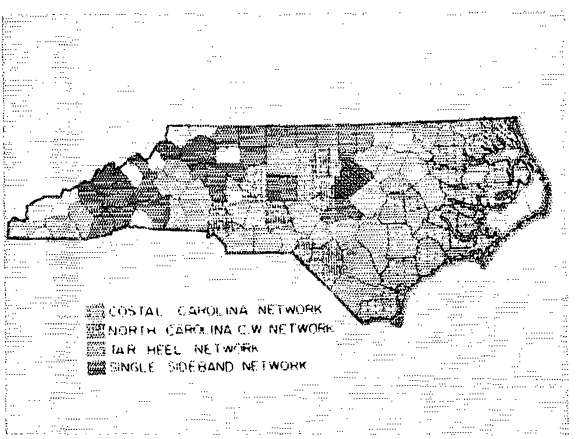
BY SAM BEARD,* WA4POS

AMATEUR radio did the work and amateur radio got the credit . . . on a statewide television network in North Carolina this Spring. More than 500 amateurs and helpers in 91 counties assisted the TV network in gathering and reporting election returns from the Democratic and Republican primaries, handling the returns on the regular 75-meter amateur-net frequencies. As a result, some five million North Carolinians got election returns faster and amateur radio got the full credit, courtesy of the TV election team.

The amateur exercise proved several important points. Amateurs *can* get together on a single procedure for message handling, messages can be kept brief; tight discipline can be maintained by net control, and the results can really be rewarding in terms of good public relations for amateur radio.

Not a single amateur was given any individual credit by the six participating TV stations that flashed election returns over the entire State. The entire credit went to the regularly established message-handling nets . . . the Tar Heel Emergency Net, the N.C. Net (c.w.), the Single Sideband Net and the Coastal Carolina Net. Three of these four are active in NTS. Both audio and video credit was given every half hour or oftener.

*Vice President, News & Public Affairs, WRAL, Channel 5 TV, 2619 Western Boulevard, Raleigh, N.C. 27606



Four traffic nets volunteered to cover various counties. Only nine counties, shown in white, were not covered and these were low population areas. In one instance, the station was set up in a county courtroom and the 75-meter antenna was strung from the balcony of the courtroom into the judges' chambers!

These special Public Service Awards were issued by TV station WRAL to those who participated in the North Carolina election returns project.

The idea of handling election returns via amateur radio was born in North Carolina four years ago and stemmed from an awareness on the part of amateurs that such exercises would promote efficient message handling in time of real emergency. And . . . North Carolina has had plenty of those . . . what with destructive hurricanes that time after time have smashed inland through the eastern part of the State. It worked four years ago . . . and this Spring; the speed and accuracy of amateur radio's reporting of elections returns amazed even the hams who helped organize it.

Net managers started this year with a Raleigh meeting in February. Each manager volunteered to cover vote tallies in approximately 25 of the State's 100 counties, handling both the adding of precinct returns and reporting to Raleigh. Meantime, six North Carolina television stations laid plans to carry the amateur returns on a state-wide basis beginning shortly after the polls closed at 6:30 P.M. and lasting until . . .

Enthusiasm among the amateurs to handle this public service job was tremendous. In less than two weeks of talking up the project on the nets, all but 15 of the 100 counties were covered. When May 4 rolled around only 9 counties were missing and they represented such a small vote total (less than 1%) that they would make no difference in the outcome.

Net managers handled the organization work among the amateurs. WRAL-TV in North Carolina's capital city of Raleigh prepared the uniform reporting sheets to be used by amateurs at the county courthouses where the vote totals were received, by the reporting sta-

Each ham net had its own telephone line to flash the amateur radio returns to these telephone operators at the WRAL-TV studios.

tions in each county and at the four net receiving stations in Raleigh. Everyone followed exactly the same system of message handling. Test runs prior to May 4 showed that the messages, reporting cumulative totals in three of the major races including the race for Governor, took less than 15 seconds. The procedure was honed down to the point where there was about as much silence on the nets as there was reporting, but the returns poured into Raleigh at a record rate from the 2191 precincts scattered around the State.

Each amateur station in Raleigh had auxiliary equipment standing by in case of breakdown. The four Raleigh stations reported handling some 400 messages during the seven hour operation. Each Raleigh amateur used his own telephone line to flash the amateur radio returns to the TV studio and simultaneously to a computer, which added totals from each of the four amateur nets.

First returns arrived in Raleigh at 6:38 P.M. . . . eight minutes after the polls closed. Several counties completed their count and the amateurs could fold up their gear and go home by 9:00 P.M. Some other counties were slower in getting their votes counted and the entire exercise went for seven hours . . . closing down at 1:30 A.M. Sunday morning.

But . . . when the hams sent their last message and took down their temporary antennas or cranked up their mobiles to go home . . . they could take pride in a job well done. It was the fastest reporting of a North Carolina election in the State's history.

Each participating amateur got as his reward . . . what else? A certificate! QST

Strays

Feedback

The equation at the end of the first paragraph in the right-hand column of page 19 of July *QST* should have been written

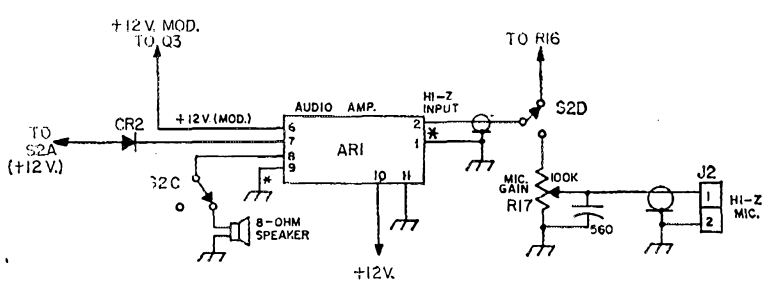
$$A \vee B = \overline{\overline{A} \cdot \overline{B}}$$

in WA6KGP's article on digital logic.

—•••—

The switching circuit for the "Connecticut Bond Box," *QST*, August 1968, page 11, has an error in the audio-input line to AR_1, Fig. 1. The wiring of S_2D should be changed as shown here. Also, it was learned that at high audio settings of the receiver (R_{16}), a "dead" spot would occur at a setting of the receiver tuning dial which corresponded to the transmitter crystal frequency, Y_1 or Y_2. Though no B+ was applied to Q_1 and Q_2 during receive, it was learned that the hiss noise caused by the superregen. receiver was reaching Q_3 by means of the 500-ohm winding of AR_1 (terminals 6 and 7) and was being rectified by the collector-base junction of Q_3. This in turn placed as much as 4 volts d.c. on Q_1 and Q_2 causing the oscillator and doubler to operate during the receive mode. A simple cure was effected by adding a silicon diode (CR_2) in series with the cold end of AR_1's 500-ohm output winding, as shown. The diode permits the normal flow of the 12-volts during transit, but blocks the rectified hiss-noise voltage during receive. CR_1 can be any silicon diode capable of handling 50 volts or more at 100 or more ma.

Late word from Motorola indicates that the MPF157 used at Q_5 has been discontinued. Their alternate type is the MFE3004, a slightly more expensive item. An RCA 3N128 can also be used for Q_5. — *W1CER*.



1967 VE/W Contest Results

COMPILED BY T. C. CUNNINGHAM,* VE2CK

THE Montreal Amateur Radio Club is pleased to present the complete results of the 1967 VE/W Contest, which was marked by greater activity than any previous year.

—•••—

A record 101 Certificates of Merit were issued to all section winners on phone and c.w.

Scores are grouped by divisions and sections. The station first listed in each section is the certificate winner for that section. Likewise, the "power factor" is indicated by A or B; A indicates power input up to and including 200 watts (multiplier of 1.5); B indicates power input over 200 watts (multiplier of 1). The total operating time to the nearest half hour is indicated by the fourth figure.

Example of listings: VO1HH 64,476-398-54-17 -A, or, final score of 64,476, 398 stations worked, section multiplier of 54, total operating time of 17 hours, and power factor of 1.5.

C.W. RESULTS

CANADIAN DIVISION

Newfoundland

VO1HH 64,476-398-54-17 -A
VO1HJ 51,993-327-53-20 -A

Labrador

3B2AW 17,415-129-45- 4 -A

Prince Edward Island

W1GKJ/VE1 83,490-506-55-20 -A
VE1AJK 32,130-238-45-13 -A
VE1ATJ 7614- 94-27-11 -A

Nova Scotia

VE1ON 82,650-475-58-14 -A
3C1AI 52,050-347-50-14 -A
VE1ZT 46,512-408-57-12 -B
3C1EK 18,081-147-41-10 -A
VE1DB 10,920-140-39- 9 -B

New Brunswick

VE1APP 73,425-445-55-16½-A
3C1DH 43,056-299-48-15 -A
VE1AMB 41,262-299-46-17½-A
3C1AIT 31,392-218-48-14 -A
VE1AE 21,525-175-41-16 -A
VE1ZS 13,248-148-32- 7 -A
VE1ABC 8118-123-22-16½-A

Quebec

VE2AUU (VE2BN, opr.) 125,874-666-63-19½-A
VE2NI 121,905-645-63-19 -A
VE2XPO 109,209-617-59-17 -A
VE2ASU 102,129-577-59-18½-A
VE2AYU 98,952-532-62-20 -A
VE2BVY 92,502-571-54-20 -A
VE2ALH 65,688-391-56-16 -A
VE2BCB 59,895-363-55- -A
VE2PJ 49,020-380-33- -A
3C2BV 45,792-288-53-11 -A
3C2AWR 34,077-307-37-11½-A
VE2AQO 22,842-162-47-11 -A
VE2DCJ 19,188-156-41-16½-A
VE2DFT 16,095-145-37-12 -A
VE2WA 12,000-100-30- 4 -A
VE2AJD 11,610-129-30-11 -A
VE2BPU 10,248-122-28- 5½-A
VE2AQI 7076-122-29- 8½-B
VE2UN (VE2s BOW BQO, WA2UPC) 80,964-526-52-16 -A

Ontario

VE3GIY 120,060-667-60-20 -A
VE3DXD 104,676-572-61-19½-A
VE3BJK 97,920-554-60-20 -A
VE3EES 81,984-448-61-18½-A
3C3EEW 80,214-461-58-18 -A
VE3CWP 79,980-430-62-20 -A
VE2BYJ/3 76,596-491-52-20 -A
VE3GCE 54,774-358-51-15 -A
3C3AR 52,260-335-52-12 -A
VE3DH 49,572-306-54-12 -A
VE3M1 48,499-313-41-19 -A
VE3DDU 44,700-298-50-11½-A
VE3GOG 43,560-264-55-20 -A
3C3DSB 42,381-277-51-19½-A
VE3AIA 34,320-260-44-12½-A
3C3EEM 30,870-210-49-11½-A
VE3BC 29,808-216-46-15 -A
VE3BGX 23,736-172-46- 8½-A
VE3BUR 21,252-154-46- 4 -A
VE3FDP 18,795-179-35-16½-A
3C3CKW 18,576-129-48- 6 -A
VE3EPY 17,712-144-41- 8½-A
VE3GMZ 16,872-152-37- 6½-A
VE3GI 7569- 87-29- 5 -A
3C3FIN 6891- 69-33- 6½-A
VE3AED 4623- 67-23- 5½-A
3C3GLD 2640- 44-20- 9 -A
VE3ATI 2106- 39-18- 2 -A
VE3BUE 1575- 35-15- 4 -A
VE3CGJ 672- 16-14- 5 -A
VE3GLZ (VE3GLZ, W9IRJ) 80,910-465-58-20 -A

Manitoba

3C4ZX 68,796-440-52-15 -A
VE4FQ 18,495-137-45-11½-A
VE3EUP/4 16,896-128-44- 6 -A
VE4GS 6930- 66-35- 3½-A

Saskatchewan

VE5KT 148,005-759-65-20 -A
VE5US (VE5UF, opr.) 137,340-763-60-20 -A
VE5DZ 30,033-213-47-16½-A

Alberta

VE6AJC 121,716-644-63-19½-A
3C6AJJ 91,500-500-61-20 -A
3C6ATH 73,254-421-58- 9½-A
3C6UP 66,582-411-54-17½-A
VE6ABV 54,339-307-59-14½-A
VE6HH 49,284-304-54-19½-A
VE6VV 39,900-350-57- 8½-B
VE6AUH 789- 17-14- -A

British Columbia

VE7LB 131,922-698-63-20 -A
VE7AAF 114,204-614-62-17½-A
VE7EH 111,447-609-61-16½-A
VE7AXM 86,220-479-60-18 -A
VE7BAG 44,640-310-48-10½-A
VE7AGN 26,496-184-48-10 -A
3C7BPB 25,056-174-48- -A
VE7BLO 9180- 85-36- 6 -A
VE7TO 7176- 74-33-10 -A
VE7UBC (VE7s BFK BGE BRY) 97,470-570-57-20 -A

Northwest Territories

3C5BW/8 66,825-405-55-19 -A
VE8DG 21,285-165-43-13 -A

ATLANTIC DIVISION

Eastern Pennsylvania

WA3ATX 67,980-206-11-20 -A
W3JET 37,950-115-11-12½-A
WA3ABN 18,480- 56-11-11 -A
W3QOT 16,500- 50-11- 7 -A
K3ZMS 3750- 25- 5- 5 -A
W3ADE 2480- 31- 4- 3 -B
K3RFB 1000- 10- 5- 3 -B
W3UIU 600- 10- 2- 2½-A

Maryland-D.C.

W3HQU 81,360-226-12-18 -A
W3AYS 54,360-151-12-10½-A
WA3DSD 32,340- 98-11-10 -A
W3MNE 28,600-130-11-18 -B
WA3HAN 24,480- 68-12- -A
W3DYC 16,200- 54-10-17 -A

Southern New Jersey

W2EXB 56,160-156-12-12½-A
WB2MRA 25,920-108-12-13½-B
W2ZVW 18,000- 60-10- 4 -A
WB2MOQ 15,840- 66- 8- 3½-A
K2SQM 6160- 28-11- 8 -B
WB2UVB 2970- 11- 9- 4 -A

Western New York

WA2BEX 73,440-204-12-19- -A
W2ADN 57,750-175-11-16½-A
WA2OKF 39,600-120-11-13 -A
WA2FRR 18,600- 62-10-10½-A
K2DDN 16,500- 55-10- 6½-A
W2GKZ 11,200- 51-11- -B
W2TOP 10,800- 60- 6-12 -A
W2BBX 4320- 18- 8- 4 -A
WA2SSJ 2550- 17- 5- 2 -A
WB2YME 1440- 16- 3- 7 -A
WB2ZLK 1260- 7- 6- -A
K2KKH 1080- 12- 3- 1 -A

Western Pennsylvania

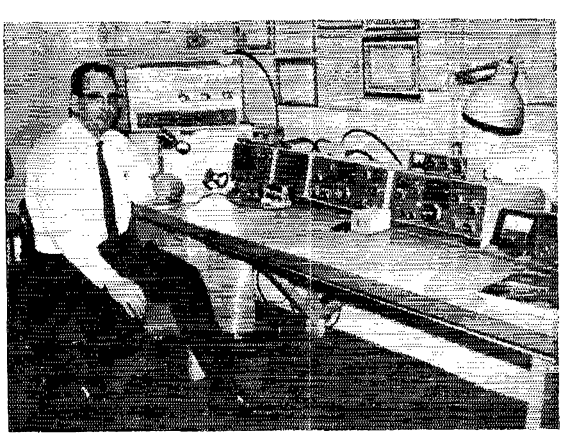
K3HKK (K3AHT, opr.) 61,050-185-11-15 -A
W3ENR 21,600- 90-10- -B
WA3BHM 14,400- 48-10- 6½-A
WA3DET 14,400- 60- 8-12½-A
K3RXK 3600- 24- 5- 8 -A

CENTRAL DIVISION

Illinois

W9LKJ 106,560-296-12-19½-A
W9JCK 93,960-261-12-19½-A
W9LNQ 70,290-213-11-14½-A

* Address all correspondence to 1125 Marlatt Street, Montreal 9, P.Q., Canada.



3C7AHD demonstrates how it's done on phone, pacing the Canadian phone scorers with 541 two-ways in 64 sections.

Top W scorers, **K2EIU/5** (left) and **W1BGD/2** (right), each worked 302 c.w. stations in 12 sections. Commencing with this contest, the Montreal Amateur Radio Club will award a separate trophy to the high U.S. station and another to the high VE. This will leave the W/K group to compete against each other, and likewise the VEs.

WA9MMT 40,590-123-11-9 -A
WA9RAT 39,600-120-11-14 -A
W9QWM 33,120- 92-12- 7½-A
WA9FBC 22,500- 75-10- 7 -A
K9UCR 20,680- 94-11- 8 -B
WA9QQC/9 17,760- 74-12- 9 -B
WA9OTD 14,640- 61- 8- 3½-A
WA9NLF 12,420- 46- 9- 8 -A
W9FFQ 12,300- 41-10- 4½-A
W9HVP 11,400- 38-10-15 -A
W9WR 10,800- 60- 9- -B
W9TCU 10,260- 38- 9- -A
WA9OQE 5130- 19- 9- -A
K9FHV/9 3420- 38- 3- 5 -A

Indiana

W9YB (WA4PCW, opr.) 86,040-239-12-20 -A
K9JZZ 58,410-177-11-17 -A

Wisconsin

W9DTE 44,550-135-11- -A
WA9IAT 43,230-131-11-12 -A
W9PQA 28,200- 94-10- -A
K9BNF 24,750- 75-11-15½-A
W9RKP 21,450- 65-11- 5 -A
K9GDF 18,810- 57-11- -A
W9AEM 17,820- 54-11- 5 -A
WA9NSR 16,830- 51-11- 4 -A

DAKOTA DIVISION

Minnesota

KØORK 74,880-208-12-14 -A
KØZXE 62,040-188-11-20 -A
WØKDS 56,430-171-11- -A
WØYCR 39,820-181-11-11½-B
WØEPG 15,000- 50-10- 7 -A
WØIYP 5400- 45- 6- 4 -B
WØKUI 180- 3- 3- 1 -B

DELTA DIVISION

Louisiana

W5KC 55,110-167-11-13 -A
WA5GVB 29,370- 89-11- 9 -A
WA5QPA 27,060- 82-11- 5½-A
W5BUK 24,480-102-12- 9 -B
WA5QOE 13,770- 51- 9- 5½-A

Mississippi

W5AMZ 56,880-158-12-17 -A
WA5OYU 15,000- 50-10-11 -A

Tennessee

K4PUZ 99,720-277-12-18 -A
WA4ZUI 7770- 37- 7-18 -A

GREAT LAKES DIVISION

Kentucky

K4KSB 68,040-189-12-16½-A
WA4WSW 1080- 6- 6- 1 -A

Michigan

K8HZU 84,240-234-12-18 -A
W8WVU 81,720-227-12-20 -A
K8CGD 55,110-167-11-19 -A
W8TJQ 39,600-110-12-12½-A
WA8KME 33,330-101-11-12½-A
K8OOK 25,800- 86-10-14 -A
W8CNL 19,580- 89-11-13 -B
WA8OFW 8000- 40-10- -B
WA8WTT 1050- 7- 5- 6½-A
W8SH (K1ZND, WB2UJK) 49,680-207-12-16 -B

Ohio

K8VIX 86,400-240-12-16½-A
WA8TWC 74,160-206-12-18 -A
W8MJG 68,400-190-12-16 -A
W8GOC 62,640-174-12-16 -A
WA8LVT 57,600-160-12-11½-A
WA8NTA 52,920-147-12- -A
WA8UHN 31,350- 95-11- 8½-A
W8KMF 28,800- 96-10-11 -A
W8MXO 17,280- 48-12- 5½-A
WA8LWH 13,200- 40-11- 4½-A
WA8TYF 13,200- 55- 8- 4½-A
W3BWD/8 12,000- 40-10- 7 -A
WA8UFM 2250- 15- 5- 3 -A
WA8RXM (WA8s PVU RXM) 25,410- 77-11-11½-A

HUDSON DIVISION

Eastern New York

W1BGD/2 108,720-302-12-20 -A
W2TER 35,400-118-10-14 -A
W2CRS 10,800- 40- 9- 5½-A

N. Y. C.-L. I.

WA2UWA 51,360-214-12- -B
K2MFY 45,000-125-12-13 -A
W2ZV 14,400- 40-12- 5 -A
W2GKZ 11,220- 51-11- -B
WB2JIA 3990- 19- 7- -A
WA2JZX 1920- 16- 4- 1½-A
W2NNH 1650- 11- 5- 2½-A
WB2WXR 990- 11- 3- -A

Northern New Jersey

WB2RKK 71,280-216-11-16 -A
WA2ASM 60,480-168-12-17- A
WB2NZU 56,760-172-11- -A
W2KHT 54,000-150-12-13 -A
WB2UEK 42,840-119-12- 8 -A
W2NEP 18,480- 56-11- 3½-A
W4LIN/2 7920- 22-12-11 -A
K2UUT 5250- 25- 7- 4 -A

MIDWEST DIVISION

Iowa

WAØSDC 74,580-226-11-15 -A
WAØNVM 33,000-110-10-10 -A

Kansas

WØIEM 57,090-173-11-18 -A
KØBYC 34,200-114-10-12 -A

Missouri

WØVXO 100,620-258-13- -A
WØOAW 85,470-259-11-20 -A
WØGAX 50,490-153-11-15½-A
WØQWS 45,000-125-12- -A
KØDEQ 39,960-111-12-14- -A
WØEEE 38,500-175-11-17 -B
WAØEMS 32,340-147-11- 8½-B
KØDYM 32,100-107-10-12 -A
WØQEV (KØJVD, opr.) 21,300- 71-10- 3 -A
KØRWL 10,800- 45- 8- 2½-A
WØKCG 8400- 28-10- 4 -A
WØPXK 6720- 28- 8- 3½-A
KØYGR 1500- 25- 2- 4 -A

Nebraska

KØQIX 41,250-125-11-15 -A

Murphy has stopped **VE5KT** cold in previous VE/W Contests, but not this time. Bob's 148K c.w. score led all entries. VE5KT expects to be exchanging contacts in the 68 contest, portable from Alberta.

Tough competition marked the VE2 home grounds of the sponsoring MARC. When the smoke had cleared, however, Frank, **VE2BN** (right), operating the rig of **VE2AUU,** Murray (left), led all Quebec scorers. Frank, like many others, finds the VE/W Contest a "most enjoyable ham activity." *(Photo by VE2AXR)*

KØOAL 6300- 42- 5- 4½-A
WAØGVJ 3120- 13- 8- 1 -A

NEW ENGLAND DIVISION

Connecticut

W1WY 59,040-164-12-14 -A
W1TS 51,480-143-12-13½-A
W1ACR (W4JTA, opr.)
46,200-140-11-13 -A
W1DDJ 39,930-121-11-10 -A
K1THQ 38,280-116-11- 9½-A
W1MOT 9600- 40- 8- 3½-A
WA1GGN 900- 15- 2- 2½-A

Eastern Massachusetts

W1BVP 27,000- 75-12- -A
W1ZLX 26,640- 74-12-10 -A
W1AQE 16,740- 62- 9- -A
WA1FHU 14,300- 65-11- -B
K1UCA 9990- 37- 9- 5 -A
W1DMD 7380- 41- 6- 3½-A
K1SWT 2430- 27- 3- 5½-A

Maine

K1GAX 20,520- 76- 9- 5 -A

New Hampshire

K1PQV 7200- 30- 8- 9 -A

Rhode Island

WA1BLC 39,600-110-12-14 -A
K1QFD 19,710- 73- 9- 9 -A

Vermont

W1PEG 16,200- 81-10-15½-B

NORTHWESTERN DIVISION

Alaska

KL7MF 26,400-132-10-10½-B

Oregon

W7YEX 25,440-106-12-14 -B
W7LT 4340- 31- 7- -B

Washington

W7IEU 18,500- 65-10-16 -A
WA7DLO 11,100- 37-10- 7 -A
W7GYF 3990- 19- 7- 1½-A
WA7CXD 3600- 20- 6- 1½-A
WA7GLC 600- 5- 4- 2 -A

PACIFIC DIVISION

East Bay

WA6AFI 51,480-143-12-19½-A
K6AUD 51,150-155-11-20 -A
W6CNA 40,200-134-10-13 -A
W6EJA 3780- 21- 6- 3 -A

Hawaii

KH6IJ 6660- 37- 9- 4½-B

Nevada

W7CRT 9000- 50- 6- 6½-A

Sacramento Valley

WB6GEO
30,300-101-10-10 -A
WA6JDT
18,480- 56-11- 8 -A
WB6RYQ 12,420- 46- 9- 8 -A
WB6SVC 2640- 22- 6- 4 -B

San Francisco

W6BIP 37,440-156-12-17 -B

San Joaquin Valley

K6RTK 23,400- 78-10- 6 -A

Santa Clara Valley

WB6KBK 61,380-186-11-19 -A
WA6NYK
53,790-163-11-18 -A
WB6ITM 41,530-126-11-15- -A
W6GJV 14,400- 60- 8-10 -A
W6ISQ 10,080- 42-12- 4 -B
W6GBY 2250- 15- 5- 2½-A

ROANOKE DIVISION

North Carolina

W4OVQ 41,250-125-11-11 -A
K4MPE 30,800-140-11-15 -B
W4OMW 18,300- 61-10-10 -A

South Carolina

W4YDD 78,870-239-11- -A

Virginia

W4YGO 61,050-185-11-14½-A
W4CRW 59,760-166-12-17½-A
W4JUK 18,240- 76-12- -B
W4KFC 16,250- 73-12- 3 -B
WA4NVD 12,210- 37-11- -A
W4DVT 11,760- 49-12- 3 -B

West Virginia

WA8CNN
22,200- 74-10-12½-A
WA8RDW
10,800- 45- 8- 9 -A

ROCKY MOUNTAIN DIVISION

Colorado

WØLMO 28,380- 86-11-13 -A

New Mexico

W5LEF 36,240-151-12-12½-B
K5MAT 21,300- 71-10- 5½-A
W5DZA 14,040- 52- 9- 7½-A

Utah

W7SQD 6660- 37- 6-10½-A
W7POU 1500- 10- 5- 1 -A
WA7EVO 1200- 10- 6- 1 -B

Wyoming

W7TSM 5940- 33- 9- 3½-B

SOUTHEASTERN DIVISION

Alabama

K4GMR/4
21,000- 70-10- 7½-A

Eastern Florida

W4WHK 39,960-111-12- 9½-A
WA4LCO 38,160-159-12-18½-B
W4HOS 21,660- 60-12- 4 -A
W4ZOK 8250- 25-11- 5 -A

Georgia

W4YWX 86,400-240-12-20 -A
W4BEY 74,910-227-11-17½-A
WB4AJR 40,260-122-11-13½-A
K4BAI 39,180-108-12- 6½-A

SOUTHWESTERN DIVISION

Arizona

W7TVS 31,500-105-10-19½-A
W7ESE 6930- 33- 7- 2½-A

Los Angeles

W6RCV 33,660-153-11-14½-B
W6TMP 13,200- 40-11- 8 A
K6YFZ 8640- 32- 9- 3 -A

Orange

KØGJD/6 74,160-206-12-19 -A
W6KNE 48,180-146-11-17 -A
W6QFU 34,760-158-11-15 -B
WB6YPX (W6DLE, opr.)
11,340- 42- 9- -A
WB6UTC 2700- 15- 6- 2 -A

(Continued on page 158)

San Diego

K6CAG 30,300-101-10-11 -A
WB6VFL 1200- 8- 5- 1 -A

Santa Barbara

WB6DPV 34,200-114-10-14 -A
W6GEB 28,500- 95-10- 8 -A

WEST GULF DIVISION

Northern Texas

WA5CBE 75,570-229-11-20 -A
W5QGZ 31,190- 93-11-12½-A
K5YED 12,720- 53- 8- 8 -A

Oklahoma

K5OCX 49,170-197-11- -A

Southern Texas

K2EIU/5
108,720-302-12-20 -A
W5JAW 93,600-260-12-19½-A
W5TPZ 38,280-116-11-19½-A
K8IAE/5 24,600- 82-10-17 -A
K5MLN 20,400- 68-10- 7 -A
WA5JMK/5
18,480- 56-11- 5½-A

PHONE RESULTS

CANADIAN DIVISION

Labrador

VO2AB 24,156-183-11-13 -A

Nova Scotia

VE1ANT 2016- 42-16- 3 -A

New Brunswick

VE1ARM 33,232-268-62-18 -B
VE1RD 31,944-363-41-14 -B
VE1ZS 8352- 87-32- 4 -A

Quebec

WØIIEP/VE2
484- 22-11- -B
VE2DFE 96- 8- 4- 1 -A

Ontario

3C3EFX 14,190-110-43-13½-A
VE3EVZ 2775- 74-25- 3 -A
VE3BGX 2268- 42-18- 3 -A
VE3BS 1350- 25-18- 2 -A
VE3ESN 624- 16-13- 3½-A

Increased phone activity accelerated the phone scores in the contest with **K5SVC** exchanging his Mississippi multiplier 72 times. Frank proudly displays this neat station, which produced the high W/K phone score.

1968 VE/W Contest Announcement

September 28-29

THE Montreal Amateur Radio Club invites all W and VE amateurs to participate in the 1968 VE/W Contest. This year the contest period will run from 2300 GMT Saturday, Sept. 28 to 0200 GMT Mon., Sept. 29.

Two winners will be announced; high U.S. scorer and top Canadian, and a certificate goes to the high scorer in each ARRL section.

Phone stations look for each other near the following frequencies: 3810, 7210, 14,280, 21,400 and 28,600 kc.

Although the MARC and ARRL **do not** stock forms for this event, Daystrom Ltd., 1480 Dundas Highway East, Cooksville, Ontario, Canada is supplying Canadian entrants with free International Contest Log forms. They're a 2-part affair, designed for carbon use, providing an automatic log copy. VEs please address your requests to the Daystrom contest department and furnish your name, call, street address, province, contest name and anticipated number of contacts. Ws please follow the log sample below.

1) *Eligibility:* The contest is open to all amateurs located in the ARRL sections listed on page 6 of this *QST*. Multiple operator stations may enter; however their scores will be listed separately and will not be eligible for awards.

2) *Contest period:* All contacts must be made during the period from 2300 GMT Sept. 28 to 0200 GMT Sept. 29. Only 20 hours total operating time may be used in this period, however. Times on and off the air must be shown in the log. Time spent listening counts as operating.

3) *Bands:* All bands and modes for which the participant is licensed may be used. A station may be worked once on phone and once on c.w. on each frequency band. C.w. and phone are separate, requiring separate logs.

4) *QSO:* W/Ks will work only VE/VO stations and vice-versa. W to W, and VE to VE QSOs do not count. Valid points can be scored by contacting stations not working the contest if complete exchanges are made. The exchange consists of QSO number, RS or RST report, and ARRL section for W/Ks, geographical areas as listed below for VE/VOs.

5) *Scoring:* Count two points for each completed exchange. Incomplete contacts do not count. For final score: VE/VOs multiply: total points × ARRL sections × power multiplier.

W/Ks multiply: total points × Canadian areas × power multiplier × 10 (The factor of 10 has been arrived at by multiplying the ratio of U.S. sections/Canadian areas by the ratio of U.S. logs/VE logs received for the last two contests.)

6) *Power multiplier:* All stations using d.c. power inputs of 200 watts or less during the entire contest use 1.5; all others use 1.

7) *Canadian Geographical Areas:*

	Prefix	*Abbreviation*
Newfoundland	VO1	NFLD
Labrador	VO2	LAB
Prince Edward Island	VE1	PEI
Nova Scotia	VE1	NS
New Brunswick	VE1	NB
Quebec	VE2	QUE
Ontario	VE3	ONT
Manitoba	VE4	MAN
Saskatchewan	VE5	SASK
Alberta	VE6	ALTA
British Columbia	VE7	BC
Yukon	VE8	YU
Northwest Territories	VE8	NWT

8) *Reporting:* Follow the sample log shown below. Log forms are *not* available from MARC or ARRL. Single operator stations may not have assistance from any other person during the contest.

9) *Awards:* The overall contest winner wins a handsome trophy. In addition the winner in each ARRL section receives a certificate. Awards to Canadian winners will be to the section leaders. The top phone only score and top c.w. only score will be listed separately. The section certificate will go to the highest score.

10) *Deadline:* All logs must be postmarked no later than midnight, November 4, to be eligible for awards. Please make sure that your call and section are printed on each page and on the top left hand corner of your envelope. Logs cannot be returned. Mail logs to Tom Cunningham, VE2CK, 1125 Marlatt Street, Montreal 9, P. Q., Canada.

QST

VE/W CONTEST LOG 1968

Call....W4SVJ.... *Mode*....C.W. *ARRL Section*....GA.....
Power Input....150 W....

Freq. Mc.	*Times On/Off GMT*	*Time of QSO*	*Sent*				*Received*				*New Sec. Wkd.*
			Nr.	*Station*	*RST*	*Section*	*Nr.*	*Station*	*RST*	*Section*	
14,050	on 2300	2300	1	W4SVJ	579	Ga.	1	VE2NE	579	Que	1
"		2302	2	"	589	"	2	VO1CA	589	Nfld.	2
"		2308	3	"	569	"	1	VE8MA	559	NWT	3
"	off 2313	2312	4	"	559	"	1	VE7AIC	549	BC	4

Total Operating time: 13 min. Bands used: 14 Mc. Sections 4 Points 8

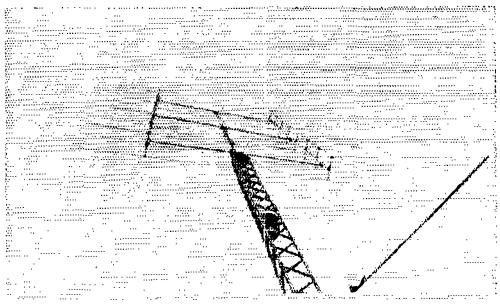
Claimed score: 4 QSOs × 2 (points per contact) × 4 (different sections worked) × 1.5 (power multiplier) × 10 (ratio of U.S./Canadian sections by logs received during last two contests) = 480 points.

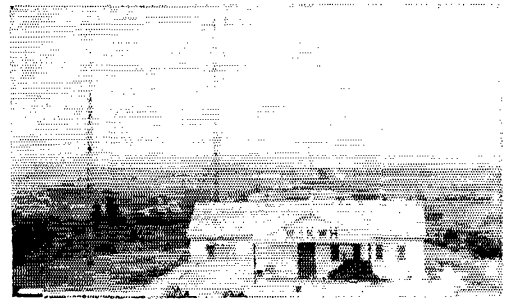
I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental regulations, and I agree that the decision of the contest committee of the Montreal Amateur Radio Club, Inc. shall be final in all cases of dispute.

Signature..... *Call*.....

Results, June V.H.F. QSO Party

REPORTED BY BOB HILL,* W1ARR





Pittsburgh is the Steel City, and it would appear as though a hefty amount of that steel winds up as antennas for Steel City ARC's **W3KWH**. At right is a view of the shack (shack?); looking west, we note (*left to right*) a modest 64-element collinear array for 144 MHz, an 11-element beam for 50 MHz, and a 32-element job (up about twenty feet) for 432 MHz. At left is a neck-craning closeup of the 2-meter monster.

THIS one (held June 8–10) was very much a good, solid, typical, meat-and-potatoes Party, characterized by agreeable weather, exciting sporadic-*E* openings on six meters for many areas of the country, mediocre conditions on 2, lots of multioperator mountaintopping — you know the pattern if you're a June Party regular. Some 431 logs came in (126 of them multioperator), chronicling the efforts of a total of 930 different v.h.f.ers. We received entries from 65 sections, with 59 single-op and 18 multiop certificate awards to be mailed September 13.

In the single-operator multiband category, kudos to **K3IPM** for a record high score of **37,989** (amassed on bands ABCD). While he was unable to set new QSO or section marks (W4GJO holds the former with 598 two-ways in 1962; W2CRS knocked off 64 sections in this very Party), Stan was in a class by himself for total points! The rest of the top-10 lineup looks like this: **K3WJB** 19,440 (ABC); **W2CRS** 17,984 (ABCD); **WA2FGK (K2LNS, opr.)** 14,625 (AB); **K9KFR** 13,800 (AB); **W5WAX** 13,149 (ABD); **K3MTK (K3LWR, opr.)** 10,220 (AB); **W2CNS** 9500 (ABCD); **WAØJYK** 8688 (ABCE); and **WB4DQW** 7849 (AB). Just missing the list was Canadian champ **VE3BPR** with 7084 (ABD).

Single-band leaders were (*50 MHz*) **W9ECV/Ø 15,822; K5AGI** 10,105; **WA4STJ** 9870; **K5IPV** 9495; **WA5TTH** 8280; (*144 MHz*) **K1HTV 2751**; **W2AQT** 2052; **WA2EBT** 1760; **WA3GPL** 1584; **W3FC** 1200. In Canada, **VE3ZZZ (VE3ABG, opr.)** nosed out VE4MA with 1122 points to take 50-MHz honors; **VE3ERQ's** tally of 207 was high on 144 MHz.

In the popular multioperator ranks, those Mt. Airy Pack Rats at **W3CCX/3** nibbled their way to a stunning top of **67,896** (ABCDE). Other solid scores were turned in by **W2PEZ/2** 43,225 (ABCE); **W2JKI** 41,607 (ABCD); **W2UFT** 35,230 (ABCD); **K1PXE/1** 33,292 (ABC); **WB2FKJ/2** 32,376 (ABCDE); **WA1IOX** 31,806 (ABCDE); **K2RTH** 30,774 (ABCD); **W2OJ/2** 29,095 (ABCD); and **W3KWH** 28,083 (ABD). **VE3FIB** topped Canada with 13,392 (ABD), and that's no lie.

Out in the Rocky-Mountain and Far-West areas, where it's like pulling teeth to rack up a decent score, **K7ICW** led single-op multiband entrants with **4068** points (ABD). Al was followed by **WA6ZQU/6** 3528 (AB); **WB6KAP** 2240 (ABCD); **VE7XF** 1890 (AB); and **K6IBY** (ABC) and **WB6DUB** (AB), both with 1260 points. Top single-band performances came from (*50 MHz*) **W7FN 7029**; **WA7CJO** 4995; **K7VNU** 3248; **W7JRG** 2691; **K7DBR** 2394; (*144 MHz*) **WB6PKA/6 678**; **WB6CKT** 445; **WA6FJJ** 272. Multiop efforts were paced by **WAØSLM/Ø** with **7358**; other contenders were **WAØPHZ/Ø** 7279; **WB6NDJ/6** 7200; **K7AUO/7** 6815; **K6BPC** 6690; **K7KOT/7** 5340; **K6YNB/6** 4928; **W7ZSL/7** 4725; **K6TJL/6** 4644; and **K6SLQ/6** 4180.

QRV for the September brawl?

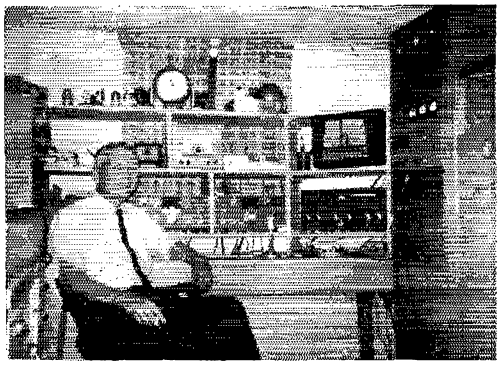
DIVISION LEADERS

Single Operator		*Multioperator*
K3IPM	Atlantic	W3CCX/3
K9KFR	Central	K9DKW
KØALL	Dakota	.....
K5AGI	Delta	K5TYP
W8KKF	Great Lakes	WA8PLZ/8
W2CRS	Hudson	W2PEZ/2
W9ECV/Ø	Midwest	KØTLM
K1ABR	New England	K1PXE/1
W7FN	Northwestern	K7AUO/7
K7ICW	Pacific	K6TJL/6
K4SUM	Roanoke	W4PAR/4
W7VDZ	Rocky Mountain	WAØSLM/Ø
WA4STJ	Southeastern	.....
WA7CJO	Southwestern	K6BPC
W5WAX	West Gulf	WA5KPU
VE3BPR	Canadian	VE3FIB

*Assistant Communications Manager, ARRL.

Soapbox

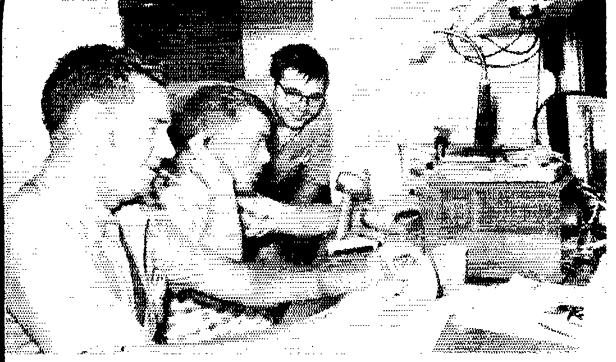
"The QRM on band openings was horrendous, with irrationally long calls — especially when a local station would call the DX and sign his own call five times followed by 'Go ahead, go ahead, go ahead, go ahead, go ahead' — as though the DX didn't know when to return the call! But all in all, a useful prelude to Field Day, especially for getting the s.s.b. ear tuned up." — **W3IUB.** "So much c.w. activity — too bad it isn't that good all the time." — **WA3GPL.** "My boss, a CBer, gave me the afternoon off just so I could enter the contest. Who says all CBers are bad!" — **WA3GLZ.** "We operated portable at Hilltown, Pa., which is a 700-foot hill about 20 miles NW of Philadelphia. One of the highlights was our first extended contact on 1296 — quite an achievement for us, as we had tried unsuccessfully for 4 years! A contact on 220 with a station in Maine was also among the exotic items we worked. We were rather disappointed with the apparent lack of activity on 432 in New England. S.s.b. activity on 6 meters was greatly increased over past years and gives indication that we had all better be on s.s.b. for next January's contest." — **W3CCX/3.** "New rules FB on starting and ending time." — **K3LNZ.** "Conditions were above average on 2 — give 6 meters back to the 'heathens.' Too many of the 6M group are ill-mannered, lousy operators. S.s.b. won't talk to a.m. stations and make snide remarks about a.m. calling them." — **W3LUL.** "We are thankful that you arranged the date of this QSO Party so that it would coincide with a nice little tropo; mighty nice of you, hi." — **W3HB.** "Many stations unreadable on a.m. would have been solid on c.w." — **WA3EPT/3.** "S.s.b. proved to be the only way to work sections on 6." — **K2QPN.** "This was the first time I was on 6 meter s.s.b., and it really paid off." — **WB2OEU.** "Couldn't work anyone, hardly; all the sections heard from were on s.s.b. and they don't listen for n.f.m. or a.m. stations." — **WB2ZDP.** "Low power does work out if you have an efficient antenna system." — **K3ZAP.** "We were disappointed this year with many last-minute equipment problems that plagued us. The club is planning a much-improved operation for the Fall V.H.F. Party." — **K3HKK/3.** "Shows how good 6 could be all the time." — **WA9WIL.** "Look for us with a kw on 2 and a better antenna in Sept. and Jan." — **W9YT.** "My first six out of seven QSOs were VEs." — **WA4JJY.** "Propagation on 50 MHz was most peculiar: none of the openings lasted very long (usually ten minutes or less), and signals were weak. However, the 'hot spot' kept skipping around so that most of the country was covered. We went out in a blaze of glory, our last contact being with K7ICW in Nevada, who was readable here for about one minute. The biggest disappointment was hearing one of the mountaintoppers QSL Montana and not being able to hear the Montana station. The most gratifying aspect of 50 MHz was the increase in c.w. activity. We worked several sections on c.w. which were not heard on s.s.b., particularly into the East Coast area. These contacts made Sunday morning



'Tis very heaven to work a Seven, especially a Seven in super-scarce Wyoming. **W7VDA** brought joy to the hearts of fifty fortunate 6-meter ops during the Party but wasn't able to raise anyone else in his own call area! Jim began his 50-MHz. career from Montana in 1956 and has been very active from Wyoming for the past eight years.

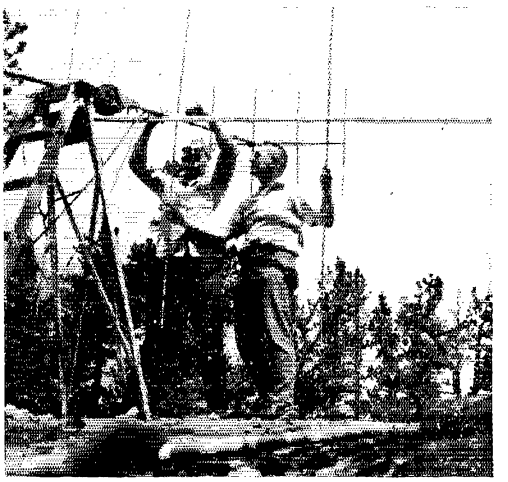
Precariously perched atop his Silver Spring QTH, **WN3ILD** contemplates the Twoer with growing frustration. Not only did Ray have to labor under the handicap of a simple antenna and a poor crystal frequency, but we suspect he also kept sliding off the roof between QSOs.

appeared to combine tropo and meteor scatter. As usual, 144 MHz was a disappointment." — **W4WQZ.** "Enjoyed contest from mountaintop in Kentucky. Sporadic-*E* openings were great." — **WA8LXJ/4.** "Wish more stations had used c.w. Some need new receivers. Which way do you point your antenna when stations are coming in from three directions at the same time? Skip was really something! Heard Mexico, Cuba, called VE5US with no results, VV5ABF, VP5EC or DC, some stations speaking Spanish — all in all, the best V.H.F. Party I've ever been in." — **W8NOH.** "Never heard so much QRM on the low end of six." — **WA8HPY.** "As usual, I saw nothing but the highest courtesy in all contacts. This is to be expected, as two meters is the most courteous band. (Ask the converted 2-meter people who operated 75 meters!) Each year fewer people actually work the contest; the high scores by top stations may prove discouraging to some." — **K8ZES.** "Recommend extra points be given for each c.w. contact." — **WA8KPN.** "Why doesn't anyone else try 8-element 4-bay quads?" — **WA8TFO/8.** "The short-duration sporadic-*E* on six certainly helped the section multiplier. Some of the fellows who started early missed it, unfortunately. The most fun: working VE3BPR on 432 MHz with my varactor tripler with less than one watt to the antenna!" — **W2CRS.** "Picked up five new states on 6." — **WA2KUL.** "100% Murphy from start to finish." — **WN2BND.** "Why does everybody concentrate between 145.0 and 145.4? Lots of room on the band. I was mostly near the low end (144.26) and hardly anybody ever tuned there." — **K2QBW.** "Weather was superb, conditions on six were wonderful, but activity seemed to be off, probably because of the Kennedy funeral and day of mourning. Two-meter c.w. continues to improve; at times the low end sounded like 40 c.w. in a Sweepstakes!" — **W2UFT.** "I do not like the new time rules at all; wish you would go back to the old rules." — **W2SEU.** "Guess my 20-year-old SCR-522 is getting tired — and so am I! See you in September." — **W2KXG.** "Most people aren't very talkative during a contest because of the rush for points." — **WN2ETO.** "Some operators should look introspectively at their calling practices during band openings. Some of the things heard on 6 meters would have made even a 20-meter DX man wince!" — **WA2CVS.** "Unfortunately, I lost several very good hours of contest time — had to graduate from high school." — **WB2ECU.** "We opened the day with K2QKR stepping on a rattlesnake. Fortunately he had high shoes, and K2DJL's fast thinking and action disposed of the snake before it could strike. Conditions were average, except for some openings on 50 MHz. We had a good time on 1296 — although we made only four contacts they were lengthy and involved considerable experimenting. Contacts into Quebec and Ontario added to the 2-meter enjoyment. On 220 MHz we managed to work 9 sections.



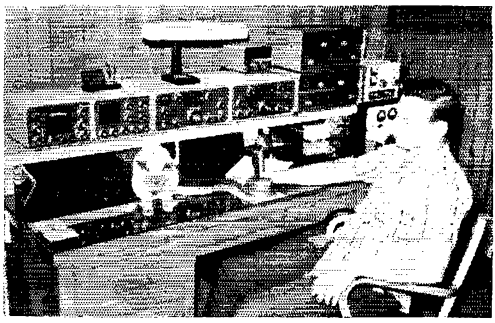
Let's share a moment of ecstasy with (*left to right*) WA4HAZ, K4HGK and WA4JVD as they thrill to the prospect of another new multiplier for **W4PAR/4.** Forced to abandon plans for 2-meter operation when their car filled with 144-MHz. gear went off the side of the mountain, the boys stuck to 6 and made it pay off handsomely.

Thanks for the new rule (any 28 consecutive hours): it was a pleasure to break camp during daylight Sunday evening. Please keep this rule: I am sure all mountaintop stations appreciate it, especially from the safety angle." — **W2PEZ/2.** "We of the Interstate V.H.F. Society thank all those who helped us in our undertaking in June. In September, and from now on, you will hear our club operating under the call WB2GKE." — **WB2WIK/2.** "Found good signals on 6 and 2 from Sunrise Mt., northwestern N.J., where we are building our club station." — **WB2OOO.** "Missed working but heard North Dakota, Wyoming, and VP7DD, all on s.s.b." — **WØPFP.** "Sorry it is my last contest from WØ-land." — **K2PCG/Ø.** "With Hurricane Abby in her death-throes, 2-meter DX was available via tropo with heavy QSB and alert c.w. just above 144 and 145." — **W1DZA.** "Ehto byl ochen' vozbuzhdayushchij kontest!" — **KL7ELA/W1.** "Preparations for the Spring contest started last September following the Fall V.H.F. contest. As a result, a 500-watt final for 144 MHz and a 200-watt rig for 220 MHz were completed and helped accumulate a good score." — **K1PXE/1.** "Finally made it on all bands to 10 KMHz. Why couldn't we have weather like this in January?" — **WA1IOX/1.** "For the record, we decided to enter the QSO Party at 1815 GMT on June 8, so we had 45 minutes to prepare!" — **WA1IED.** "It was Tenerife Mountain, near Milton, N.H., last year; Mount Blue Job, near Rochester, N.H., this year; and I wonder now where it will be next year. On Saturday the black flies were a constant bother, but they rested on Sunday while the mosquitoes took their place." — **VE3FCH/W1.** "Conditions generally fair, but use of c.w. again paid off. Highest multiplier count ever here. Tnx to K1FFE/4 for meteor-scatter QSO on 144 MHz for E.Fla. section!" — **K1ABR.** "Enjoyed contest, but it seems to be more and more a battle of the big guns." — **WA1GFG.** "We found the 2-meter activity very disappointing; hope it is better in Sept." — **K1YLU/1.** "I tried!" — **W8KNC/-KL7.** "I worked no 1s, 2s, 3s, or 6s — simply did not hear a single one. Even forgot to talk a local into getting on to give me my own section! It's great to be back on 6. (First QSO was in 1947 from Sheridan, Wyoming.)" — **W7JRG.** "Six would have been more interesting had the band really opened up. Two meters not as active this time." — **WA7ECY.** "Good 6M band openings and two new bands (2.3 and 3.3 GHz) helped us amass our highest score in the last four years. In general, we need more activity above 2M out here." — **K7AUO/7.** "During my few hours of contest operation I contacted and met more new hams than in a year of 'normal' operation." — **WA6OWH.** "Scores are low in this area this year due to lack of 6-meter openings." — **WB6NDJ/6.** "I was monitoring in hopes of some double-hop *E*! No luck." — **KH6BZF.** "This year's contest was the best effort accomplished by this station to date. It was very helpful to choose your own starting hour, and the 28-hour time limit should eliminate some of the inequities existing between some of the densely-populated Eastern sections and propagation-dependent, population-shy Western sections. The appearance of the June Perseids meteor shower June 9 (GMT) provided some very unusual ionо/meteor scatter this year and this shower seemed to peak during the contest. C.w. provided a double-hop *E*s contact with a Ga. station — don't think I could have read him on s.s.b." — **K7ICW.** "Think I'll move back to Ohio — *E*s much better than in the 'wild and wooly West'!" — **W6DOR.** "Some of the young squirts got back from school just in time." — **WA6CXB.** "I was amazed that I could often work the same stations as the mountaintoppers." — **WB6CKT.** "Can't recall when tropo propagation conditions have been so poor. Only one short-skip late Sunday morning into Washington/-Oregon on six meters." — **K6TJL/6.** "Six was very good here Sunday: there were rapid changes geographically, but *E* skip was plentiful. Two was very quiet — not much going on at all." — **W4EPV.** "Our antenna and six-meter rig were in North Carolina and the two-meter rig about 10 feet away in Tennessee." — **W4RUL/4.** "One of the best QSO Parties we've ever been in. Actually, we made it into a junior Field Day and took to the hills, set up antennas, ran from emergency power and had a ball working 6 and 2. We had an excellent band opening on 6 and must apologize to all those stations we couldn't sort out of the pileups. At times, we sat for two minutes trying to get just one call out of all those calling us. It was worse than Channel 11 on CB!" — **WAØSLM/Ø.** "The best of sportsmanship displayed in a contest." — **WAØPHZ/Ø.** "The band was wide open all day Saturday, but I couldn't get on until late evening. Sunday, the band opened for about 15 minutes after I spent the whole day in front of the rig." — **W7VDZ.** "Band conditions were great during most of the contest period. Will be back in Illinois next contest. All the stations up there know me as KL7EBB/W9." — **WB4DQW.** "VP7DD sure sucked a number of fellows out of the American phone band on 50 MHz. At one time I heard 7 stations (W/K) calling him between 50.096 and 50.1." — **WB4IIP.** "Working 144 MHz only in southeastern Florida has its problems. Imagine having to work a 1400-mile path for one little multiplier!" — **K1FFE/4.** "Heard many 6s and Ariz., Nev., and other 7s, all on sideband." — **K4HAV.** "More contacts could have been made on scatter if some of the transceiver owners had paid more attention to getting their calls across rather than the height of their antenna, the type of rig, or the type of microphone." — **WA7CJO.** "Those amateurs who don't get into a v.h.f. contest don't know what they're missing." — **WA6FJJ.** "Our club had a very difficult time securing permission to operate from any choice mountain-peaks in the area and finally had to settle for Mount Wilson, which is the site of all television transmitters for the Los Angeles area. Careful preparation allowed operation within 100 yards of the TV towers with a minimum of ITV birdies in the receiver." — **K6BPC.**



WAØs SLM (*left*) and LVM (*right*) trudged up 8500 Rocky-Mountain feet, endured two inches of hail and two electrical storms, and still managed to hand out 283 QSOs as **WAØSLM/Ø.**

"We were turned away from our chosen mountaintop QTH by the Forest Service and finally got on seven hours late at a church camp, where the temperature dipped to the mid-30s inside our tent. We broke one 220-MHz Yagi driven element in raising our antennas, and then we shut down 15 minutes before a good six-meter opening to the East." — **K6YNB/6.** "I worked 47 sections on 50 MHz, and 43 of these were east of the western Oklahoma border. Only sections worked west were Nev., Ariz., N.Mex. and Mont. Worked every section east of Okla. western border except S.Dak., Ky., W.Fla. and Maine. Worked VE2 through VE5 and heard VP7. All in all, a very good contest." — **W5WAX.** "Being crystal-controlled held down my total contacts. Heard all call-areas and twice as many sections as I worked. No 2-meter-or-above activity here." — **WA5LXT.** "As usual, local participation was virtually nil. For all the v.h.f. stations in South Texas, not many ever seem to enter contests. Next year I hope to have some s.s.b. gear on and thus have a more even chance in the contest. Am curious as to whether any 2-meter *Es* was caught during the Party, since activity would be abnormally high." — **WA5IYX.** "I've been in every ARRL v.h.f. contest. No National Convention was going to keep me out of this one!" — **W1HDQ/5.** "This station was built to get into the backs of the beams of the W stations. It worked! Some of the boys gave us 579 without turning their beams north. Would be interested to know if any stations report trying unsuccessfully to raise us on 2. We worked everything we could hear, but maybe we now need a better converter." — **VE2RM.** "Two meters open to the west (W8-land) early Sun. morning; the band finally appears to be picking up." — **VE3ERQ.** "Band conditions were very poor in this area, and it was a constant struggle to receive signals just above the noise. It was overcast and wet here and hardly the



Central-Division single-op champ (by a fat margin) K9KFR fondly regards his HS-type cat and perhaps ruefully considers the QSOs he missed on 2 because the kw amplifier expired. Bob's metalwork helped: for 6, it was 11 elements at 90 feet; for 2, how about 15 elements up 105 feet.

type of weather for sporadic-*E* openings. Most of the time only a couple of signals could be heard at any one time, and had to rotate the beam constantly because of changing conditions." — **VE4MA.** "Better condx than last year under my old call of VE7AXM. Being s.s.b. and v.f.o. helped a lot." — **VE7XF.** "We are not overly crushed with signals up in this part of the country on 2 meters. During the Arietids shower, contacts were completed with WA6MGZ and WB6VYM on s.s.b.; just missed with K6RIL on c.w." — **VE7BQH.**

Minimum Number of Sections					
	30	15	4	3	2
Band (MHz.)	50	144	220	420	1215
K1ABR	21	19			
K1AGB	17		10		
W1ALE	8	8	2	3	
W1BCG/1*	16	10	7		
K1BZM/1	29	15	8	2	
WA1DCI		9		3	
K1HFK	31				
K1HTV		21			
WA1IED*	7	18			
WA1IOX*	37	17	4	3	1
W1IPJ/1*	26	14	8	7	
K1J1X		9	6	6	
W1JSM	3	18			
W1LUA/1*	21	16	5		
W1MX	17	8	4		
W1NBN*	16	15	4	3	
K1OJQ		15			
K1PSR			6		
K1PXE/1*	26	20	12		
K1SRZ	14	7	4		
K1YLU/1*	20	14	8	3	
K1YON	11	2	10	3	1
W9INW/1		10		3	
K2ACQ				8	
W2AQT		19			
WA2CJK/2*	44	23			
W2CNS	28	14	3	5	
K2CQG				7	
W2CRS	29	21	11	3	
WA2EBT		16			
WA2EUS	7	5		3	
WA2FGK	28	17			
WB2FKJ/2*	23	18	10	5	1

Minimum Number of Sections					
	30	15	4	3	2
Band (MHz.)	50	144	220	420	1215
WA2IRN	17	16			
W2JKI*	36	20	9	4	
WB2KHD/2*		17			
W2MAU*	5	17	5	3	
W2OJ/2*	29	17	5	4	
W2OW*	16	9	2	3	
W2PEZ/2*	34	20	9		2
W2QQ/2*	36	14			
K2RTH*	38	18	9	4	
W2SEU	16	8	6	3	
W2UFT*	34	20	6	5	
K2VMR/2*	42	13	3		
WB2VQK					2
WB2WIK/2*	40	21			
WB2ZJR*		16			
K2ZRJ*	30	12			
W3ARW*	18	20	8	5	
W3CCX/3*	35	20	13	12	1
W3CGV	21	5	2	4	
WA3EPT/3*	29	17			
K3ERM/3*	30	16	4		
W3FC		15			
WA3GPL		16			
K3HKK/3*	33	19	2	3	
K3IPM	38	14	10	1	
W3KWH*	41	21		7	
W3LUL	7	17			
W3PGA/3*	23	16		1	
K3WJB	33	19	2		
WA4BXZ*	30	3		1	
WB4DQW	46	1			
WB4FOX	39				
W4GDS	48				

Minimum Number of Sections					
	30	15	4	3	2
Band (MHz.)	50	144	220	420	1215
WB4HAP*	35				
WB4HED*	32	3			1
W4OJU	31				
W4PAR/4*	41				
K4PXE*	45	4			
K4QIF*		17		6	
WA4STJ	42				
K4SUM	22	11		6	2
W4TZG*	33				
WA4VCC/4*	34	4			
W4WQZ*	35	6		1	
K5AGI	47				
W5BDF	30				
K5IPV	45				
WA5KPU*	34				
WA5TTH	45				
WA5TXI	37				
K5TYP*	44	1			
W5WAX	47	5		1	
WB6AAE*	3	5		4	
WA6GER	7	4	3	4	
W6HPH		5		4	1
K6IBY	11	5	4		
WB6KAP	8	5	4	3	
WB6NDJ/6*	10	5	4	5	1
K6TJL/6*	11	7	1	7	1
WA7CJO	37				
W7FN	33				
K7ICW	30	5		1	
W8AEC		18			
WA8BCA*	36	17		2	
W8CCI*	48	6			
K8DOC*	42	10			

Minimum Number of Sections					
	30	15	4	3	2
Band (MHz.)	50	144	220	420	1215
WA8HPY	34				
W8IDU		13		3	
WA8LOW	35	4			
WA8PLZ/8*	47	10		2	
WA8VHG		8		3	
K9DKW*	43	4			
K9HMB	48				
K9KFR	40	10			
WA9MEF	30				
WA9SDC	37	3			
K9VPE/9*	32	3			
W9YT*	43	6			1
WA0JYK	43	3	1		1
KØMBC	35				
WAØMRH	40				
WØPFP	42				
KØTLM*	52	3			
KØYNW	33	2			
K2PCC/Ø	41			2	
W9ECV/Ø	54				
W1HOY/KP4	43				
VE2HW		15		3	1
VE2RM*	24	15			
VE2SH	22	11		3	
VE3BGA*	25	9		4	
VE3BPR	26	15		5	
VE3DSE		6		4	
VE3EVW		7		4	
VE3EZC		16		8	
VE3FIB*	27	19		2	
VE3SAU*	31	13			

* Multioperator Station.

SCORES

In the following tabulation, scores are listed by ARRL divisions and sections. The top single-operator scorer in each section receives a certificate award. Multiple-operator scores are shown at the end of each section tabulation; in sections where at least three such entries were received, the top multioperator scorer receives a certificate award. Asterisk following call indicates Headquarters staff member, ineligible for award.

Columns show final score, total number of contacts, section multiplier, and bands used. A represents 50 MHz; B, 144 MHz.; C, 220 MHz.; D, 420 MHz.; E, 1215 MHz. and above.

ATLANTIC DIVISION

Delaware

W3CGV 4640-134-32-ABCD
W3FC 1200- 80-15-B

Eastern Pennsylvania

K3IPM 37,989-577-63-ABCD
K3WJB 19,440-355-54-ABC
K3MTK/3 (K3LWR, opr.) 10,220-292-35-AB
WA3ADN 4268-194-22-AB
W3IUB 4160-160-26-A
WA3ASL 3484-134-26-AB
WA3AAN 3080-170-18-A
W3ETR 2604-124-21-AB
WA3ICH 2096-131-16-A
K3QGQ 2071-109-19-A
WA3HIT 1860-124-15-AB
WA3GPL 1584- 99-16-B
WA3GLZ 938- 67-14-A
WA3KEE 660- 60-11-A
WA3IOB 621- 69- 9-AB
W3IZU 574- 41-14-B
WA3HET 270- 30- 9-A
WN3JWL 78- 26- 3-B
W3CCX/3 (22 oprs.) 67,896-715-81-ABCDE
W3ARW (K3SQO, W3GF) 11,322-193-51-ABCD
K3YFD (8 oprs.) 7,192-248-29-AB
W3LP (4 oprs.) 5307-183-29-AB

Maryland-D. C.

K3LNZ 2716- 97-28-AB
K3GEG 2600-100-26-A
W3LUL 2472-103-24-AB
K3YVC 1316- 94-14-A
W3HB 1020- 65-15-ABD
K3ICH 960- 64-15-A
W3GN 784- 56-14-B
WA3GBK 600- 60-10-B
WA3ILO 140- 28- 5-AB
WN1JHE/3 120- 30- 4-B
WA3HAO 90- 18- 5-AB
WN3ILD 9- 9- 1-B
K3ERM/3 (6 oprs.) 15,200-299-50-ABC
WA3EPT/3 (7 oprs.) 14,536-316-46-AB
W3PGA/3 (7 oprs.) 9200-228-40-ABD
W3DFS (W3s CQH DFS, WA3EMC) 8330-245-34-AB
WA3JMR/3 (W3SCC, WA3s EOP FYZ) 4640-157-29-ABC
WA3HEN (K3OJI, WA3HEN) 3650-146-25-AB
WA3JZR (4 oprs.) 2912-104-28-A

Southern New Jersey

WB2SZK 5876-212-26-ABC
WB2YEH 5766-184-31-ABC
K2QPN 3750-150-25-AB
K2SQS 884- 68-13-AB
K2ZRJ (K2s BWR ZRJ) 6846-163-42-AB
WB2ZJR (WA2BIW, WB2FXI) 1488- 93-16-B

Western New York

W2CNS 9500-177-50-ABCD
WB2OEU 4080-136-30-AB
K2CEH 2132- 72-26-ABC
WA2KND 816- 48-17-ABD
K2ACQ 480- 30- 8-D
WB2KYQ 396- 36-11-B
W2WGL 153- 17- 9-B
WB2ZDP 114- 19- 6-AB
WB2CHO 44- 11- 4-A
W2FAN 20- 5- 2-D
WN2DRQ 12- 12- 1-B
WA2CJK/2(K2RKP, WA2s CJK UJM) 27,738-414-67-AB
W2QQ/2 (K2s LGJ LWR) 11,500-230-50-AB
W2OW (16 oprs.) 5790-186-30-ABCD
WA2VMB (8 oprs.) 3900-130-30-AB
W2MAC (7 oprs.) 3510-101-30-ABCD
K2LFB (K2LFB, WA2GJA) 1872- 77-24-ABD
WB2VPY (17 oprs.) 1274- 98-13-AB
WA2AGT (WA2AGT, WB2MXS) 468- 52- 9-AB

Western Pennsylvania

W3BWC 3550-140-25-ABC
WA3ISY 2944-128-23-AB
WA3BBJ/3 1710- 90-19-A
W3CSA 518- 37-14-AB
W3DJM 380- 38-10-A
K3ZAP 125- 25- 5-AB
WA3JDT 6- 3- 2-B
W3KWH (9 oprs.) 28,083-387-69-ABD
K3HKK/3 (9 oprs.) 14,991-254-57-ABCD

Indiana

K9KFR 13,800-276-50-AB
WA9IMF 3333-111-30-A
WA9ONY 3275-131-25-AB
WA9SSX 1840- 80-23-A
WA9QXZ 396- 44- 9-A
K9JTX 154- 22- 7-A
WA9YLZ 136- 34- 4-B
K9VPE/9 (K9s QCB VPE) 9415-269-35-AB

Wisconsin

WA9SDC 5360-134-40-AB
WA9WIL 3416-122-28-A
WA9UUK 418- 37-11-ABD
WA9SZH 56- 8- 7-AB
WA9EZU 45- 9- 5-A
W9KHH 9- 3- 3-B
K9DKW (6 oprs.) 9917-211-47-AB
W9YT (K9OXY, WA9s IQY LZM) 9750-185-50-ABE

DAKOTA DIVISION

Minnesota

KØGYO 270- 27-10-A

North Dakota

KØALL 602- 43-14-A

DELTA DIVISION

Louisiana

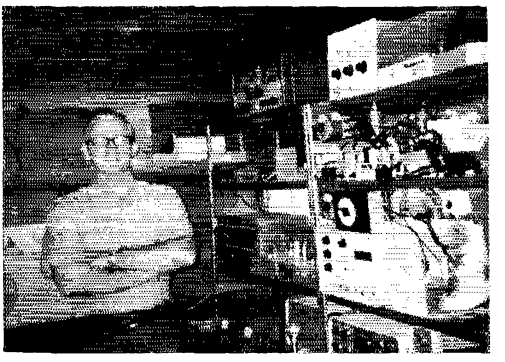
K5AGI 10,105-215-47-A
WA5TTH 8280-184-45-A
W5JFB 16- 8- 2-AB

Mississippi

K5TYP (5 oprs.) 9270-206-45-AB

Tennessee

WB4FOX 4251-109-39-A
W4IMX 429- 33-13-A
WA4JJY 299- 23-13-A



W5WAX savors sweet success — in this case, rolling up the second-highest single-op score west of the Mississippi. On 50 MHz., where he nabbed 47 sections, Sam swiveled six elements at a mere 100 feet.

K3JRO/3 (4 oprs.) 8885-215-39-AB
WA3CFK/3 (WA3CFK, WN3JBS) 4031-139-29-AB
WA3FRU (5 oprs.) 1820- 91-20-AB

CENTRAL DIVISION

Illinois

K9HMB 6096-127-48-A
W9EET 2378- 82-29-AB
WA9KAN 1230- 82-15-A
K9TSQ 595- 85- 7-AB
W9DJZ 500- 50-10-A
WA9PYA 495- 99- 5-B
WA9SDT 336- 24-14-AB
WA9CUK 270- 30- 9-A
WA9OBQ 240- 60- 4-B
WA9FXH 232- 58- 4-B
K9DNW 228- 38- 6-A
WA9MBZ 144- 36- 4-B
K9DTB/9 140- 20- 7-AB
WA9NRI 132- 44- 3-B
WA9KQD 27- 9- 3-AB
WA9TCW/9 (WA9s QZE TCW) 324- 54- 6-AB
WB4IED (7 oprs.) 5940-163-36-ABE
W4WQZ (W4WQZ, WA4CGA) 5712-133-42-ABD
WA4PWO/4 (WA4s HGQ PWO YCL) 4620-154-30-AB
W4TZG (W4TJC, WA4HSE, WB4ENN) 4455-135-33-A
WA4BXZ (K4PKV, WA4BXZ, WB4ANX) 3536-102-34-ABD
WA4ZTH (4 oprs.) 2436-116-21-AB
WB4HAP (WB4s HAP IOB) 225- 35- 9-A

GREAT LAKES DIVISION

Kentucky

WA8LXJ/4 1554- 74-21-A
WA8TYF/4 663- 51-13-AB
K4QPJ (K4s QPJ WYN) 799- 47-17-AB

Michigan

W8NOH 2244-102-22-AB
WA8PST 868- 62-14-AB
W8LDU 832- 49-16-BD
W8CVQ 672- 53-12-ABD
WA8VHG 594- 49-11-BD
WA8PIE 584- 73- 8-B
WA8EOW 420- 35-12-A
WA8LLY 160- 32- 5-B
WN8YVY 2- 2- 1-B
WB8AOA/8 (4 oprs.) 560- 56-10-AB

Ohio

W8KKF 5790-192-30-ABC
WA8LOW 5494-141-39-AB
WA8HPY 4794-141-34-A
WA8WJW 2392- 92-26-A
K8WVZ 2124-118-18-A
K8ZES 954-106- 9-BD
WA8STX 798- 57-14-AB
WA8KPN 720- 60-12-A
W8JRN 624- 50-12-ABCD
WA8RCN 156- 26- 6-A
WA8MTS 8- 4- 2-A
WA8ZYT 3- 3- 1-A
WA8PLZ/8 (7 oprs.) 25,134-422-59-ABD
WA8BCA (9 oprs.) 24,750-445-55-ABD
W8CCI (7 oprs.) 24,192-448-54-AB
K8DOC (7 oprs.) 21,892-421-52-AB
WA8AHD (WA8s AHD FHF) 1826- 83-22-A
W8VND (16 oprs.) 1612-124-13-AB
WA8SRF (WA8s SRF TNF) 468- 52- 9-A
WA8TFO/8 (WA8s TFO UEG) 432- 48- 9-A

HUDSON DIVISION

Eastern New York

W2CRS 17,984-260-64-ABCD
WA2KUL 3597-109-33-AB
WA2VAZ 798- 42-19-AB
W2IP 338- 26-13-B
K2CQG 196- 14- 7-D
WN2BND 100- 25- 4-B
WB2VQK 24- 4- 2-B
K2QBW 18- 6- 3-B
W2JKI (5 oprs.) 41,607-576-69-ABCD
W2UFT (6 oprs.) 35,230-509-65-ABCD
WB2FKJ/2 (12 oprs.) 32,376-508-57-ABCDE
K2BGU (5 oprs.) 7339-179-41-AB
W2ZXK (6 oprs.) 2484-108-23-AB
WA2DNR (5 oprs.) 2071-109-19-AB
WB2WHW (WB2s WHW YHE) 130- 26- 5-B

New York City-Long Island

WB2MZE 6169-199-31-AB
WB2QLP 6090-210-29-A
W2SEU 3201- 80-33-ABCD
WB2WQE 2541-121-21-AB
WA2ZPX 2192-137-16-AB
WN2ESD 672- 84- 8-B
WA2EUS 660- 40-15-ABD
WB2UMH 462- 42-11-A
WB2TJE 455- 65- 7-B
W2KXG 270- 54- 5-B
WB2UFN 228- 38- 6-A
WN2ETO 5- 5- 1-B
WB2PGR 4- 4- 1-B
K2RTH (6 oprs.) 30,774-423-69-ABCD
WA2CVS (WA2BCS, WB2WOU) 2808-156-18-AB
WB2TOC (WB2s TOC ZAP) 1133-103-11-AB
WB2UCX (WB2s UCX ZBV) 315- 45- 7-B

Northern New Jersey

WA2FGK (K2LNS, opr.) 14,625-325-45-AB
WA2IRN 6831-207-33-AB
W2AQT 2052-108-19-B
WB2VFX 1980- 90-22-AB
WB2WEL 1827- 87-21-AB
WA2EBT 1760-110-16-B
W2CVW 1312- 82-16-AB
W2DZA 1062- 47-18-ABC
WB2ECU 927-103- 9-B
WA2BLB 560- 80- 7-B
WB2RTF 378- 63- 6-B
WB2BUP 375- 65- 5-B
WN2DUH 344- 43- 8-B
WB2VEE 24- 6- 4-A

W2PEZ/2 (7 oprs.)
43,225-624-65-ABCE
W2OJ/2 (5 oprs.)
29,095-497-55-ABCD
WB2WIK/2 (7 oprs.)
26,169-429-61-AB
K2VMR/2 (8 oprs.)
22,214-380-58-ABC
WB2QOQ (6 oprs.)
12,256-383-32-AB
WA2ANI (5 oprs.)
6660-222-30-AB
W2BSC (6 oprs.)
4158-189-22-AB
WB2KHD/2 (WB2s GMR KHD) 3298-194-17-B
WB2WIL/2 (5 oprs.)
1365- 75-15-ACD
K2RPZ/2 (K2RPZ, W2MNK)
1128- 94-12-A
WN2DQE (WN2s CUE DQE) 330- 55- 6-B
WA2CEW (WA2s AQK CEW, WN2FIG)
164- 41- 4-B

MIDWEST DIVISION

Iowa

WØPFP 5250-125-42-A

Kansas

W9ECV/Ø
15,822-293-54-A
WAØJYK 8688-176-48-ABCE
KØYNW 4200-120-35-AB
WØQDH/Ø
2444- 94-26-AB
WAØPOY 2156- 72-28-ABCE
WØSPF 574- 41-14-A

Missouri

KØTLM (KØTLM, WAØIKI)
13,915-253-55-AB

Nebraska

WAØMRH
7600-190-40-A
K2PCG/Ø
7095-165-43-AD
KØMBC 5075-145-35-A

NEW ENGLAND DIVISION

Connecticut

K1HTV 2751-131-21-B
K1YON2665- 67-27-ABCDE
WA1HUE
1518- 69-22-AB
WN1ISD 432- 48- 9-B
W1ZGZ/1 387- 43- 9-A
W1DZA 342- 38- 9-B
W1ENZ 273- 39- 7-B
WA1GTP 65- 13- 5-AB
WN1IQJ 45- 15- 3-B
WA1GIS 28- 7- 4-A
W1QVF/1 12- 4- 1-E
WA1CYT/1 8- 2- 2-AE
KL7ELA/W1*
4- 4- 1-B
K1PXE/1 (8 oprs.)
33,292-547-58-ABC
WA1IOX (13 oprs.)
31,806-513-62-ABCDE
W1LUA/1 (6 oprs.)
16,674-388-42-ABC
W1BCG/1 (7 oprs.)
5115-146-33-ABC
WA1IED (5 oprs.)
2590-100-25-AB
K1MUJ/1 (6 oprs.)
2196-183-12-A
WA1GLS (W1PDI, WA1GLS)
636- 53-12-B

Eastern Massachusetts

K1SRZ 5200-193-25-ABC
W1MX (WA2KZV, opr.)
4930-157-29-ABC
K1AGB 4293-128-27-AC
K1BXA 2813- 97-29-A
W1J8M 1848- 88-21-AB
WA1ETC 945- 63-15-AB
K1OJQ 720- 48-15-B
W1LMZ 420- 30-14-B
WA1DCI 312- 22-12-BD
WA1GDR 192- 24- 8-A
WA1DYU 180- 30- 6-A
WA2PTS/1
105- 21- 5-B
W1CTR/1 95- 19- 5-B
W1NBN (K1s JPW QDR, W1EUJ)
5206-128-38-ABCD
K1TXV (K1s PMM TXV)
2560-160-16-AB
WA1FCD (WA1s CPG DWL FCD) 1065- 71-15-AB
WN1IIE (WA1HHK, WN1IIE)
104- 26- 4-B

Maine

W1IPJ/1 (12 oprs.)
26,125-428-55-ABCD

New Hampshire

K1HFK 2697- 87-31-A
W1AZK 1166- 50-22-BC
W1ALE 840- 35-21-ABCD
W91NW/1 767- 56-13-BD
K1PSR 216- 18- 6-C
VE3FCH/W1 (7 oprs.)
1636-244-19-AB

Rhode Island

K1ABR 5560-139-40-AB
WA1GFG 5460-182-30-AB
W1POP 1539- 81-19-AB

Vermont

WA1GYL/1
5174-199-26-AB
K1GYT 2704-104-26-AB
W1MEP 231- 20-11-ABC
W1ADZ/1 (K1PYX, W1ADZ) 672- 48-14-AB

Western Massachusetts

K1ZGB 5040-168-30-AB
WA1HHN
2204-116-19-AB
K1JIX 1995- 62-21-BCD
K1ULZ 924- 77-12-AB
W1UCB 180- 20- 9-AB
K1YLU/1 (9 oprs.)
17,865-371-45-ABCD
K1BZM/1 (8 oprs.)
13,770-235-54-ABCD
WA1EJW/1 (WA1s EJW LJX) 3584-128-28-A
WA1IAM/1 (WA1s IAM IAN) 275- 25-11-AB

NORTHWESTERN DIVISION

Alaska

W8KNC/KL7
5- 5- 1-AB

Montana

W7JRG 2691-117-23-A
W7OIO 22- 11- 1-AB
W7DB 18- 9- 2-AB
K7LYY/7 (6 oprs.)
1040- 65-16-AB

Oregon

WA7ECY 1210-110-11-AB
W7UDM
1170- 70-15-ABCDE
W7TYR 266- 34- 7-ABCD
K7UYX/7 (K7ZCB, opr.)
24- 12- 2-AB
K7AUO/7 (12 oprs.)
6815-222-29-ABCDE
W7ZLR (K7H8J, W7ZLR)
84- 12- 7-AB

Shown above is a view of the antenna setup put to work by the **WB6NDJ/6** gang to tally 7200 points on all v.h.f. bands. The 5-foot microwave dish is in the foreground; other radiators include 6 elements on 6, 20 elements (plus a ground-plane) on 2, 11 elements on 220 and 20 elements on 432.

K7ICY (4 oprs.)
62- 31- 2-AB

Washington

W7FN 7029-213-33-A
K7VNU 3248-112-29-A
K7DBR 2394-114-21-A
K7KOT/7 (K7KOT, W7DNU)
5340-178-30-AB
W7Z8L/7 (K7s CAL WTG)
4725-221-19-ABE
K7MQF/7 (K7MQF, WA7GDU)
2432-128-19-AB
K7IEY/7 (K7IEY, WA7EHE)
1425- 75-19-AB
W7HMJ/7 (5 oprs.)
1170- 78-15-AB

PACIFIC DIVISION

East Bay

W6BXO 528- 48-11-AB
WA6OWH 66- 22- 3-B
WB6NDJ/6 (7 oprs.)
7200-260-25-ABCDE
WB6AAE (WA6s AGA VDC)
912- 69-12-ABD
WA6DUR/6 (4 oprs.)
750-150- 5-B

Hawaii

KH6BZF 1- 1- 1-A

Nevada

K7ICW 4068-112-36-ABD

Sacramento Valley

WA6GER
1044- 49-18-ABCD
W6TEE 333- 34- 9-ABCD
W6DOR 231- 33- 7-A
WB6WBP 215- 43- 5-B
WA6CXB 104- 26- 4-B
WN6BZI, 80- 20- 4-B

San Francisco

W6AJF 516- 30-12-ABCD
WB6WLF 68- 17- 4-A
K6NCG (WB6KLL, WA9LRO, WAØIKJ)
1183- 91-13-AB

San Joaquin Valley

WB6JTZ/6
340- 34-10-A
W6BWK/6 (4 oprs.)
1590-159-10-AB
WA6EXV/6 (WA6EXV, WB6CWN)
522- 87- 6-B

Santa Clara Valley

WB6KAP 2240- 98-20-ABCD
WB6DUB
1260-126-10-AB
WB6CKT 445- 89- 5-B
WA6FAC 150- 50- 3-B
W6ASH/6 26- 5- 2-BE
K6TJL/6 (6 oprs.)
4644-154-27-ABCDE
K6SLQ/6 (6 oprs.)
4180-189-20-ABCD

ROANOKE DIVISION

North Carolina

W4HJZ 2436- 86-28-ABD
W4EPV 1512- 72-21-AB
K4VAA 1196- 52-23-A
WB4CES 559- 43-13-A
WB4INE 260- 28-10-A
W4PAR/4 (K4HGK, WA4s HAZ JVD)
9266-226-41-A
WA4VCC/4 (K4LVV, WA4s BNX VCC)
6878-181-38-AB
W4RUL/4 (K4s EPC MOU, WA4LYF)
4110-137-30-AB
WA4WZP (WA4s MDW WZP, WB4EKD)
2052-108-19-AB

South Carolina

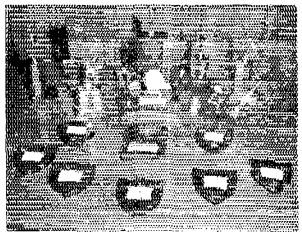
K4PXE (5 oprs.)
8085-165-49-AB

(*Continued on page 154*)

Happily proclaiming that "the U.S.A. gang come through like Gangbusters," QRP advocate **VE3EZC** snared 8 sections on 432 MHz. with just sixty watts.

Eighth World-Wide RTTY Sweepstakes

October 5–7, 1968



Eight trophies and eight plaques will be awarded in various categories.

THE Canadian Amateur Radio Teletype Group, CARTG, is pleased to announce the 8th world-wide RTTY SS.

1) The contest will commence at 0200 GMT Saturday October 5 and end at 0200 GMT Monday October 7, 1968. The total contest period is 48 hours but no more than 36 hours of operation is permitted. Times spent in listening counts as operating time. The 12 hour non-operating period can be taken at any time during the test, but "off periods" may not be less than two hours at a time. Times on and off *the air must be summarized on the log and score sheet.*

2) The contest will be conducted on the 3.5, 7, 14, 21 and 28 MHz. amateur bands.

3) The ARRL Country List will be used (except that KL7, KH6 and VO are to be considered as separate countries).

4) Messages will consist of the message number, time in GMT, zone, country or state.

5) Points: All two-way contacts with stations in one's own zone will receive 2 exchange points. All two-way contacts with stations outside one's own zone will receive the points listed below in the table. Stations may not be contacted more than once on any one band. Additional contacts may be made with the same station if different bands are used for each contact.

6) Logs must contain bands, number, exchanges and times sent and received GMT, calls, scores, countries, exchange points, shifts and rest periods.

7) A multiplier of one is given for each country worked, including one's own, on each band, e.g., if one country is worked on 3 bands, then 3 points is given.

8) The total number of exchange points multiplied by the number of countries worked, multiplied by the number of continents contacted (maximum of six) equals the final score. *Example:*

3.5 MHz. —	5	countries
7 "	4	"
14 "	18	"
21 "	10	"
28 "	3	"
Total of	40	countries

Exchange points = 2020
Continents = 5

2020 × 40 × 5 = 404,000
CLAIMED SCORE

9) Logs must be received no later than November 30, 1968 and should be sent to the CARTG, 85 Fifeshire Road, Willowdale, Ontario, Canada. QST

CORRESPONDENT zone

YOUR zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	2	14	10	13	16	18	22	20	25	30	36	37	39	21	22	19	20	17	11	25	29	29	22	22	16	28	25	31	39	35	14	36	25	29	34	39	40	47	44	15
2	14	2	15	8	7	16	16	12	16	23	24	30	30	12	14	16	19	20	19	19	25	31	26	30	28	35	35	40	50	50	25	47	14	21	21	28	33	36	37	6
3	10	15	2	8	11	9	13	14	18	21	28	28	30	26	28	27	29	27	21	32	37	39	32	31	24	37	33	40	43	35	11	32	29	35	35	42	48	50	52	20
4	13	8	8	2	5	8	10	8	12	18	22	25	27	19	21	23	26	26	22	26	33	37	32	34	30	40	38	44	52	44	20	40	21	28	26	33	40	41	44	14
5	15	7	11	3	2	9	9	6	10	17	20	24	25	18	20	22	26	26	24	35	32	38	33	35	31	41	40	45	54	46	22	41	19	27	24	31	38	39	42	13
6	18	16	9	8	9	2	4	7	10	12	19	19	21	27	29	31	34	33	29	34	40	46	40	40	33	46	42	49	47	38	17	32	28	36	30	37	44	43	48	22
7	22	16	13	10	9	4	2	4	6	8	15	15	17	26	29	31	35	36	33	33	40	47	42	44	38	50	46	53	49	40	22	34	26	34	26	33	40	38	44	22
8	20	12	14	8	6	7	4	2	5	11	15	18	19	22	24	27	31	32	30	29	35	42	38	42	37	47	46	51	54	44	24	38	21	30	23	30	38	36	41	13
9	25	16	18	12	10	10	6	5	2	8	10	14	15	23	25	29	33	35	34	29	35	43	41	45	41	50	50	55	52	45	28	38	21	30	23	27	35	32	38	21
10	30	23	21	18	17	12	8	11	8	2	9	7	9	31	33	37	41	43	41	36	42	51	49	52	45	58	52	54	44	37	28	31	28	36	24	29	38	31	38	29
11	36	24	28	22	20	19	15	15	10	9	2	9	7	26	28	33	36	41	43	30	34	42	45	51	52	49	55	49	42	41	37	35	22	29	16	20	28	23	29	27
12	37	30	28	25	24	19	15	18	14	7	9	2	3	35	37	41	45	49	48	39	42	49	53	58	50	52	52	48	37	33	32	27	31	37	34	27	33	27	33	34
13	39	30	30	27	25	21	17	19	15	9	7	3	2	33	35	40	43	48	49	37	39	46	50	56	53	50	52	46	34	34	35	29	29	34	21	24	30	24	30	34
14	21	12	26	19	18	27	26	22	23	31	26	35	33	2	3	6	10	14	18	7	14	21	19	25	27	27	30	32	42	49	34	55	5	10	15	19	21	26	26	6
15	22	14	28	21	20	29	29	24	25	33	28	37	35	3	2	5	9	13	18	6	11	18	17	23	27	25	29	30	39	47	36	54	6	7	15	18	19	25	24	8
16	19	16	17	23	22	31	31	27	29	37	33	41	40	6	5	2	4	8	13	6	10	15	12	18	22	21	24	26	36	42	33	49	10	9	20	21	21	27	25	9
17	20	19	29	26	26	34	35	31	33	41	36	45	43	10	9	4	2	5	12	7	8	12	8	14	19	17	20	22	32	38	32	45	14	10	22	22	20	27	23	12
18	17	20	27	26	26	33	36	32	35	43	41	49	48	14	13	8	5	2	7	12	12	12	6	11	14	15	16	20	30	35	29	40	13	15	27	28	24	31	27	14
19	11	19	21	22	24	29	33	30	34	41	43	48	49	18	18	13	12	7	2	18	19	16	10	10	9	16	15	20	30	32	21	36	23	21	33	34	30	38	33	16
20	25	19	32	26	35	34	33	29	29	26	30	39	37	7	6	6	7	12	18	2	6	14	14	20	26	21	26	25	34	43	39	49	8	3	15	16	15	22	20	12
21	29	25	37	33	32	40	40	35	35	42	34	42	39	14	11	10	8	12	19	6	2	9	11	17	24	16	21	20	28	37	40	43	14	6	18	16	11	19	15	19
22	29	31	39	37	38	47	46	42	43	51	42	49	46	21	18	15	12	12	16	14	-9	2	6	10	18	17	13	11	21	29	36	35	22	14	26	22	15	22	16	24
23	22	26	32	32	33	40	42	38	41	49	45	53	50	19	17	12	8	6	10	14	11	6	2	6	13	8	12	14	24	30	31	37	22	16	29	26	21	28	22	20
24	22	30	31	34	35	40	44	42	45	52	51	58	56	25	23	18	14	11	10	20	17	10	6	2	8	8	6	10	20	24	26	30	28	22	35	33	25	32	25	25
25	16	28	24	30	31	33	38	37	41	45	52	50	53	27	27	22	19	14	9	26	24	18	13	8	2	13	9	15	23	30	18	27	32	28	41	40	33	40	33	25
26	25	35	37	40	41	46	50	47	50	50	49	52	50	27	25	21	17	15	16	21	16	7	8	6	13	2	6	5	16	22	31	29	29	21	33	29	21	27	20	29
27	25	35	33	38	40	42	46	46	50	52	55	52	52	30	29	24	20	16	15	26	21	13	12	6	9	6	2	7	15	18	25	25	34	27	40	35	27	32	26	30
28	31	40	40	44	45	49	53	51	55	54	49	48	46	32	30	26	22	20	20	25	20	11	14	10	15	5	7	2	10	17	31	24	34	25	36	30	22	26	19	34
29	39	50	43	52	54	47	49	54	52	44	42	37	37	42	39	36	32	30	30	34	28	21	24	20	23	16	15	10	2	9	15	32	42	33	39	31	24	24	20	44
30	35	50	35	44	46	38	40	44	45	37	41	33	34	49	47	42	38	45	32	43	37	29	30	24	30	22	18	17	9	2	24	7	51	42	17	40	33	32	29	48
31	14	25	11	20	22	17	22	24	28	26	37	32	35	34	36	33	32	29	21	39	40	36	31	26	19	31	25	31	15	24	2	22	39	42	46	53	52	56	51	28
32	36	47	32	40	41	32	34	38	38	31	35	27	29	55	54	49	45	40	36	49	43	35	37	30	27	29	25	24	32	7	22	2	57	48	47	42	38	34	33	50
33	25	14	29	21	19	28	26	21	21	28	22	31	29	5	6	10	14	18	23	8	14	22	22	28	32	29	34	34	42	51	39	57	2	9	10	14	18	22	23	10
34	29	21	35	28	27	36	34	30	30	36	29	37	34	10	7	9	10	15	21	3	6	14	16	22	28	21	27	25	33	42	42	48	9	2	13	12	12	18	16	16
35	34	21	35	26	24	30	26	23	20	24	16	34	21	15	15	20	22	27	33	15	18	26	29	35	41	33	40	36	39	47	46	47	10	13	2	7	15	15	19	20
36	39	28	42	33	31	37	33	30	27	29	20	27	24	19	18	21	22	28	34	16	16	22	26	33	40	29	35	30	31	40	53	42	14	12	7	2	8	8	11	24
37	40	33	48	40	38	44	40	38	35	38	28	33	30	21	19	21	20	24	30	15	11	15	21	25	33	21	27	22	24	33	52	38	18	12	15	8	2	7	5	28
38	47	36	50	41	39	43	38	36	32	31	23	27	24	26	25	27	27	31	38	22	19	22	28	32	40	27	32	26	24	32	56	34	22	18	15	8	7	2	6	32
39	44	37	52	44	42	48	44	41	38	38	29	33	30	26	24	25	23	27	33	20	15	16	22	25	33	20	26	19	20	29	51	33	23	16	19	11	5	6	2	32
40	15	5	20	14	13	22	22	18	21	29	27	34	34	6	8	9	12	14	16	12	19	24	20	25	25	29	30	34	44	48	28	50	10	16	20	24	28	32	32	2

Strays

Slow-Scan TV Pictures Exchanged Between Canada and Sweden

U.S. amateurs can join in the slow-scan fun now without having to seek a special temporary authorization. The Commission's Report and Order in Docket 17736 appears in Happenings of the Month, pages 80, 84 of this issue, and permits slow-scan television in portions of the h.f. and v.h.f. bands.

THE idea of transmitting pictures using equipment designed for voice communication has caught the imagination of many amateurs. On June 24, 1968, two-way pictures were exchanged between Art Backman, SMØBUO, in Stockholm, Sweden, and Syd Horne, VE3EGO, in Ottawa, Canada, on 14.180 MHz. This is the first time two-way pictures have been exchanged across the Atlantic by radio amateurs. In December, 1959, Copthorne MacDonald, WA2BCW, transmitted SSTV pictures across the Atlantic which were received in Great Britain.

Many months of work and planning preceded this event. In addition to constructing the cameras and receiving monitors, permission had to be obtained to transmit slow-scan TV from the licensing authorities in both countries. Special permission was granted to Canadian amateurs for a period of one year to transmit slow-scan TV pictures, provided that the bandwidth occupied for picture transmission does not exceed that used for normal amplitude-modulated single-sideband voice transmission. The frequency allocations granted to Canadian and Swedish amateurs are given in Table I.

The equipment used at both stations consisted of cameras and monitors similar to those described by Copthorne MacDonald in *QST*.[1,2] Both cameras were modified to use conventional vidicons which are more readily obtainable than the slow-scan vidicon tubes.

TABLE I

SSTV Frequency Allocations for Canadian Amateurs	*SSTV Frequency Allocations for Swedish Amateurs*
3.725- 3.750 MHz.	3.600- 3.800 MHz.
7.150- 7.175 MHz.	7.050- 7.100 MHz.
14.175-14.350 MHz.	14.100-14.350 MHz.
21.100-21.450 MHz.	21.100-21.450 MHz.
28.100-29.700 MHz.	28.100-29.700 MHz.

Note: The special Canadian frequency allocation is valid until March 31, 1969, and the special Swedish frequency allocation is valid until June 30, 1969.

Syd Horne, VE3EGO

Art Backman, SMØBUO

Development work on a still-better equipment continues on both ends. SMOBUO has completed a new camera using a Plumbicon tube and VE3EGO has a working transistorized sampling camera. (The camera samples the output from a "fast scan" picture source producing pictures at the slow scan rate.) Additional work is being done on transistorized monitors with circuitry to render the picture information more immune to QRM.

Commencing in September, regular picture transmissions are planned by VE3EGO on the 80-, 20- and 15-meter bands in order to conduct further experiments and to assist other amateurs to experiment with this mode of transmission. —*S.M.K. Horne, VE3EGO*

[1] MacDonald, "A Compact Slow-Scan TV Monitor," *QST*, March, 1964.

[2] MacDonald, "A Slow-Scan TV Camera," *QST*, June, July, and August, 1965.

Stolen Equipment

A Hallicrafters SX-100 was stolen from my home on July 13. Unfortunately, I do not know the serial number. However, the unit did have a fused a.c. plug and an SO-239 coax antenna fitting. Jack McKay, WA6DPD/3, 3116 Camp St., Pittsburgh, Pa. 15219.

The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NIM

Charles City Comments

LAST month's writeup on the Charles City disaster was factual, as such writeups should be. But with all the material sent in came also a lot of comment about what was wrong, and what *should* have been done.

'Tis ever thus. Probably we amateurs will never reach the utopian state of readiness that will enable us to handle an emergency operation in stride. Once in a while we come close to it. Usually, as in the case of the recent Iowa tornadoes, we are a long way from it.

Most of the comments received are typical. Many of them are worth repeating. Some of them are thought-provoking and significant. We take the liberty herewith of extracting a few quotes. Since we do so without specific permission, no names (or calls) will be mentioned:

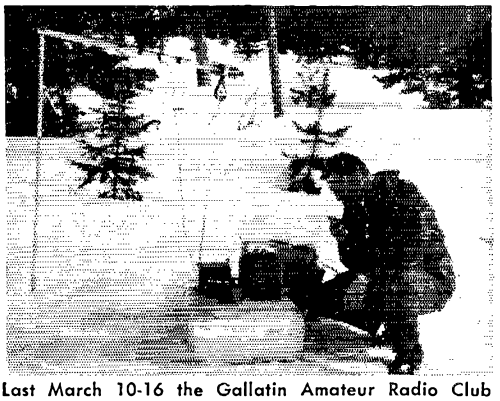
"When one monitors emergency operation on 75 meters from home," says one official, "one has a feeling of mixed emotions. The sloppy operating and incomplete messages that first came through made one almost ashamed to be associated with the amateur fraternity." He goes on to relate an example of a message ordering medical supplies which reached its destination, somehow, over an hour after origination after three relays — whether without error was never ascertained because the supplier demanded a signature and the amateurs were not able to supply one. The operation was frequently interrupted by "breakers" with "emergency" welfare traffic. An experienced traffic handler explained to some of the operators about ARL texts, but one volunteer worker at Charles City held a stack of them without knowing what they were and apparently without trying to find out. "Guess this is typical," says our correspondent, "but if our section nets would function as they should, operators would be ready for emergencies. It seems funny, too, that all emergency work hits for 75-meter s.s.b. even the c.w. operators."

As mentioned in the writeup, Charles City and other nearby places were largely without electric power for some time. "The confusion that existed in the early hours of the disaster," says another amateur official, "was typified when a service station operator from a nearby town had a 250-kw. generator mounted on a flat bed truck. When he arrived in Charles City, the local authorities told him it wasn't needed!"

One EC suggests that local citizens well acquainted with townspeople could be very helpful in locating addresses of health and welfare inquiries. They would tour the town, find out about the fates of various people and areas, then use this knowledge in answering inquiries at Red Cross headquarters and elsewhere.

Says another EC: "We cannot stress too much the need for experience in traffic-handling when radio amateurs find themselves trying to help out during an actual emergency. It's quite obvious which operators have traffic-handling experience and know-how. If you are called upon to provide emergency communications during a disaster, take time to remember the importance of portable generators, antennas and such things as extra coax feedline, connectors, tools, soldering gun, nylon rope, extra microphones, message forms and a big, big sign which reads 'EMERGENCY COMMUNICATIONS BY AMATEUR RADIO!' so no one refers to you as 'Citizens Band Operators.' "

Learning by experience is the hard way to learn, but probably the most effective. A much easier way is to learn by other peoples' experiences. Most of us realize this and wish we had done it only when the emergency is upon us and we suddenly realize we don't know just what to do. There probably has never yet been an emergency in which a sizable number of amateurs, serene in their confidence that they could handle anything, have discovered that they were inadequate and ineffective. A couple of lines of commentary at the beginning of the ARPSC slide collection are apropos: "Is your car, sitting out there in the parking lot, equipped with an operating mobile rig? If an emergency struck now, would you know precisely where to go and what to do when you got there? If not, you better pay close attention . . ."



Last March 10-16 the Gallatin Amateur Radio Club provided communications for the Junior National Ski Championships held at a ski area near Bozeman, Mont. Here's K7EVZ of Bozeman operating one of the "lunch boxes" which were used to relay times from the finish line to the control center.

* Communications Manager, ARRL.

On June 15 a joint SCN-RN6 meeting was held at Redondo Beach, Calif. to "Reshape the New Look" on ARPSC. Left to right are WA6ROF (RN6 manager), WB6UTC, K6IME and WA6KZI (SCN manager). *(Photo by WB6ZKK.)*

Pay close attention, fellows and gals. The time to learn how to do it is now, not after the tornado touches down. — *W1NJM.*

National Traffic System

Let's kick around the topic of whether or not NTS net managers and TCC directors should have "terms" of office. As you know, NTS managers at local and section level are appointed by the section management (the SCM or appointees designated by him); at region and area levels, the appointment is made under the direction of the ARRL communications manager. No specific terms are set for any such appointments or designations; the net manager serves until or unless he resigns or is otherwise replaced.

Proponents of the idea that they should be given terms point out that at present the same person remains manager year in and year out, without anyone ever questioning what kind of a job he is doing and with thought to having a new manager only if the present manager decides, for one reason or another, to resign — or dies in office. The appointment should be reviewed at regular intervals and either renewed or cancelled, as are other ARRL appointments; without this, it is very possible and quite common for the appointee to become inactive or for other reasons do an inadequate job and no one does anything about it because it is embarrassing to try to "kick him out."

Opponents contend that nothing is gained by imposing terms on such appointments except more administrative burden. If a person is doing a good job, you don't want to remind him every so often that he might want to consider quitting. If he is doing a lousy job, or not doing a job at all, you can kick him out any time, without the temptation to wait until his term runs out and then get around it by just not renewing him. The custom has been to act promptly on resignations or inactivity, but to proceed cautiously on taking action to remove an active appointee. We cannot speak for local or section levels, but at region and area levels there have been three managers removed from office in NTS's 20-year history — two for inactivity, one for unpopularity. The latter was a long drawn out procedure, because a good net manager isn't necessarily popular (sometimes quite the contrary!) and unpopularity in itself is not a good reason for dismissal. All other managers have resigned of their own accord when the time came that they felt they could no longer do an adequate job or when they just plain felt someone else ought to have a crack at it.

NTS managers are all volunteers. Those at region, area and TCC level do get certain travel expenses; the rest get nothing but the honor of serving. No one is doing any of them a favor in appointing them. On the other hand, everybody agrees that the standards should be kept high. On the whole, we feel that the leadership in NTS has been among the highest of any part of our ARRL organization, and we are very proud of them and the traffic system they have built and maintained. Shall we argue with success? Will terms for managers improve things? — *W1NJM.*

June reports:

Nets	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN	60	546	.396	9.1	87.4
2RN	59	670	.644	11.4	95.9
3RN	60	502	.393	8.4	97.9
4RN	51	391	.300	7.7	75.5
RN5	60	705	.356	11.8	91.1
RN6	60	1,249	.668	20.8	54.1
RN7	59	761	.484	12.9	45.3
8RN	60	380	.291	6.3	94.4
9RN	58	528	.164	9.1	93.1
TEN	55	303	.378	5.5	13.2
ECN	60	184	.231	3.1	83.3
TWN	44	144	.131	3.3	39.7
EAN	30	1,685	1.149	56.2	97.8
CAN	30	1,003	.758	33.4	100.0
PAN	30	1,681	.926	51.9	100.0
Sections[1]	1559	9,079		5.8	
TCC Eastern	120[2]	883			
TCC Central	90[2]	619			
TCC Pacific	120[2]	1,135			
Summary	2335	22,468	EAN	8.6	—
Record	3242	23,817	.991	15.9	—

[1] Section nets reporting (52): EMN, EMNN (Mass.); NCN(E), NCN(L) (N.C.); WSSN, BEN, WIN, WSBN (Wis.); GSN (Ga.); VN, VSN (Va.); W. Fla. Phone, GN, QFN, VEN, FMTN (Fla.); Ohio SSB, OSN, BN (Ohio); EPA, Pa. Phone, VHF 6 Meter, VHF 2 Meter, EPA Emerg. P T, PTTN (Pa.); NYS (N.Y.); Passaic Valley E T, NJEPTN, NJN (N.J.); MDDS (Md.-Del.-D.C.); QIN (Ind.), SCN (S.C.); WSN (Wash.); Colo. HN; BUN (Utah); Mich. 6 Meter, QFN (Mich.); ILN (Ill.); MINN (Mo.); PTN (Me.); CPN (Conn.); RISPN (R.I.); TEX (Tex.); OLZ, SSZ (Okla.); MJN (Minn.)

[2] TCC functions, not counted as net sessions.

We are going to have to "crack down" on section and local net reports. Please use CD-125 for reporting these nets. If you don't have a CD-125 form, be sure to indicate your *NTS* liaison, otherwise you will not be included in the listing above.

W1EFW reports that 1RN is trying to conform to the NTS operating schedule, but summer operation is rough, representation is down, QRM and traffic is up. W2FR is getting 2RN on the ball in the same manner, but likewise has a hatful of difficulties. W3MVO sez hot wx and QRN are the theme on 3RN. WA6ROF starts his RN6 managership with a bang, appointing W6BGF as assistant and establishing a PAN3 station assignment to handle overload traffic and serve as an alternate to PAN send and receive liasison stations. RN7 moved schedules to conform to NTS pattern; W7BQ reports a jump in traffic, VE7ZK leading in representation for B.C. The TEN report this month is a long way down from this RN's high standing of past years; W0LGG hopes for more activity come school and shorter days (longer nights). VE3BZB visited VE1-land to try to stir up more activity there. W7NHL says even 40 meter conditions have been bad, which tends to discourage activity in the mountains. K2KIR says weak signals and poor receiving ability during QRN is hindering traffic to and from "outlying" regions. Strangely enough, W9DYG reports summer conditions also hindering CAN. W6VNQ reports that the shift of PAN to 7135 kc. is working out well for the most part, with 3675 being used as a QNY frequency for short-hop purposes. Note that with all this moaning and groaning the system still shows a lot accomplished.

W4YOQ is the combined club and c.d. (RACES) station at Owensboro, Ky. Here are WA4JQE (standing) and W4EWL conferring at the 75-meter position, with the status board in the background.

Transcontinental Corps. Eleven unsuccessful functions in the Eastern Area, but W3EML pleased with summer performance, especially by alternates filling in for vacationers. WØLCX reports only seven missed skeds in Central Area, some of which he says he could have saved if he hadn't been out of town. W7DZX was QRL with cherry harvest at report time but reports over 90% successful functions as TCC-Pacific practically runs itself in his absence. Nearly *all* unsuccessful functions were the result of bad conditions; *very few* resulted from no-show on the part of functionaries. June summary:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern.....	120	90.8	2204	883
Central.....	90	92.2	1324	619
Pacific.....	120	91.4	2278	1135
Summary..	230	91.5	5806	2637

The TCC roster: Eastern Area (W3EML, dir.) — *W1s* BJG EFW EOB NJM, *W2s* FR GKZ MTA QC, K2RYH, *WA2s* BLV UWA, *WB2s* FIT OYE RKK UHZ, K3MVO, WA3CTP, *W4s* NLV UQ ZM, K4KNP, WB4GTG, *W8s* CHT RYP UM, K8KMQ, *WA8s* OCG POS ZGC. Central Area (WØLCX, dir.) — W4OGG, K4DZM, *WA4s* AVM WWT, WB4AIN, W5KRX, WA5AVO, *W9s* CXY DND DYG VAY, WA9OTD, WA9VZM, WA9RAK, *WØs* INH LCX, *KØs* AEM YBD, *WAØs* DOU MLE; AVM WWT, WB4AIN, W5KRX, WA5AVO, *W9s* CXY DND DYG VAY, *WA9s* OTD VZM RAK, *WØs* INH LCX, *KØs* AEM YBD, *WAØs* DOU MLE. Pacific Area (W7DZX, dir.) *W6s* BGF EOT HC IPC IPW TYM VNQ VZT, K6DYX, WA6ROF, WB6HVA, *W7s* AAO KZ ZB ZIW, K7HLR, WA7CLF, VE7ZK.

Diary of the AREC and RACES

We have a communication from HB9PJ concerning an emergency operation he conducted with SP3AUZ, which has been kicked around between this column and the IARU column. So here's the dope: On Feb. 24, HB9PJ received an SOS call from SP3AUZ (Poland) and was informed that a Polish boy would die unless he obtained a rare drug within 24 hours. HB9PJ spent hours finding a source of the drug, obtaining it and rushing it by air to Poland. Later, he received a letter from the boy's father to the effect that the drug had apparently saved the boy's life.

—•••—

On Mar. 16 W4RKH received a call from VE3AXQ requesting assistance in delivering an emergency message to a party believed to be vacationing in Panama City, Fla. WA4WHW was raised on MARS, via repeater, and the information was passed to the local EC who arranged for an announcement on a local TV station. The party being sought saw the announcement and contacted his relatives in Canada. — *W4RKH, SCM W. Fla.*

—•••—

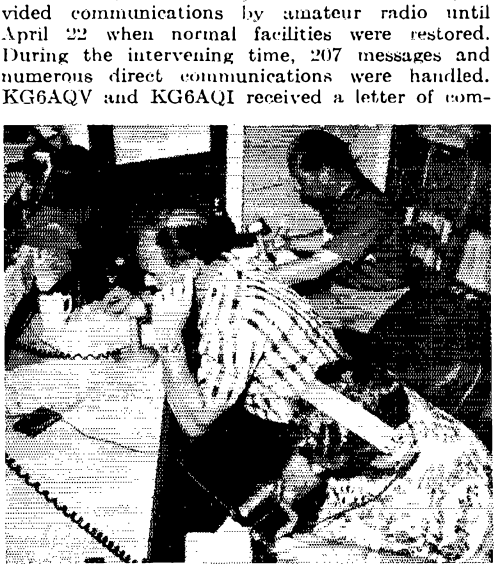
Amateurs assisted in a search for a missing boy in Don Mills, Ont., on Mar. 23. VE3ARE spread the word and soon had *VE3s* CWA DSB OV and CSO on the scene with their mobile rigs. VE3FBH was set up as control station and other stations stood by in case needed. Unfortunately, the boy was found by scuba divers the next day, drowned. — *Nortopics*, bulletin of the *Nortown Amateur Radio Club.*

—•••—

On Mar. 26 a team of 15 amateurs, led by EC W8NDM and assistant ECs W8TZZ, WA8EFK and K8WXO was activated when reports of a tornado touching down north of Monroe, Mich., were received. Four mobiles were dispatched with Red Cross survey teams to search the area for personal injury and property damage, continuing until long after dark, and reports were relayed to Red Cross headquarters. The following morning mobiles were again sent out to supply communications for survey teams estimating and reporting property damage. No personal injuries were found, although some personal problems of other kinds were solved. — *WSNDM, EC Monroe County, Mich.*

—•••—

At 2200Z April 11 the Guam Disaster Net was activated because of approaching Typhoon Jean, with KG6AAY and KG6AQI sharing NCS duties as KG6ALY acted as weather reporting and tracking station. Approximately 20 other stations from Guam, Saipan and the Western Carolines were also in the net. The typhoon struck Saipan at approximately 0400Z April 12 and battered the island for 12 hours. Damage was heavy and all public utilities were put out of action. After the storm, KG6AQV and KG6AQI flew to Saipan from Guam and provided communications by amateur radio until April 22 when normal facilities were restored. During the intervening time, 207 messages and numerous direct communications were handled. KG6AQV and KG6AQI received a letter of com-



A joint AREC/RACES drill in Orange County, Calif., simulated a widespread electrical failure on May 18. It was termed "Operation Switch-Off." Here at the AREC control station are (back to front) WA6YWN, WB6CQR and WB6RUM.

Mississippi Sideband Net outgoing manager WA5KEY (left) is shown with incoming manager WA5YUD (right) and WA5OHQ, winner of the net's W5EPT Citizenship Award.

mendation from their commanding officer. — *KG6AQI, EC Guam.*

— • • • —

Unable to get through to his brother in New York City on May 2 to inform him of the serious illness of their mother, a Brazilian citizen turned to amateur radio. An emergency message was originated by PY2AUM in Sao Paulo and transmitted to WA3CNM who relayed to WB2IYO who relayed to WA2FTS who telephoned the police precinct station who delivered the message to the addressee. — *WB2IYO, PAM N.N.J.*

— • • • —

On May 10, WA8ZDF received a call from W6QGD/HK5 that a Colombian child needed treatment by a drug not available in Colombia, in order to survive. WA8ZDF contacted the maker of the drug in Cleveland, who talked directly with the Brazilian doctor, and immediate shipment by air was arranged. HK5BFJ also assisted in the operation. — *K8SYH.*

— • • • —

On May 15 the Villages of Waynesville and Wapella, Ill., suffered damage from very high winds. At 0630Z the disaster communications chairman of the American Red Cross (W9AES) contacted W9VHD asking him to take his mobile to Wapella and set up communications. At 1100Z the North Central Phone Net opened on 3915 kc. and contacted W9VHD in Wapella. Meanwhile, K9SWR was gathering up equipment to take to Wapella for a base station. W9VHD/mobile was used until about 1600Z when the base station was activated as K9SWR/9. Also active was W9KXN who took a survey team through the country. W9VHD/mobile was then sent to Waynesville to set up communications there with K9SWR/9 in Wapella. Telephone service was restored that afternoon and the net was closed at 2100Z. Net control stations were *W9s* JXV HGO, *K9s* IVG HSK who, along with W9KXN/mobile, K9SWR/mobile/portable, *W9s* UZE ZWT, *K9s* HRC UZG and WA9ITV were the backbone of the operation, although many other amateurs called in to offer assistance. W9VHD, our reporter, says it was the best disciplined net he ever heard.

— • • • —

The first operation involving the Owensboro-Daviess County (Ky.) c.d. 30-foot rescue boat, affectionately but unofficially known as "Leaking Lena," was its own rescue beginning in the early afternoon of May 25. The boat lost its engine, said it was adrift in the channel in a rather inaccessible stretch of river, and went off the air. WA4MXD and K4UDZ in the former's mobile set out with a box of tools and spare parts to the point at which they thought the boat would reach shore. W4OYI and WB4FAY were at the club/c.d. station, W4YOQ. However, the boat couldn't be located. K9EKV prepared to get a company-owned tug underway to be crewed by himself and WA4MXD-K4UDZ, but a series of false reports led them on wild goose chases. As the weather worsened a heavy storm warning was upgraded to a tornado watch and then to a tornado warning after a twister was actually sighted. Henderson and Owensboro ARECs were both put on alert and more operators were called into W4YOQ. Mobiles ducked for shelter under bridges as the main storm lashed through. Efforts by W9ZPP, K4RGL and WA4KZI revealed the boat had made it safely to a commercial fueling station. Skillful driving on treacherous roads and rides through flood waters in leaky skiffs resulted in all concerned being soaked to the skin and liberally plastered with gumbo mud. All were secured about 9:30 P.M. — *W4OYI, SEC Kentucky.*

— • • • —

On May 25 and 26 the Boeing Employees Amateur Radio Society, working in collaboration with the Puget Sound Emergency Net, set up and maintained a 75-meter communications link between a Boy Scout Camporee near Mt. Rainier and the Seattle area, a distance of 85 miles. Shortly after the establishment of this circuit a request was received to assist in the search for an overdue airplane with four people aboard.

The existing 75-meter link was made immediately available for search traffic and WA7BSQ was dispatched from Seattle with the club's emergency station equipment. He proceeded directly to base camp, installed a dipole antenna and was handling search and rescue traffic by 2:30 P.M. Search communications were continued until 8 P.M., when other circuits were established to handle traffic, and the BEARS again were able to devote their major efforts to communications for the Scout Camporee. W7RJW, who serves as club EC, states that BEARS has an organized Search and Rescue Communications Support group on continuous 24-hour alert and is usually able to handle situations like these on a routine basis.

— • • • —

Forty-four SECs reported May AREC activities, representing 17,006 AREC members. This is four more reports than last year, just slightly fewer AREC members — so things are looking up, a little. The following sections did *not* send in SEC reports for May: W.N.Y., W.Pa., Wis., Minn., N.Dak., Miss., E.N.Y., Iowa, R.I., Vt., W.Mass., Alaska, Idaho, Ore., E. Bay, Hawaii, Sac. V., S.J.V., S.C., Va., N.M., Wyo., C.Z., W.I., Ariz., Los A., S.B., N. Tex., Man., Ont. The only ARRL *division* that was 100% SEC reporting was Great Lakes.

— • • • —

Miscellaneous Net Reports.

Net	*Sessions*	*Check-ins*	*Traffic*
QTC	20	243	136
Coast Guard	20	477	12
Clearing House	26	360	220
20 Meter ISSB	23	461	8382
North American SSB	25	480	653
7290	40	1728	1699
Interstate 75M SSB	—	1096	783
Hit & Bounce	27	345	495
Mike Farad E & T	25	296	278
Pacific Coast	—	196	174

QST

QCEN & Community Radio Watch

BY JAMES E. WEAVER, WA8COA/WA9FEW

"CRW Control. CRW Control, from K4MEE mobile 4, over."

"K4MEE from W8SVU. CRW Control, over."

"This is K4MEE. There is a three-car accident on northbound Interstate 75 immediately south of the Brent Spence bridge. Only one lane is open. Two injuries. Traffic heavy and backing up. Over."

"This is W8SVU. Roger, wait."

Following this exchange, W8SVU calls the Community Radio Watch emergency number, sending a police car, an ambulance and a wrecker to the scene. K4MEE, in the meantime, proceeds on to Cincinnati, having performed a public service.

The above report is typical of many made by Queen City Emergency Net members through the Net's participation in the Cincinnati area Community Radio Watch. In CRW, QCEN members look for fires, traffic accidents, traffic tie ups, street crimes and other emergencies during their normal business and pleasure driving. Their reports are relayed to local police and fire departments by CRW Control, the QCEN Net Control Station.

CRW Control is a base station, operating from the members' own homes. When answering a call from one of the 20 f.m. mobiles, he may be advised of traffic jams, trucks strewing loads on the highways, disabled vehicles, flooded roads, patches of heavy fog, slippery roads, as well as accidents. Or, a member may get lost in an unfamiliar section of town and ask for directions.

QCEN is the 200th group to join Cincinnati CRW, and is its first independent, volunteer organization. Civil Air Patrol is the only other non-business member. QCEN is believed to be the first amateur radio group in the U.S. to join.

Col. Jacob W. Schott (W8DZ, ex-W8FGX), Cincinnati Chief of Police, officiated at ceremonies at Cincinnati Police Headquarters granting membership to QCEN. Assisting at the April 16, 1968 presentation were Col. Richard Quehl, representing the Northern Kentucky Police, and Chief John Kuhnell, representing the Hamilton County (Ohio) Police Association. Present also was Kenneth W. Wisenbaugh, Community Radio Watch Coordinator. Earl Nichols (W4PII) and James E. Weaver (WA8COA/WA9FEW), the President and the Communications Manager of QCEN, accepted the membership.

*11652 Hollingsworth Way, Cincinnati, Ohio 45240

What is CRW?

Historically, CRW was initiated by the Greater Cincinnati Area Chamber of Commerce on January 6, 1967 as a pilot program to assist local police and fire departments. Local businesses were asked to enroll their radio-dispatched cars and to encourage their drivers to report emergencies to their dispatchers. Police and fire departments, upon receiving telephoned information, take appropriate action.

Four days after its start, this movement to bring John Q. Public into law enforcement, accident relief work and fire protection . . . in the way every citizen should be involved . . . had enrolled the fleets of 83 Greater Cincinnati Area firms. In less than a month the project had expanded the "eyes" of area police and fire departments by 2400 vehicles, owned by 104 companies.

Endorsed by city, police and fire officials, the CRW service area soon spread to include neighboring northern Kentucky communities in addition to Cincinnati and Hamilton County. Organization of units in other cities quickly followed the success of the Cincinnati test. At present, 382 major U.S. cities sponsor a

W8DZ (ex-W8FGX), Cincinnati, Ohio, Chief of Police (standing) presided at ceremonies installing the Queen City Emergency Net as a member of the Greater Cincinnati Area Community Radio Watch. Seated (left to right) are QCEN Communications Manager WA8COA/WA9FEW, QCEN President W4PII, Chief John Kuhnell representing the Hamilton County Police Association, Col. Richard Quehl representing the Northern Kentucky Police, and CRW Coordinator Kenneth W. Wisenbaugh.

Membership was conferred April 16, 1968, at Cincinnati Police Headquarters.

Watch. The movement is coordinated through National Headquarters in Chicago. CRW was originally the Brainstorm of Motorola.

QCEN interest in CRW stems from a committee report on "What More QCEN Can Do." Joining the Watch seemed like a good idea and after preliminary investigation it was voted to submit an application.

"How does CRW work?", "What are the rules of operation?", "How can I help?" are the three most frequent questions from QCEN members and prospective members. First the Net's six-meter f.m. frequency, 53.05 MHz., was chosen to allow monitoring with crystal-controlled, squelched equipment and omnidirectional antennas. CRW Controls are presently assigned to a specific day each week, from 1800 to 2300 local time, Monday through Friday. At other times members monitor whenever possible. The eventual goal is to have assigned control stations from 0700 through 2400 daily. (At least one XYL is attending the Greater Cincinnati Amateur Radio Association code and theory course[1] to be able to monitor during the working day for OMs.)

55 and 5

Normal ragchews, non-emergency communications and other chitchat occupy 53.05 MHz. in addition to CRW activities. The only rule of operation may be summed up as "55 and 5." Stations using the frequency for non-emergency communications are asked to limit their transmissions to no longer than 55 seconds and then to leave a 5-second quiet period to permit handling of emergency calls. A 5-second quiet period is asked also at the end of a transmission by one station and before the beginning of a reply by another—regardless of the length of the first station's transmission.

All materials and information needed to operate in Community Radio Watch are supplied by the local Coordinator. Monitor stations are given a "Special Dispatcher's Card" with telephone numbers of police and fire offices, and instructions for making telephoned reports. Mobile operators receive "driver's booklets," decals for their automobiles and identification cards.

"What do I report?", "What do I do when I see an emergency?", "What shouldn't I do when I see an emergency?" and "Why do we need a Community Radio Watch?" are briefly answered in the Driver's Booklet. QCEN members also receive a supplemental brochure containing the rules for use of the frequency and descriptions of the duties of CRW Controls and mobiles.

The QCEN, the Cincinnati Area Chapter of the Red Cross, and Greater Cincinnati area municipalities all have gained through the Net's CRW activities. QCEN has benefited by a renewed interest in developing and maintaining emergency communications capabilities in a constant "ready" state. This increased interest can be traced to the day-in, day-out, 365-days-per-year use for public service communications. The new-found "purpose" has attracted new members, also.

The Cincinnati Red Cross profits from the CRW activities through the Net's affiliation as the Chapter's emergency communications arm. Because of the steadily increasing number of mobile and base stations monitoring 53.05 MHz., it has become QCEN's "immediate response" frequency. It proved very effective and efficient during mobilization to the tornadoes which struck north-central Kentucky and southwestern Ohio in late April.

What is Community Radio Watch? To the Queen City Emergency Net it is an opportunity for public service, daily, through an officially sanctioned, community assistance project. It is a stimulant to the further development of instantaneous emergency communications preparedness. QST

[1] Michel, "GCARA Novice and Technician Classes," *QST*, May, 1968.

Strays

QST Congratulates . . .

Leland Smith, W4YE/W4AGI, elected President of the Marine Corps Reserve Officers Association. Leland is an active Brigadier General in the U.S. Marine Corps Reserve, a former SCM of both Alabama and Georgia, and currently Assistant Director from the League's Southeastern Division.

John Clarricoats, O.B.E., G6CL, on his election as the first Conservative Mayor of the London Borough of Enfield. John is Secretary of Region I, IARU, and editor of the Region I Bulletin.

Byron C. Sharpe, W9BE, recipient of Hadley School for the Blind's award of "Volunteer of the Year."

Charles Dorian, W3JPT, reelected Chairman of the Intergovernmental Maritime Consultative Organization Sub-Committee on Radio Communications.

Edmund Metzger, W9PRN, ARRL Central Division Vice-director, on his election to the Springfield, Illinois Board of Education.

Jerry Larrimer, WB2ZGO, one of the five finalists in the National Merit Scholarship. Jerry is a member of the National Honor Society.

Clifton N. Francis, Jr., K5HGZ/Ø, new Director of the University of Kansas Southwest Center in Garden City, Kansas.

Louis Daboll, Jr., WB4FOG, appointed Command MARS Director, Air Force Communications Service, Scott AFB, Ill.

James Morris, W7MJ, awarded a distinguished service award by the Western Radio and Television Association in San Francisco.

Harold A. Knapp, W3BQ, who, as a private citizen, materially aided in securing justice for John and James Giles and Joseph Johnson in a famous Maryland rape case.

Why The Radio Club?

BY HUGH McKEE,* K6YA

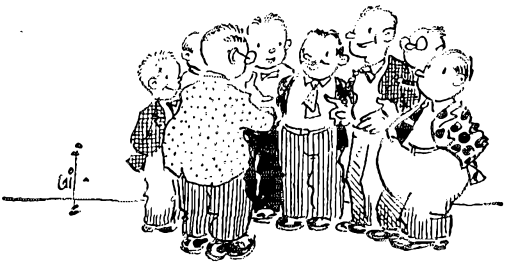
In truth, my brothers, we are tribal animals. It comes down to us from the days when our ancestors huddled in caves for protection from wild animals and the terrors of the night.

Until the invention of the automobile a man seldom traveled more than 30 miles — a day's journey on horseback. He courted a girl no more than five miles from home — easy walking distance. When he married the whole tribe danced at his wedding, and when his children were born everyone rejoiced. When tragedy struck, as it inevitably would, the entire community made the sad journey with him to and from the cemetery. When he grew old and cantankerous, instead of shoving him out of sight into a retirement community, his friends and neighbors knew what he had been through, understood and made allowances. A man never stood alone.

But nowadays, Charlie, things are much different. We are scattered like leaves in the wind. We move 3000 miles and more at the drop of a hat. We go wherever a steady paycheck is available, uprooted from our families and friends and transplanted poorly, if at all. We live in a hostile universe, protected only by a thin blanket of air and a few feet of water from burning by day and freezing by night, beset on all sides by deadly enemies, some so minute they cannot be seen by an electron microscope. If you stop to realize how vulnerable and alone you really are and let your mind dwell on it, then, Claude, you have had it, and are a prime candidate for the snake pit and electric shock. The Docs say that one in eight is in that shape right now, and the percentage is rising.

Billy Rose once said that if, by the time a man is fifty, he has enough friends for a four-handed card game, he is d — n lucky. Ask yourself this question: "If I were to lose my daily gamble with the traffic, or suffer a fatal heart attack, how many men outside my radio club would take a day off to lay me away?" True, your radio club needs you, but in fact you need it more. You need the security of belonging to a group, that feeling of "It's us against them."

When I first joined my own club I thought, with little insight, "What a heck of a way to run a railroad — no monthly dues, refreshments financed by a voluntary 'kitty', only the proceeds of a yearly auction and a monthly prize drawing to pay the bills." More mature reflection has shown how wise this really is. There is no reason for a member on the shorts to miss a meeting. If he is out of a job, club meeting is where he logically should be. On the following Monday morning, instead of pounding the pavement alone, he will have 25 or 30 men on the lookout for a spot for him.



"YOUR RADIO CLUB NEEDS YOU, BUT IN FACT YOU NEED IT MORE"

The executives of the ARRL well know that amateur radio needs strong local radio clubs, and they do everything possible to support and encourage them. The national organization can do such things as promote incentive licensing and fight the battles for internationally assigned frequencies, but the upgrading and policing of the clan must be done on the local level. Even the Federal Government, after 35 years of trying to solve the problems of this complex society from Washington, is sadly coming to the realization that the solutions will come, if at all, from the counties, cities and villages themselves. Amateur radio, like everything else, has become large and complex, but it can be only as secure and strong as are its local societies.

As any thoughtful amateur may clearly perceive, the future is cloudy. Nothing in this changing world is secure, not even the value of our American dollar. Our fraternity is beset with bickering, warring groups trying their best to tear its fabric to pieces. To a "Wireless" op who remembers amateur radio in the days before and shortly after World War I, the present picture is sad and appalling. In those days the atmosphere was one of friendly, dedicated cooperation. One could, with complete confidence, on the basis of an ad in *QST*, exchange equipment clear across the continent. (For example, in 1919 or 20 the writer traded a home-brew 20 kv. spark transformer to a ham in New Jersey for a marble-base "Boston" key with ½-inch silver contacts. A letter from him expressed delight at his bargain, whereas in fact I got the best of it. The key is still one of my treasured possessions.)

Are those days of friendly cooperation gone forever? If so, then amateur radio is likely on its way into history also. Strong, active radio clubs which can deal with our problems on the local level, and with whom the division directors can consult and work, are our best hope in an uncertain future. And our time, in all probability, is shorter than we imagine. QST

*495 Sequoia Way, Los Altos, California 94022

Happenings of the Month

Election Notice

DOT and FCC Okay Slow Scan TV

Fee Protest Filed with DOT

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions:

Nominations are now in order for director and vice director in these eight divisions of ARRL. Only ten Full Members need to join together in naming a candidate, by a petition which must reach the Secretary of ARRL by noon EDST September 20.

Democracy within our League starts with these nominations. If more than one candidate is nominated, and each meets the requirements explained below, then all Full Members of the League in the division will have a chance to choose from among the candidates by secret ballot between October 8 and noon of November 20.

The election procedures, outlined briefly here, are specified in the Articles of Association and Bylaws; copies will be sent to members free upon request.

Any eligible Full Member of the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf Divisions can be nominated for either director or vice director. If one person is nominated for both offices, his nomination for director will stand and that for vice director will be void; no person may simultaneously be a candidate for both positions.

Since all the powers of the director are transferred to the vice director in the event of the director's death, resignation or inability to serve, careful selection of candidates for vice director is just as important as for director. The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
Newington, Conn. 06111

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 1969–1970 term.

(Name Call City Zip Date)

The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full 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, is commercially or governmentally engaged in frequency allocation planning or implementation, 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 Newington, Conn., by noon EDST of the 20th day of September, 1968. 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 neces-

New England Convention Cochairman Eli Nannis, W1-HKG, (left) and Director Bob Chapman, W1QV, (right) welcome ARRL Vice President Dr. R. O. Best W5QKF to his first official visit since taking office in May.

sary 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 8 and November 20, except that if on September 20 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are: *Central:* Philip E. Haller, W9HPG and Edmond A. Metzger, W9PRN. *Hudson:* Harry J. Dannals, W2TUK and Stan Zak, K2SJO. *New England:* Robert York Chapman, W1QV, and Bigelow Green, W1EAE. *Northwestern:* Robert B. Thurston, W7PGY and R. Rex Roberts, W7CPY. *Roanoke:* Victor C. Clark, W4KFC and L. Phil Wicker, W4ACY. *Rocky Mountain:* Carl L. Smith WØBWJ, and John H. Sampson, Jr., W7OCX. *Southwestern:* John R. Griggs, W6KW and Thomas J. Cunningham, W6PIF. *West Gulf:* Ray K. Bryan, W5UYQ; the vice-director's office is vacant.

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

For the Board of Directors:

July 1, 1968

JOHN HUNTOON
Secretary

SLOW SCAN TV IN THE U.S....

The Federal Communications Commission has adopted new rules permitting slow-scan television in portions of the amateur bands 3.5 Mc. and above. The segments chosen are those which after November 22, 1968 will be restricted to holders of Advanced and Extra Class licenses. On the bands below 50 Mc., bandwidth will be limited to that occupied by an s.s.b. voice transmission, and above 50 Mc., to that of a double sideband voice transmission.

The Report and Order, reproduced in full at the end of this department, provides a good description of slow scan television. In addition it comments on the points made in favor and against the proposal.

Moreover, in incorporating slow scan into the table of frequency allocations set forth in Section 97.61, FCC has reorganized its presentation of this information, making it easier to follow. (For space reasons, we are not repeating the 1.8-2.0 Mc. portion of the table, since it was presented in detail on pages 71-73, *QST* for June 1968.)

. . . AND SLOW SCAN IN CANADA

The Department of Transport has authorized frequencies in the h.f. bands for slow scan television:

3725-3750 kc.
7150-7175 kc.
14,175-14,350 kc.
21,100-21,450 kc.
28,100-29,700 kc.

Some interesting work with Sweden has already been done; see page 71.

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOT but are temporarily resident outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily resident outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current *QST* address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern or West Gulf, but your *QST* goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.

ARRL/CANADA FILES BRIEF ON FEES

ARRL in Canada has filed a brief with the Department of Transport protesting the sudden raise in the annual amateur license fee from $2.50 to $10.00. The text follows:

ANNUAL RADIO LICENSE FEES

This submission is presented by the Canadian Division of the American Radio Relay League on behalf of its more than three thousand members who are licensed Canadian radio amateurs.

Its purpose is to request reconsideration of the recent increase in Amateur Experimental Station license fees from $2.50 to $10.00 per year. Bearing in mind the non-commercial nature of the Amateur Service, and its value to the young, the handicapped, industry, the government, and, in fact, to the general public this increase is considered to be excessive.

The American Radio Relay League, Inc. (hereinafter referred to as "the League") is a non-profit organization whose voting members are composed solely of American and Canadian licensed radio amateurs. The Department of Transport, in its dealings with amateur radio, has always recognized the Canadian Division of the League as the representative of and spokesman for the Canadian radio amateur, there being no other Canadian organization of national scope to whom the Department could have reference in matters concerning Canadian radio amateurs.

We would like to point out at the beginning that we have no quarrel whatever with the Department's basic and laudible attempt to balance its budget wherever possible by revenues derived from services rendered, but sometimes, and we think that such is the case here, other factors of considerable weight should be recognized.

The Amateur Service is unique in that it has been established, in this country, as in most countries of the world, in recognition of the amateur's contribution to the state of the art and his value to his government and the general public. The definition of the Service by the International Telecommunications Union, which is repeated almost verbatim in Canada's General Radio Regulations states that the amateur is "interested in radio technology solely with a personal aim and without pecuniary interest."

The public service record of the amateur over the years in providing emergency communications is so well known that it is mentioned only to point out once again that the amateur performs on a volunteer basis, on his own time and expense, frequently at severe inconvenience and discomfort, and often at risk of injury. In Canada in particular, he has provided the only communication into remote areas, such as the Arctic, where mail and telephone services are necessarily almost non-existent.

The amateur has contributed greatly also to the technical development of radio communication. Even today when research is almost wholly confined to government and industry, many amateurs continue to devote much of their time to construction of equipment, development of technical and operating techniques, and generally to the "self-training and technical investigation" mentioned in the I.T.U. and Canadian definitions of the Service. To emphasize this point, it should be stated that amateurs no longer confine themselves to communication by voice or telegraphy, but are actively engaged in radio-teleprinter, facsimile, television, and other modes of operation, not to mention communication by complex V.H.F. repeater systems, moonbounce and satellite.

The value of the Amateur Service to the Armed Forces has been proven many times, and is mentioned here purely as a matter of record. Not only is it a reservoir of trained technicians and operators, but the frequencies occupied by the Service in time of Peace become a most valuable asset when they are relinquished in time of war.

Your staff will also be aware of the Stanford Institute Research Report concerning amateur radio as a natural resource. Without wanting to labour the point, we would simply quote the following from page 65:

> "Because of the inextricability of amateur involvement with the radio frequency spectrum, and more importantly, because of the uniqueness of the services that amateurs are able to perform, the amateur radio service itself assumes some of the characteristics of a national resource whose continued existence it may be in the best interests of the nations of the world to assure."

Canadian amateurs have, for more than forty years, paid an annual license fee of $2.50; this has been considered by most amateurs to be a "registration" fee rather than a fee for privileges granted or services rendered. It is true that the Department of Transport has encountered certain expenses in administration of the Service, but Amateurs have always prided themselves in being largely self-policing, and are almost unique in this respect. Even in the field of location and cure of television interference it probably does more to help the Department than any other Service. They therefore justifiably feel that they contribute much more to the normal operation of their licensing authority than their license fees, since they do a good deal of the work normally undertaken by the Department itself.

Amateur radio in general and MARS in particular were favorably mentioned during a Congressional hearing on Department of Defense appropriations for fiscal 1969. Morale traffic between the men in Thailand and Viet Nam and their families back home was discussed in the testimony of Generals Grant and Klocko in response to questions posed by Representatives Andrews and Rhodes. Mr. Rhodes praised the work done by the Phoenix gang from Barry Goldwater's station K7UGA. Here's K7GPZ and K7MJC, rear; WA7DUO, W7TPG, Doris Counts, K7UGA, K7PNY, W7AQS; WA7FCM, center row; and in front, K7BPM, K7CCI, W7DOZ, W7DNF and WA7EXZ.

Looking, for a moment, at the magnitude of the fee and comparing it with other countries around the world, based on information available from the International Amateur Radio Union as of 1967, the proposed fee of $10.00 is almost unequalled any where else in the world. Your staff doubtless have the information there, but we would say in reference thereto that only Czechkoslovakia at $14.00, the Ivory Coast at $10.00 and Lebanon at $17.00 are either equal to or exceed your proposed fee. Scanning the rest of the reported countries, some seventy in number, the vast majority appear to have fees in the range of 30¢ to $5.00 with a large number at $2.00 or less. The United States itself, with its vast bureaucracy, has a license fee of 80¢ per year. It is quite apparent to us, that many of these countries recognize the asset which the radio amateur body creates, and are doing their best to foster its growth.

It was for this reason that the recent increase to $10.00 annually, without any warning or prior consultation with representatives of Canadian amateurs. produced such an immediate and violent reaction. It is obvious that the Department's cost of operation has increased in recent years, but a quadrupling of their fee was felt to be unwarranted and a hardship.

We should point out that perhaps one of the reasons whereby the United States has been able to achieve such an attracting fee structure is that they have gone to a five year licensing programme with the fee being payable once each five years in the sum of $4.00. This charge doubtless goes a long way toward covering the "paperwork" cost surrounding the issuance or renewal of the station licenses and we think that this is one area where your Department might achieve perhaps remarkable economy particularly having regard to the coming automated license renewal system which you are instituting.

WHO THE DEVIL IS WHO?

Fourth in a Series of Call Conversion Charts

Here are additional calls of amateurs taking advantage of new rules which allow Extra Class licensees licensed 25 years ago or longer to acquire two-letter calls. If you should be listed here, let us know by post card right away.

Now	*Was*	*Now*	*Was*	*Now*	*Was*	*Now*	*Was*
W1FS	W9BLQ	W3LD	W3GVZ	W5HE	W5GUZ	W7SQ	W7JPN
W1HJ	W1PQB	W3MA	W1JWG	W5HY	W5LMI	**W8**BW	W4FQX
W1HM	K1YKN	W3MP	W3EPV	**K6**AU	W6PYN	W8BY	W8NTS
W1HO	W1LFR	W3NX	W3IYE	W6CW	W6LED	W8CM	W8CHO
W1HV	W1AFM	W3OU	W3RBC	W6CZ	W7CNZ	W8CN	K8QJH
W1IA	W1OUG	W3PZ	W3FOU	W6DJ	W6UXW	W8CS	W8GRY
W1IU	W1EIQ	W3QW	K3UMM	W6DL	W6KCC	W8DE	W8BQH
W1JK	W1KTJ	W3RC	W3LFC	W6DP	WA6KII	W8ED	W8BJD
W2CB	W2HAD	W3RF	W3DHO	W6EB	W6SHZ	W8EM	W8HMO
W2DG	W2VUY	W3RY	K3WPF	W6EO	W6APL	W8ER	W8DVB
W2GX	WB2BLJ	**K4**CI	W4BJJ	K6EV	W6LDA	W8EV	W8IRN
W2IF	W2UJN	K4CQ	K4QKY	K6EZ	W6CCE	W8FC	W8ORD
W2II	WB2HZH	K4DW	K4MFB	W6FE	W6TGF	W8FP	W8OBS
W2JK	WA2RGQ	K4FN	K4ESV	K6FU	W6YHB	W8FH	WA8RSS
W2KF	K2AGU	K4FQ	W4NLI	K6FV	WA6JND	W8GF	W8LLD
W2KK	WB2ADE	K4FW	W8DUS	W6FZ	WB6TYO	**W9**CH	W9KMN
W2MN	K2YOR	K4GE	W4MJY	K6HA	W8OPA	W9CQ	W9HGP
W2OA	W2IYZ	K4HY	WA4KFO	W6IB	W6FXA	W9DG	W9GRV
W2PD	W2DYP	W4HY	WA4QME	K6NA	W6IBD	W9DL	W8BRA
W2PH	W2FXQ	K4ID	W4HKQ	W6NC	K6DOI	W9DM	W9MWQ
W2QC	W2LYG	W4JB	K4TML	W6NR	W6SXR	W9EB	W9EHW
W2QL	K2DTZ	W4NA	W4DCH	W6PK	W6WXX	**WØ**BJ	WØDNW
W2RP	W2AMK	W4ND	WA4WJA	W6PY	WA6TLI	WØBW	WØQVZ
W2SM	W2QZE	W4PD	WA4FHP	W6QK	W6PUS	WØDJ	WØRDR
W2SQ	WB2CMB	W4VZ	W2LFP	W6TF	K6ORS	WØDR	WØKJG
W2UJ	WA2OIL	W4YD	K4COQ	W6YT	WA6SAB	WØGI	WØOJW
W2UN	W2BZN	**W5**BH	W5LSC	W6PG	W6FVO	WØGW	WØHHZ
W3FA	W3MCG	W5BI	W5IDE	**W7**BL	WA7DSJ	WØGX	WØECA
W3GM	W3BES	W5CJ	W5GJY	W7CU	W7STC	WØHI	WØDHC
W3GN	W3MSR	W5DS	KL7EVP	W7HS	W7NPU	WØHV	WØAUC
W3IK	W3HIX	W5FL	W5DWT	W7HV	W7FTR	WØHZ	WØJRI
W3KK	W3DSK	W5FV	W5CQF	W7JJ	W7CCG	WØIE	KØTPD
W3KS	WA3IIK	W5GM	W5EGI	W7JN	W7IMA	WØIT	WØBJV
W3LB	W3KDZ	W5GX	W5GZX	W7KE	W7AST		

It seems anomalous that five year licenses will eventually be issued by your Department but that the fees therefore will have to be continually billed and paid on an annual basis.

By way of further economy which we believe your Department might be able to effect, we would suggest that your present policy of provision of field staff for examinations at all times, be discontinued, and that a procedure like that used by the F.C.C. be instituted. That is to say: set up a schedule for field office examinations at certain times and places where applicants may attend for the purpose. This procedure we believe, could free many of your present staff for other duties, either in administrative work, in the amateur service, or in other assignments altogether.

There is no doubt that a fee of $10.00 will be a severe hardship on those amateurs to whom it possibly means most; the blind, the physically handicapped, the aged, and others on a limited income, and for whom it provides a form of relaxation and recreation. It must also affect the very young, from whose ranks the new amateur is normally recruited and will thus adversely affect the growth of the Service, which is low enough even now.

It is for these reasons that the League feels that the recent increase is a retrogressive step and requests that reconsideration be given to the whole matter, including charges for license amendments. It is known that hundred of similar representations have been made to you and to their Members of Parliament, both by individual amateurs and local amateur radio clubs and it thus is apparent that the amateur fraternity supports this request.

Recent correspondence from your office would indicate that some reconsideration has already taken place, and that certain proposals will shortly be made to amateur organizations. The League is anxious to assist in any way possible, and looks forward to participating in such meetings and discussions.

Yours sincerely,

AMERICAN RADIO RELAY LEAGUE

N. B. EATON,

Director

LICENSE SUSPENDED

The General Class license of Brad Welton, WA1FTI has been suspended by the Federal Communications Commission for six months (April 29 to October 28, 1968). FCC found that the licensee transmitted music from his station, transmitted a callsign not assigned to his station, failed to identify properly, used A-2 in the frequencies 3.8 to 4.0 Mc and failed to keep an accurate log. (*FCC rules sections 97.125, 97.121, 97.87 (a), 97.123, 97.61 (b) (5), and 97.103*)

THE CARTERPHONE CASE: PHONE PATCHES

The FCC has confirmed and strengthened the decision of its hearing examiner in the Carterphone case which says that telephone companies' tariffs preventing customer-owned accessories are too restrictive and must be replaced.

Here are some pertinent paragraphs:

". . . Our conclusion here is that a customer desiring to use an interconnecting device to improve the utility to him of both the telephone system and a private radio system should be able to do so, so long as the interconnection does not adversely affect the telephone company's operations or the telephone system's utility for others. A tariff which prevents this is unreasonable; it is also unduly discriminatory when, as here, the telephone company's own interconnecting equipment is approved for use. The vice of the present tariff, here as in *Hush-A-Phone*, is that it prohibits the use of harmless as well as harmful devices. . . . We are not holding that the telephone companies may not prevent the use of devices which actually cause harm, or that they may not set up reasonable standards to be met by interconnection devices. These remedies are appropriate; we believe they are also adequate to fully protect the system. . . ."

However, the Bell System and several other parties have already asked for a stay in the effective date of the order (at copy time on record for July 29) and probably will ask for reconsideration. Thus, amateur-owned devices used with telephones remain in the shadow of technical illegality.

The strength of the FCC's order leaves little doubt that approval of customer-owned accessories will eventually come, though legal maneuvers could go on for months.

NOVICE ELIGIBILITY PROPOSAL

Earlier this year the Electronics Industries Association, prompted by its newly-formed Amateur Radio Equipment Section, filed a petition with the Federal Communication Commission seeking changes in the rules governing the Novice license to accomplish:

1) Reduction of the code speed to the minimum consistent with the Geneva Regulations—i.e., perhaps simply to demonstrate ability to send all characters and recognize them correctly by ear.

2) Restore phone privileges in the 2-meter band.

3) Grant new privileges, voice and c.w., in the top end of the 10-meter band.

4) A five-year term, renewable license

5) Removal of the restriction prohibiting the issuance of the Novice Class license to previous licensees.

In late July FCC acted on the petition, denying the first four requests on the basis that the general subjects had just recently been reviewed, or that the proposals were inconsistent with Novice objectives. As to the final item, however, FCC had a favorable reaction and has now proposed that any citizen (or national) will be eligible for a Novice license if he has not held an FCC-issued amateur license in the previous twelve months. In other words, aside from processing time internally within the Commission, one could be a Novice for two out of three years the rest of his life.

Please read the text of the proposal, Docket 18266, which follows, and then express any views to your division director.

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

In the Matter of

Amendment of Part 97 of the Commission's Rules concerning the Novice Class Amateur Radio license. DOCKET NO. 18266 (RM—1288)

NOTICE OF PROPOSED RULE MAKING

Adopted July 24, 1968; Released July 26, 1968

By the Commission: Chairman Hyde absent.

1. The Commission has under consideration a petition for rule making in the above-entitled matter which has been submitted by the Electronic Industries Association (EIA). Two comments supporting the petition and one comment in opposition were filed. The petitioner proposes that for the Novice Class license the code speed be reduced, the license term be increased to five years and be renewable, radiotelephony privileges in the 145-147 MHz band be restored, operating privileges on frequencies between 29.4 and 29.6 MHz be authorized, and the restriction prohibiting the issuance of the Novice license to previous licensees of any class be removed.

2. The purpose of the Novice Class license is to provide an easy access to the Amateur Radio Service for persons who need an opportunity to obtain operating experience and proficiency for advancement in the field.

3. For the following reasons petitioner's requests for extension of the Novice Class license term, for restoration of radio telephony privileges, and for expansion of frequency operating privileges for this license are denied. The Commission reviewed and revised the term and privileges of the Novice Class license in rule making Docket 15928 (FCC 67-978) which recently established an "incentive licensing" program in the Amateur Radio Service. One of the rule changes adopted in that proceeding provided that, effective November 22, 1967, the Novice Class license term is increased from a one-year to a two-year non-renewable term. This new period is considered to be adequate to meet the purposes for which the Novice Class license is established. The other rule change adoped in Docket 15928 with respect to the Novice Class deleted the radiotelephony privileges in the 145-147 MHz band, effective November 22, 1968, in order to foster the code proficiency of these licensees. Petitioner has not presented any factors which would justify restoration of these privileges. Nor are we aware of any valid basis for reallocations to extend the Novice Class frequency operating privileges to the 29 MHz band. Petitioner's contention that this would afford the Novice Class both long range and short range communication opportunities is not compelling since present Novice Class frequency allocations provide such capability.

4. Petitioner's proposal for a reduced Novice Class code speed requirement is not considered appropriate. The present five word per minute requirement is regarded as the minimum necessary to verify the qualifications of an applicant to effectively transmit and receive the Morse Code under the conditions, emergency and otherwise, which are likely to be met. Petitioner has also proposed that the Novice Class license be renewable. General renewability is not regarded as consistent with the short-term temporary nature of this license. Accordingly, these proposals are also denied.

5. The petitioner further proposed the relaxation of Section 97.9 (f) of the rules to permit previous holders of Amateur licenses to obtain the Novice Class license. The Commission finds that a rule change of this nature is justified. It is not uncommon for a person to obtain an Amateur license as a youth, give up his license to follow his chosen career, and then return as a licensee in later years when he is in a better position to enjoy such pursuits. Nevertheless, the present rule bars his return as a Novice Class licensee since he has been formerly licensed. The Commission is unable to recon-

cile this limitation with the purpose of the Novice Class license. Accordingly, the Commission proposes to amend its rules to permit any eligible person to obtain a Novice Class license provided that he has not held a Commission-issued license within the 12 months prior to his application. The twelve-month gap is intended to obviate any element of routine renewal. No person would be permitted to hold Novice and Technician Class licenses concurrently.

6. The specific rule changes proposed herein are set forth in the attached Appendix. Authority for these proposed amendments is contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

7. Pursuant to applicable procedures set forth in Section 1.415 of the Commission's Rules, interested persons may file comments on or before October 15, 1968, and reply comments on or before October 30, 1968. In accordance with the provisions of Section 1.419(b) of the Commission's Rules, an original and fourteen copies of all statements, briefs, and comments filed shall be furnished the Commission. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken. The Commission may also take into account other relevant information before it, in addition to specific comments invited by this Notice.

FEDERAL COMMUNICATIONS COMMISSION

BEN F. WAPLE
Secretary

Appendix

I. Part 97 of the Commission's Rules is proposed to be amended as follows:

1. Section 97.9(f) is revised as follows:

§97.9 Eligibility for new operator license.

* * * * *

(f) *Novice Class.* Any citizen or national of the United States, except a person who holds, or who has held within the 12-month period prior to the date of receipt of his application, a Commission-issued Amateur Radio License.

CANADIAN CALLS CAN BE HELD OPEN

The Department of Transport has standardized procedures to avoid reassignment of a particular callsign in certain cases. Regional Offices are being requested to arrange for the reservation of amateur call signs upon request for periods of up to two years. Such requests should include justification satisfactory to the Regional Superintendent, Radio Regulations. Absence overseas, particularly by members of Canada's Armed Forces, is a typical reason.

SLOW SCAN REPORT

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

In the Matter of	
Amendment of Part 97 of the Commission's Rules to provide for the transmission of pictures in the high frequency bands by stations in the Amateur Radio Service.	Docket No. 17736 RM-265

REPORT AND ORDER

By the Commission:

1. On September 25, 1967, the Commission released a Notice of Proposed Rule Making to amend its rules to provide for the transmission of pictures, using narrow band modulation techniques, by amateur stations in the telephony segments of the amateur bands. The Notice was duly published in the Federal Register on September 30, 1967, 32 F.R. 13728, and all formal comments and reply comments filed in response thereto have been carefully considered by the Commission.

2. The rule changes proposed in this Docket would provide for picture transmission with a bandwidth not in excess of that occupied by an amplitude modulation single sideband voice transmission and would permit simultaneous voice transmission provided the total bandwidth occupied does not exceed the bandwidth of a normal double sideband (voice) amplitude modulated transmission. The necessary bandwidths for single and double sideband are considered to be 3 kc/s and 6 kc/s, respectively. A choice of either amplitude modulation, A5, or frequency modulation, F5, for the picture transmission was proposed. A choice of either A3 or F3 for voice transmission is already provided in each band involved. Narrow band TV transmission, also referred to as "Slow-Scan TV;" is transmitted by frequency modulating a subcarrier between the limits of 1500 c/s (black) and 2300 c/s (white). Vertical and horizontal synchronization is maintained by transmitting short bursts of 1200 c/s tone. Live scenes are transmitted as a series of "stills." The photo conductive layer at the slow scan vidicon is exposed to the light and dark areas of the scene for a fraction of a second and is then scanned at a rate of 15 c/s. A single scene can be scanned in 8 seconds. The output signal of the scanner is introduced into the audio section of a single sideband suppressed carrier (SSBSC) transmitter and is transmitted without loss of picture detail in the conventional SSBSC transmitter voice bandwidth.

3. One comment was opposed to any provision for narrow band TV; two opposed anything but "cw-type" emission for TV; nineteen individuals and one club supported the proposal without change; two individuals and two organizations proposed either reduction in the number of bands available, reduction in the size of the 'phone band segments to be available or allocations in the telegraphy segments of the high frequency bands. One proposed that all telephony bands be available for narrow band TV, while another would also make the telegraphy-only portions of the high frequency bands available. Based upon a desire for additional experience to further evaluate the interference potential of slow-scan TV, an additional trial period was requested by an individual and two organizations.

4. Generally, the recommendations for reduced frequency availability or for operation in telegraphy sub-bands were based upon the fear that disruptive or destructive interference to telephony communications would result from narrow band TV. Since May, 1966, a number of amateur stations throughout the United States have been authorized to transmit slow-scan TV signals for test and demonstration purposes. No cases of interference resulting from these authorizations have been reported to the Commission. Slow-scan TV is more susceptible to interference than is radiotelephony, requiring a ratio of desired to undesired signal of 10 db to 20 db for marginal to good picture quality. This requirement would appear to be such that slow-scan TV would generally not be used in the more heavily populated portions of the available frequency bands. Furthermore, there is some evidence that a single sideband transmitter, operating in the slow-scan TV mode within the same bandwidth as radiotelephony, has less interference potential than the same transmitter using radiotelephony at its rated peak envelope power.

5. The frequency sub-bands below 28 Mc/s available for slow-scan TV are being limited to those which will ultimately be available only to Extra and Advanced Class licensees. In addition to providing further incentive to upgrade operator licenses, the limitation should also be some assurance that the operators using slow-scan TV have the requisite technical skill to operate in a manner compatible with existing radiotelephone operation. General and Conditional Class licensees may continue to operate in these sub-bands, using A5 or F5 emission if desired, until the exclusivity as scheduled in Section 97.7 of the Rules prevails. Consistent with the intention to limit slow-scan TV to the Advanced and Extra Class licensee subbands and the Commission's statement in Docket 15928 that it will stay in whole or in part, as appropriate, any part of the reserved frequency segments which do not appear to be sufficiently occupied, the availability of these sub-bands for slow-scan TV will likewise be reviewed and changed if believed appropriate.

6. Suggestions were made that specfic standards not be adopted, thus allowing greater flexibility in the choice of operating parameters. Standards for narrow band TV were not specified in the proposal and no such standards are being established. Amateurs will be permitted the freedom of developing various systems within the bandwidth limits specified in the Rules.

7. It was also suggested that, before any amateur was authorized to transmit television signals, he be required to demonstrate his knowledge of TV techniques. The Commission now has six classes of amateur operator licenses. With the exception of the Conditional Class, which in scope is comparable to the General Class, each license is evidence of a different level of the general qualifications of the licensees. No particular mode of emission is emphasized in any of the current written examinations. It is not believed either practicable or desirable to depart from the established license structure, which through the evolutionary improvement of examinations can be relied upon to assure adequate technical skill for the types of emissions and frequency bands now available to the various classes of licensees.

8. Recommendations were made that double sideband emission be permitted for the transmission of pictures in the 28, 50, and 144 Mc/s bands because of the preponderance of double sideband transmitting equipment now in use in those bands, ease of reception because of the presence of a carrier, and the low occupancy of those bands. The Commission is not persuaded that its proposal to restrict slow-scan TV in the 28 Mc/s band to single sideband should be modified. Although it is recognized that many stations operating in the 28 Mc/s band continue to use double sideband emission, that in itself does not appear to be sufficient reason to deviate from the original proposal. However, the limited use of single sideband emission in the amateur bands above 50 Mc/s, together with the lower occupancy on those bands justify the relaxation to permit the transmission of slow-scan pictures by double sideband emission in those bands.

9. It was pointed out that there is pending before the Commission a petition requesting that the band 144-144.1 Mc/s be made available only for A-1 emission. The action taken herein is not to be considered determinative of that request, and the suballocations within the 144 Mc/s band will be reviewed in consideration of the petition.

10. Three comments raised questions as to the station identification requirements and recom-

Frequency Band	*Emissions*	*Limitations*
		(See paragraph (b)
kc/s		
1800 - 2000	A1, A3	1, 2
3500 - 4000	A1	
3500 - 3800	F1	
3800 - 3850	A5, F5	
3850 - 3900	A5, F5	3
3800 - 4000	A3, F3	4
7000 - 7300	A1	
7000 - 7200	F1	
7200 - 7225	A5, F5	
7225 - 7250	A5, F5	3
7200 - 7300	A3, F3	
14000 - 14350	A1	
14000 - 14200	F1	
14200 - 14235	A5, F5	
14235 - 14275	A5, F5	3
14200 - 14350	A3, F3	
Mc/s		
21.00 - 21.45	A1	
21.00 - 21.25	F1	
21.25 - 21.30	A5, F5	
21.30 - 21.35	A5, F5	3
21.25 - 21.45	A3, F3	
28.0 - 29.7	A1	
28.5 - 29.7	A3,A5,F3,F5	
29.0 - 29.7	F1	
50.0 - 54.0	A1	
50.1 - 54.0	A2.A3,A4,A5,F1, F2,F3,F5	
51.0 - 54.0	AØ	
		(See paragraph (b)
Mc/s		
144 - 148	A1	
144 - 147.9	AØ,A2,A3,A4,A5, FØ,F1,F2,F3,F5	
220 - 225	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5	5, 6
420 - 450	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5	5, 7
1215 - 1300	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5	5
2300 - 2450	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5,P	5, 8
3300 - 3500	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5,P	5
5650 - 5925	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5,P	5, 9
10000 - 10500	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5,	5
21000 - 22000	AØ,A1,A2,A3,A4, A5,FØ.F1,F2,F3, F4,F5,P	
Above 40000	AØ,A1,A2,A3,A4, A5,FØ,F1,F2,F3, F4,F5,P	

mended identification in other (than the picture) modes. As amended, effective January 15, 1968, Section 97.87 requires a station transmitting slow-scan TV to transmit its own call sign by telegraphy or telephony at the times prescribed for identification. Transmission of the other station's call sign is not required and there is no requirement for transmitting call signs by picture.

11. Several comments referred to the apparent omission of the 220–225 Mc/s band from the bands in which slow-scan would be permitted. A provision for slow-scan was included in the proposal and is in the amended rules.

12. In view of the foregoing, the Commission finds that the amendments to Part 97, Amateur Radio Service, as set forth in the attached Appendix are in the public interest, convenience and necessity. The authority for such amendments is contained in Section 4(i) and 303 of the Communications Act of 1934, as amended.

13. Accordingly, IT IS ORDERED, That effective August 30, 1968, Part 97 of the Commission's Rules IS AMENDED as set forth in the attached Appendix.

14. IT IS FURTHER ORDERED, That this proceeding IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION
BEN F. WAPLE
Secretary

Released July 19, 1968

APPENDIX

I. Part 97 of the Commission's Rules is amended as follows:

1. Revise §97.61 to read as follows:

§ 97.61 Authorized frequencies and emissions.

(a) Following (the adjacent table) are the frequency bands and associated emissions available to amateur stations, subject to the limitations stated in paragraph (b) of this section and §97.65.

(b) Limitations . . .

(3) Effective November 22, 1969.

(4) 3900–4000 kc/s not available in following United States possessions: Baker, Canton, Enderbury, Guam, Howland, Jarvis, Palmyra, American Samoa, and Wake Islands.

(5) Amateur stations shall not cause interference to the government radiolocation service.

(6) Not available in those portions of Texas and New Mexico bounded by latitude 33°24′ North, and 31°53′ North, and longitude 105°40′ West and 106°40′ West between the hours 0500 and 1800 local time, Monday through Friday, except to stations authorized to operate in an organized civil defense network when civil defense emergencies exist or when arrangements have been made with the Commission Engineer in Charge at Dallas, Texas, and the Area Frequency Coordinator at White Sands, New Mexico, for drills at specific dates and times.

(7) In the following areas the d.c. plate input power to the final transmitter stage shall not exceed 50 watts, except when authorized by the appropriate Commission Engineer in Charge and the appropriate Military Area Frequency Coordinator.

(i) Those portions of Texas and New Mexico bounded by latitude 33°24′ North, 31°53′ North, and longitude 105°40′ West and 106°40′ West.

(ii) The state of Florida, including the Key West area and the areas enclosed within circles of 200 miles radius centered at 28°21′ North, 80°43′ West and 30°30′, 86°30′ West.

(iii) The State of Arizona.

(iv) Those portions of California and Nevada South of latitude 37°10′ North and the area within a 200 mile radius of 34°09′ North, 119°11′ West.

(8) No protection in the band 2400–2450 Mc/s is afforded from interference due to the operation of industrial, scientific, and medical devices on 2450 kc/s.

(9) No protection in the band 5725–5875 is afforded from interference due to the operation of industrial, scientific, and medical devices on 5800 kc/s.

2. Revise the headnote and paragraph (c) and add new paragraphs (d), (e), and (f) in §97.65 to read as follows:

§ 97.65 Emission limitations. . . . .

(c) On frequencies below 29.0 Mc/s and between 50.1 and 52.5 Mc/s, the bandwidth of an F3 emission (frequency or phase modulation) shall not exceed that of an A3 emission having the same audio characteristics; and the purity and stability of emissions shall comply with the requirements of §97.73.

(d) On frequencies below 50 Mc/s, the bandwidth of A5 and F5 emissions shall not exceed that of an A3 single sideband emission.

(e) On frequencies between 50 Mc/s and 225 Mc/s, single sideband or double sideband A5 emission may be used and the bandwidth shall not exceed that of an A3 single sideband or double sideband signal respectively. The bandwidth of F5 emission shall not exceed that of an A3 single sideband emission.

(f) Below 225 Mc/s, A3 and A5 emissions may be used simultaneously on the same carrier frequency provided the total bandwidth does not exceed that of an A3 double sideband emission.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 322

June 16, 1968

At the personal call of the President, the Executive Committee of The American Radio Relay League, Inc., met in Conference Room #1 of United Air Lines at O'Hare Field in Chicago, Illinois, at 12:30 p.m. June 16, 1968. Present: President Robert W. Denniston, WØDX, in the Chair; First Vice President W. M. Groves, W5NW; Directors Charles G. Compton, WØBUO, Harry J. Dannals, W2TUK, Noe. B. Eaton, VE3CJ, and Carl L. Smith, WØBWJ; and General Manager John Huntoon, W1LVQ. Also present were General Counsel Robert M. Booth, Jr., W3PS, and Attorney James J. Brosnahan of Cooper, White & Cooper, San Francisco, California.

The Committee:

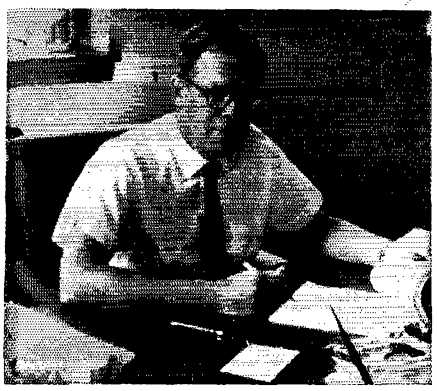
1) heard an extensive report by counsel concerning the status of the lawsuit of Dr. Donald A. Miller against the League and its Secretary and General Manager John Huntoon, arising from the actions of the Awards Committee disallowing or withdrawing DXCC credits for certain DXpedition operations of Dr. Miller in 1955, 1956, and 1967, including a summary of the facts developed during the taking of the depositions of Dr. Miller and Mr. Huntoon;

2) reviewed a draft, prepared in Hartford, Connecticut, on June 15, 1968, of an agreement looking toward withdrawal of the lawsuit by Dr. Miller;

3) concluded that approval of the agreement would be highly favorable to the interests of the League; and

Behind the Diamond

Number 8 of a Series



A few hams would call him, "The Demon Behind the Diamond." His position in amateur radio has, from time to time, made him a somewhat controversial figure — like his predecessors, he has been accused of being a dictator, with the directors his puppets. It is true he is a man of conviction, with a way of cutting through miscellaneous baloney to the real meat of any matter; it's true that staff members better be well-prepared when they report on a subject. But demon he ain't, and for every detractor, our subject has a dozen admirers, especially among those who have come in contact with him personally.

Enough of a come-on? Okay, we're talking about **John Huntoon, W1LVQ,** secretary and general manager of ARRL, secretary of the International Amateur Radio Union and Editor of *QST*.

As a high-school student in Glen Ellyn, Illinois ("You mean there's really a non-New Englander at Hq.?") he converted the science club into a radio club, acquired W9KJY in 1932, and proceeded to plunge into the traffic game. Soon he was route manager for Illinois and corps area net control (WLTK) for the old Army Amateur Radio System. He was elected in 1936 as ARRL section communications manager for Illinois and served several terms as secretary of the Chicago Area Radio Club Council. "JH" helped run the 1936 Central Division and 1938 ARRL National Conventions in Chicago, taking time out during the latter to win the code-speed contest.

His organizational qualities at the National caught the eyes of ARRL Hq. staffers and resulted in John's becoming assistant secretary of ARRL in 1939. In 1942, on leave of absence, he joined the Coast Guard as a chief radioman, first as an instructor in its Atlantic City radio school and later in communications intelligence work in Washington.

W1LVQ was initiated into international conference work by A. L. Budlong, W1BUD, at Atlantic City in 1947, and with "Bud" he was a member of the U.S. delegations to the 1949 Inter-American Radio Conference and the 1959 Geneva Radio Conference. In 1956 he became assistant general manager, and effective January 1, 1961 he was elected secretary and appointed general manager by the Board of Directors.

John's a member of DXCC and is reasonably active on several bands. He's also a bee keeper and "gentleman farmer", amateur astronomer and telescope builder, sports car rallyist, cryptanalyst and clarinetist — rather, he *was* active in all these things until League duties and travel interfered. John and his wife Pat have three daughters, and make their home in a still-rural section of East Hartford.

4) on motion of Mr. Dannals, unanimously VOTED (Mr. Huntoon abstaining) to submit the question of approval of the agreement to the Board of Directors, under the provisions of Article 6 of the Articles of Association, by mail ballot to be returned to the Secretary not later than July 1, 1968.

There being no further business, the Committee adjourned, at 6:10 p.m.

JOHN HUNTOON
Secretary

WIDEBAND TV REJECTED

The Federal Communications Commission has denied a petition for rulemaking which would have permitted TV transmissions with a 1-Mc. bandwidth in the 52–54 and 145.9–147.9 Mc. bands. The petition, RM-399, was filed December 26, 1962 on behalf of the Institute of Amateur Radio by its executive secretary, Wayne Green. Ability to transmit "live" pictures, use of conventional television broadcast receivers and the longer distance transmission possibilities were cited as reasons for the proposed amendment.

Opposition comments centered on heavy use of the bands for local voice communication, which would be hampered by interference from even a few TV signals; availability of the 420 Mc. band which could better support wideband TV; and increased interference to Channel 2 TV.

FCC indicates increasing use of the bands, including repeaters and satellites; it also feels that authorization of a TV signal using 1 Mc. of a 4 Mc. band is not justified. Further, its action in providing for slow-scan television in the bands below 225 Mc. also lessens the desirability of the IoAR proposal. The petition denial was released on July 29, 1968. QST

Hamfest Calendar

Each month we receive one or more notices of Hamfests just too late to get into QST in time to be useful. Please remember that the normal deadline for this column is the 15th of the second month preceding date of issue. E.g., for the November issue, we should have material by September 15.

Arkansas—The Arkansas DX Association is sponsoring the 1st Statewide DXmeeting September 7. Particulars from ADXA, Box 7323, Little Rock, Ark. 72207.

Belgium—The 4th International Ham Convention will take place in the Casino at Knokke on September 13, 14, and 15. There will be lectures on parametric amplifiers, v.h.f., transmitters, transistors and other interesting subjects. There will be visits to Bruges and Damme, exhibitions, and a mobile rally. La Nuit de L'Amateur dancing in the Wiener Weinstube, transmitter hunts, and an exercise in co-operation with the Belgium Red Cross. Here's a unique opportunity to spend a few fine days with the YL at the seaside. For more information write Lucien Vervarcke, ON4LV, Lippenslaan 284, Knokke 1, Belgium.

District of Columbia—Annual Amateur Historical Radio Conference sponsored by Antique Wireless Association with Smithsonian Institution as Host October 4, 5, and 6. Intormal OOTC meeting Friday, continuous programming Saturday with shows and demonstrations of early equipment. Old-time auction and tours Sunday. Well known guests and speakers attending from coast-to-coast. Everyone welcome. Advance registration deadline Sept. 28. Write for details and program from Lincoln Cundall, W2QY, 69 Boulevard Pkwy., Rochester, N.Y. 14612.

Iowa—The Jester Park Hamfest will be held September 15 at Jester Park, five miles northwest of Des Moines, Iowa. Camp facilities nearby, swap shop, new equipment displays, and fun for all. Registration is $1.00 per ham, the rest of the family free. For further information write DMRAA, Box 88, Des Moines, Iowa 50301.

Illinois—The Peoria Area ARC will hold its 11th Annual Hamfest, Sunday, September 15, at Exposition Gardens (same place as last year), located on the Northwest edge of Peoria, Ill. Food will be available. There will be plenty of free activities for the entire family, beginning with the campsite opening the preceding evening. Coffee and donuts at 9:00 to 9:30 A.M. CDT. For the kiddies there will be clowns, prizes and cartoons. For the XYL: guided bus tours of Peoria and for the OM a huge swap section and the usual eyeball QSOs. Plenty of parking. Advance registration is $1.50, $2.00 at the gate. For further details and advance registration write Ferrel Lytle, W9DHE, 419 Stonegate Rd., Peoria, Ill. 61614.

Massachusetts—The New England DXCC Dinner will be held at the Charter House Motel on Route 128 in Waltham on October 5.

Maryland—The annual Foundation For Amateur Radio Hamfest will take place on Sunday, September 22 from 1000 to 1700 at the Gaithersburg Fairgrounds in Gaithersburg, Md., the same place as last year. For more information write WA4PBG, 317 Van Buren St., Falls Church, Va. 22046.

Michigan—The Iosco Radio Club presents its 4th Annual Northeastern Michigan Hamfest on October 4, 5, and 6 at East Tawas, Michigan, located 60 miles North of Bay City on U.S. 23. This year's event will feature "Your Air Force in Communications" with displays from Wurtsmith Air Force Base and Lee Smits, radio commentator from the Detroit area. Displays of equipment, swap and shop, auction, and a banquet will be the feature events. Programs will begin Friday at 6:00 P.M. and will end Sunday afternoon at 3:00 P.M. For additional information contact W8DET, 8303 E. Hawaii St., Oscoda, Mich. or K8IYZ, 20245 Oakfield, Detroit, Michigan 48235.

Nebraska—The Lincoln ARC is sponsoring the third annual Lincoln Ham Picnic. It will be held at Hy-Gain Electronics factory, Highway 6 at Stevens Creek just Northeast of Lincoln, Nebraska on September 15. Registration will begin at 11:00 A.M. and the eating will begin at 1:00 P.M. No registration fee. Bring your own picnic lunch and eating utensils. Pop and coffee will be turnished free. Recreation for the kids. Hy-Gain will have all their major antennas set up for display. Talk-in stations will be located on 3.982 and 50.4 MHz. For more information write WAØOVL, Alan Floth, 715 "D" St., Lincoln, Nebraska 68502.

New York—The Central New York Chapter of QCWA will hold its Annual Banquet and Meeting on September 28 at Hanson's Hotel, Oquaga Lake, Deposit, N.Y. Cocktails from 5 to 7 P.M., buffet dinner served at 7:00 P.M., and business meeting and election of officers at 8:30 P.M. All members of QCWA everywhere are invited to attend and enjoy an excellent dinner at this delightful location on Oquaga Lake. A program for the ladies is being planned. Use Exit 83 from the East and Exit 82 from the West on Route 17, New York's most scenic route. Tickets are $5.00 per person. For further information contact Clark Galbreath, W2AXX, 111 Keeler St., Endicott, N.Y. 13760.

Ohio—The Greater Cincinnati ARA will hold their 31st Annual Stag Hamfest at Stricker's Grove, Compton Rd., Mt. Healthy, Cincinnati (just off Route 127) on Sunday, September 22. Eats and refreshments all day, special events, swap and shop market, and meet Mr. "Stag" Hamfest. Registration fee of $4.00 covers all eats and refreshments and events for all day. Note this is a stag hamfest. For further information contact Elmer H. Schubert, W8ALW, 3965 Harmar Court, Cincinnati, Ohio 45211.

Ohio—The Ashtabula ARC, K8QBC will hold an auction at the K of P Hall on Fargo Drive in Ashtabula, Ohio. The date is September 27, the time is eight until midnight.

Pennsylvania—The Skyview Radio Society will hold its 6th Annual Swap and Shop on September 15. The club grounds are located 6 miles East of New Kensington, Pa., on Route 366 or 10 miles N.E. of Monolville, Pa. to Camp Jo Ann at junction of Routes 380 and 366. Follow signs to the club grounds. A big time for all, 12:00 noon to 6:00 P.M., OMs, XYLs, YLs and all harmonics are invited. More information from K3ZCA, 239 Michigan Ave., Lower Burrell, Pa. 15068.

South Carolina—The Rock Hill Hamfest will be held at Joslin Park, Rock Hill, S.C. on October 6 at 8:00 A.M. Lots of food, playground, bingo, and trading.

Washington—The Walla Walla Valley ARC will hold its 22nd Annual all-family Hamfest September 22 at Jefferson Park in Walla Walla. Sunday's activities include W7DP museum display, swap shop, dealer displays, games, contests and awards. The annual meeting of ARRL officials will be Saturday afternoon on the 21st, with N.W. Director Bob Thurston presiding. The MINOW gals and the N.W. S.S.B. Asso. will hold meetings Sunday. Lunch will be at 12:30 and will be potluck, coffee, and punch furnished. Registration is 9:00 A.M. until noon, and is free. For more information contact Pat Stewart, W7GVC, 1404 Ruth Ave., Walla Walla, Wash. 99362

Wisconsin—The 15th Annual W9DXCC has been set for September 14 at the Ramada Inn-O'Hare, 3939 N. Mannheim, Schiller Park, Ill. 60176, tel. 312-678-4800. Rates will be $14.00 for a single room and $18.00 for a double room. Registration will begin at 1300Z, the charge for the meeting and banquet will be $6.00 per person, tax and gratuity included. K9VLE will give a slide show of W9 DXers so send Ralph 2 or 3 35mm. slides of your antenna and operating position. For more information write W9EWC, 414 South 8th St., Hilbert, Wisc. 54129. QST

COMING A.R.R.L. CONVENTIONS

September 28-29 — Roanoke Division, Greensboro, N.C.
October 12-13 — Hudson Division, Tarrytown, N.Y.
January 17, 1969 — Southeastern Division, Miami, Florida.
June 20-22, 1969 — NATIONAL, Des Moines, Iowa.

NOTE: Sponsors of large ham gatherings should check with League headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL for up to two years in advance.

ARRL HUDSON DIVISION CONVENTION
Tarrytown, N. Y. October 12 – 13, 1968

The scenic Hudson River Valley will again be the locale of the ARRL Hudson Division Convention on October 12 and 13. Focal point for the Convention's array of activities will be the Hilton Inn at Tarrytown, New York, picturesque hamlet made famous by Washington Irving's Ichabod Crane and the Headless Horseman.

Spacious exhibit areas will feature displays of amateur equipment and services, and manufacturers' technical experts will be on hand to explain the latest gear and to answer questions.

Highlight of the affair will be lectures and meetings on amateur radio public relations, Amateur Radio Public Service Corps., MARS, DX, traffic, antennas and YLRL.

ARRL Hq. personnel will be on hand for the ARRL forum and technical talks.

All hams-to-be will be welcomed at a special session on Saturday morning when they'll feast their eyes on basic equipment and hear how easy it is to "join the family."

One of the most colorful personalities in amateur radio, Bill Leonard, W2SKE, Vice President and Director of News Programming at CBS, and holder of 55 DX awards, will lead off the entertainment at Saturday night's banquet.

And reigning over all will be "Miss Amateur Radio." This charming XL or XYL, holder of an amateur ticket, will be selected from member radio clubs of Hudson Amateur Radio Council, sponsor of the Convention.

Only a short distance from New York City, the Convention site is south of exit 9 on the New York Thruway and is close to the famed Tappan Zee Bridge. Multi-laned highways and frequent train schedules make the Hilton Inn quickly accessible from New York City, the Albany area and metropolitan New Jersey.

Convention chairman is Larry Strasser, K2-UMM. Registration is $3.00, in advance ($4.00 at the door) and is required for forum attendance; no admission charge to the exhibit area. Banquet tickets are $8.00 in advance and, if any remain, $11.00 at the door. A check or money order to Dave Popkin, WA2CCF, Registration Chairman, 303 Tenafly Road, Englewood, New Jersey, 07631, will speed your advance tickets to you.

Room reservations ($15 single, $20 double) go directly to the Hilton Inn, 455 South Broadway, Tarrytown, New York. Be sure to mention our Convention to qualify for the special rate.

ARRL ROANOKE DIVISION CONVENTION
Greensboro, N. C. September 28-29, 1968

The ARRL Roanoke Division Convention will be staged by the Greensboro Radio Club, W4GG, Saturday, September 28th. and Sunday, September 29th., 1968 at the Statler Hilton Inn, Greensboro, North Carolina 27402.

Friday evening will be open for pre-convention rag-chews and informal meetings.

Saturday's program includes forums on TVI by Don Harris, W4BUZ; RTTY by Brad Thomas, WA4LWE; DX by "Tex" Price, W4-GXB, with special guest, Russ Wicker, W4ZXI, with slides of his recent KS4CF DXpedition to Swan Island and other spots; and a mobile demonstration and talk by Oliver Caldwell, WA4FQO. Additional technical seminars are scheduled, including information on solid state devices, antennas and v.h.f.; Wayne Nelson, W4AA, will be in attendance with a display of antique ham radio gear.

Saturday's night activities include a banquet followed by guest speakers and entertainment.

The ARRL meeting Sunday morning will be conducted by Vic Clark, W4KFC, Roanoke Division Director. League General Manager John Huntoon, W1LVQ and Novice Editor Lewis McCoy, W1ICP, will be in attendance. Bill Grenfell, W4GF and other FCC representatives have been invited to participate.

Representatives of Army, Navy and Air Force MARS will address a special MARS seminar. RACES and other emergency communications will be discussed by Cliff Blalock, State Radio Officer for Civil Defense. Weldon Fields, W4AJT and "Hoppy" Hopkins, W4-SHJ, will handle the traffic and Nets operation forum.

The ladies have not been forgotten; a special program and a tour have been arranged.

Convention registration is $4.00 per person and Saturday night banquet and entertainment tickets are $6.00. Due to limited seating, banquet tickets will be sold in advance. Tickets also will be available for a Saturday noon buffet luncheon and a continental breakfast Sunday morning. Advance registration and tickets available from Herbert Dixon, WA4-MFG, P. O. Box 476, Greensboro, North Carolina 27402. All requests for room reservations should be addressed directly to the Statler Hilton Inn, P. O. Box 989, Greensboro, North Carolina 27402. QST

Correspondence From Members-

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

EXPANDED CODE PRACTICE

¶ May I add a few words of appreciation for the ARRL's Code Proficiency Program, in particular for the increased 20 and 25 w.p.m. practice copy transmitted each evening? One of the outstanding advantages of the program is that it gives a person the opportunity of copying c.w. at a known constant speed by which he is able to gauge his progress, and it is available every night. And where else can you get such good practice (complete with QRM right on the frequency many times, sadly) to sharpen your wits and ears? — *Rev. Joseph F. O'Reilly, W9UFL, Ste. Marie, Ill.*

¶ I'm sure I speak for many when I say that it is something we need to get over the hump and help to get that Extra ticket. Keep it up and many thanks. — *Herbert M. Berlier, W6JAQ/K7ZJU, San Diego, Calif.*

¶ Bouquets to whomever started the extra code time at 20 & 25. — *Eugene Hastings W1VRK, Swampscott, Mass.*

¶ That extra practice at 20 & 25 is just what I need. — *Raymond W. Haynes, W8FOV/WB6YHV, Running Springs, Calif.*

¶ This will be used by many and practice produces perfect. — *Joe Poston, K9GCE, Indianapolis, Ind.*

¶ I find the extended code practice sessions for 20 & 25 w.p.m. very useful. I would like to suggest that you mention in *QST* the need for hams to get their Extra Class tickets right away if they expect to be properly identified in the next edition of the Callbook; (in time for the Nov. new c.w. Extra Class frequencies). — *J. W. Krentz, W6HCX Downey, Calif.*

¶ Between W1AW, W6OZ and W6OWP the FCC let me pass the General in June of '66. I'm a little slow on the Extra because my time is not too loose, but keep up the 0130Z sked. and I'll make it before November! — *Charles M. Cross, WB6SWJ, Palo Alto, Calif.*

¶ Just what the doctor ordered! — *Joe Pontek, K8HKM, Lansing, Mich.*

¶ Extra ten-minute practice periods appreciated. Hope you continue a trial period. — *Gregory P. Widin, WB2ZSH, Watchung, N.J.*

[EDITOR'S NOTE: We're glad everyone finds it helpful. We'll keep it up as long as possible.]

COMMUNICATIONS ESCALATION

— continued

¶ Your Editorial called "Communications Escalation" in the May 1968 *QST* was excellent. You have called for a "New dimension to the traditional concept of public service" consisting of "expanded personal communication." You have suggested that we could well afford to talk less about technical trivia, or make "authentic but minimum contact," in favor of truly meaningful communication. And you ask: "How?"

I should like to suggest that amateurs will tend to communicate more when they have more to communicate. Are amateurs well balanced? Usually no. Amateur radio is one of the most engrossing hobbies; it grasps a person, young or old, and there is a tendency to devote time to it, to the exclusion of much else. This is a not-unreasonable attitude during the first flush of enthusiasm, but all too often it continues indefinitely, not as a function of discovery, but of escape from more demanding responsibilities.

Responsibility to self is, perhaps, the most important. When we leave school, how much do we bother to think about the world? How often do we read a book? How often do we discuss matters of personal or social importance beyond a superficial level? How are you to expect hams to discuss anything important unless they are interested in, and involved in anything important? How are they to know the meaning of the events of the world about them, when they derive nearly all facts and apparent meanings from newspapers and equally superficial magazines? How are they to examine ideas deeply, so that they can discuss them meaningfully, if they never read a book about them?

And yet, how often do hams find time during the frenzie of "civilized" life to sit down and read a good book — and I do not mean an escape book (for that they have amateur radio)? How often do they take time out from their engrossing hobby, to invite a few friends over — not for an evening of chat about baseball scores or babies or office gossip, but about the things that are really important to everyone: the value of the individual in a world of increasing impersonality, the struggle for meaningful government, the dangers of interpersonal alienation, the meaning of life for children, the meaning of life, the meaning of death.

When radio amateurs are stimulated to think more deeply about the world outside of their narrow hobby, they will be motivated to talk about it. — *R. L. Gunther, VK7RG, Editor, The Australian EEB (Electronics Experimentors Bulletin), Sandy Bay, Tas., Australia.*

¶ Bravo to W2LYH's letter in the July *QST*! His feeling that DX contacts are too short and impersonal is all too true. Isn't one of the purposes of amateur radio to encourage better relationships and understanding between foreign countries? DX contacts consisting only of signal reports, QTHs, names, and rig information certainly don't have much meaning for either operator. These type of contacts are fine if you are interested only in "working a new country," but DX contacts could be made much more interesting if a rag chew type of QSO was

carried on, in which the operators talked about everything in general and really enjoyed the conversation. Most operators will find that they both have common interests other than ham radio which they like to discuss.

Next time you get on the DX bands, try to find a DX station who wouldn't mind rag chewing and find out how much more interesting and pleasurable your operating time will be. — *David C. Miller, WA8VBV, Marion, Ohio.*

BETTER TRAFFIC PROCEDURES

¶ I feel that traffic net members should be urged to establish meaningful standards of operation, so that some of the poor practices which are all too common may be eliminated. Monitoring the 75-meter nets for the past few months has been an eye-opening experience.

It appears that many regard the handling of traffic as the only responsibility of the participants, and fail to remember that all of us also have an obligation to maintain high standards, consistant with sound engineering and the "state of the art".

Commonly observed, are the following: lack of care in zero beating (a.m. stations, please note), unclean signals (a.c. hum, ripple, chirpy c.w., etc.), overmodulation, flat-topping, broad sigs, etc.

I have yet to hear the NCS inform the offending party. There seems to be an attitude of permissiveness which would be intolerable elsewhere.

On a 75-meter frequency which is used by a large group of seasoned operators, it is the general practice to comment freely and openly upon audio quality, stability, purity of signal, etc., with the end result that the overall quality of operations conforms with the highest possible standards.

There is no valid reason, in my view, for the nets to be less vigilant in this respect than practitioners of other phases of activity. The dedication and publication service aspects of traffic work do not absolve operators from their responsibilities. Any failure to insist upon high standards is unworthy of amateur radio, and dilutes the value and prestige of this splendid and dedicated group of hams. — *David Mann, K2AGZ, Kinnelon, New Jersey.*

CONTESTS

¶ Although I enjoy the annual field day very much, it has brought to my attention one shortcoming of the operation of contests in general. That is, persons not wishing to enter the competition, but rather, pursue some other aspect of the hobby, are hard pressed to find band-space that is not being used by contest stations.

This is a real shame for several reasons. One, it gives the League a poor representation in the eyes of both League and non-League amateurs who are DXing, ragchewing, handling traffic, and so on. Two, stations with a real emergency on their hands do not stand a chance. The list could go on of course, however my wish is not to belabor the point.

In addition to pointing out the problem, I would also like to offer a suggestion for solving it. I believe that by setting aside a part of each band for the contest, both parties would be happier. How much of the band would depend on the percentage of amateurs that participate each year in each contest, (i.e. if 75% of all amateurs participated in each year's field day, allot 75% of each band to the contest, as outlined in the *QST* announcement). The League could each year determine how many amateurs participated in the contest of the year before and portion each phone and c.w. band as outlined above. — *David M. Johnson, WA5OHH/-VE6, Calgary, Alberta, Canada.*

¶ There is no room left for slow operators on today's crowded bands. If someone has a message which is urgent in nature, he usually finds an adequate frequency on which to handle it, with the help of others. We receive the same gripes on v.h.f. during the v.h.f. SS and QSO Parties; but, we are courteous enough to QSY and let nets resume their operations, et cetera. Two and six meters are more crowded than during the contests, yet the really sharp operators, non-participants in the contests, don't seem to mind the hastiness at all.

It is said that the reason for the contests is not easily defined, and probably consists of several integrated views: (1) To let an amateur know how his equipment is working in relation to the other station's. (2) To have fun (pertains to multi-op stations, especially). (3) Gives practice in quick operating procedure. (4) Prepares amateur for emergencies (especially Field Day, but any time a group goes portable). (5) Gives an amateur with even moderate equipment a chance to work many stations, DX, etc.

So, I don't see any reason to fight the contests; they do, in fact, make our operators quicker, more prepared, and more informed. — *Steven D. Katz, WB2WIK, Springfield, N. J.*

¶ Nearly every issue of *QST* contains a letter from at least one anti-contester. Please allow a contester to express a few ideas. From the complaints about our activities, there must be thousands of us?

I would like to see one or more state QSO parties every weekend — say one for each state every year. I think the length of the annual Sweepstakes should be extended. Thirty hours elapsed time does not give one much time for sleep, meals, work, church etc., if he is to get in 24 hours of operating time.

Surely, many hams must be employed in some branch of communications. Some of these jobs require someone to be on duty 24 hours a day, 7 days a week. Longer contest periods would give people on weekend shifts a better chance for full participation.

My first taste of contesting was in the SS of the early thirties, when it extended about two weeks and required complete message exchanges for each contact. Operating a transmitter with around 3 watts input, I gained enough c.w. operating practice to raise my code speed to 35 w.p.m. an achievement which led to a job copying "press" at a broadcast station. In those days jobs were hard to find.

Enough reminiscing. Nowadays my favorite ham activity is contesting on 3.5, 7, and 14 MHz. I seldom come out with a top score, but I do a pretty good job of testing the effectiveness of my homebrew rig. Based on results in one contest, changes can be made in equipment and antennas to improve operating convenience and performance in the next. For example, a recent change in placement of a 7 MHz. dipole moved my signal from the "bottom of the pile" to a point where I — occasionally — raise an east coast station ahead of other callers.

I think the competitive interest in a contest inspires the participants to a greater effort to improve operating ability and overall equipment performance. This is surely a valuable contribution to the state of our hobby.

As for the complaints of "contests cluttering up the bands on weekends when I want to chew the rag":

This weekend I have been listening to the c.w. activity in a CD party. There is plenty of it, all between 20 and 50 kHz. from the low edge of the band, a maximum span of 30 kHz. A similar situation exists in most contests, with possibility the SS "Cluttering up" a little wider span (once a year). Plenty of wide open spaces in the remainder of the band — how much room do you rag chewers and DXers want??

By the admission of the anti-contesters themselves, there are *many* of us contesters. So please multiply my sentiments by thousands and keep those contests going! — *Charles O. Alexander, WØKCG, Jefferson City, Mo.*

CHEST MIKE

¶ Re the Hints and Kinks item of Fig. 3, page 43 of the July, *QST*: the pictorial diagram is a marked improvement over the straight lines and angles generally encountered in the literature. However, it seems to me that certain significant statistical data on the basic supporting structure were inadvertently omitted. — *B. B. Blackburn, Jr. W4TA, Vienna, Virginia.*

¶ Bouquets to the editor for his presentation of W6IEL's mike stand. — *Thomas E. Coates, WA8FQJ Englewood, Ohio.*

¶ I'll take W6IEL's word that it is inexpensive, but I haven't seen such a cute mike support in a long time. — *W. W. Cooper, K4ZZV, Miami, Fla.*

¶ Great idea — that chest mike holder shown on page 43, July *QST*. Now please show us a configuration that we OMs can use. — *Fabian T. McAllister, W8HKT, St. Joseph, Mich.*

U.H.F. ACTIVITY NIGHTS?

¶ Now that the June v.h.f. contest has passed, the bands above 2-meters have gone back to sleep.

I propose an event held maybe 3 or 4 times a year for each band above 2-meters. A 220 nite — a 432 nite — a 1296 and above nite, each happening 3 or 4 times a year. The period of activity need not be longer than 12 hours or so — enough to catch one evening and one morning. If you know that everyone is going to be on a particular band at some particular time, you'll try hard to be on then also.

Some people don't care for contests so we could call this an *uncontest*. But it would not be without its rewards. The greatest of all rewards, of course, is in making contact with other amaterus who share your special interests in this hobby.

This proposal requires a minimum of effort. No special rules, no contest committee to plow through logs — just the simple publishing in *QST* of a suggested period of activity three or four times a year — very much like LO times or code speed qualifying runs. — *Anthony F. Souza, K1SFF, Danvers, Mass.*

DIGITAL LOGIC

¶ The digital logic articles by WA6KGP and K9CPZ in the July 1968 *QST* are outstanding. These articles may not be appreciated by those hams who have had no inclination for or exposure to digital circuits but I am sure that they will appreciate them later when they become involved with digital electronics themselves. I have had some exposure to digital techniques and I find the articles to be quite good and very helpful. I hope to see more on digital electronics in future issues of *QST*. — *Jim Olszowka, WA9SPA, Chicago, Ill.*

¶ I enjoyed the article "Digital Logic Devices" by Norman Pos. WA6KGP, in the July 1968 issue of *QST*. Appreciate the question and answer section for the Extra Exam. Keep up the good work. Interesting magazine. — *Phyllis Warnstedt, K7CPB, Seattle, Wash.* QST

C.W. PRIVILEGES

. . . Every privilege given with the Advanced license is for the a.m. man. Anyone can talk; it takes a little skill to send and receive fast. I propose just the ability to send and receive 20 w.p.m. should be enough for an Advanced c.w. license to restore all or part of the lost c.w. frequencies only. To me c.w. is an art and a means of security to the country and a person willing to pursue this art should be given a little incentive.

The U.S. Navy sees the value of code by giving a General a SN rate and an Extra class a RM3 rate with completion of a Navy correspondence course . . . — *Neil Petlock, K9WRL, CT 3, USNR, FPO, San Francisco.*

NOVICE DX

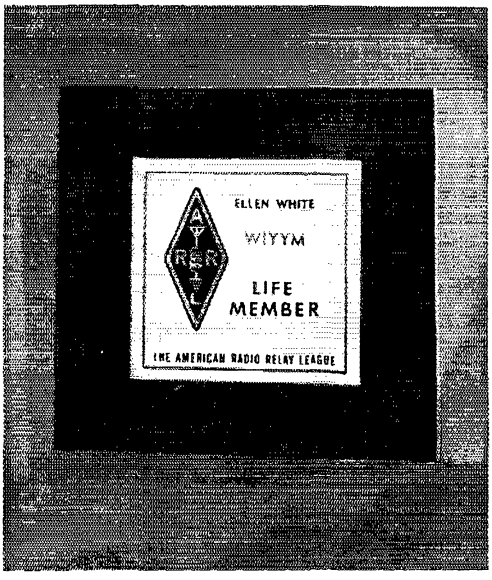
¶ Ask a DXer where he works his DX, and I'll bet you ten dollars to donuts at least 7 out of 10 or more will say "10, 15, 20." And why shouldn't they? The conditions are beautiful, you don't have to worry about ragchewers (in most cases), and almost every CQ is going to bring a good long-distance call.

But forty is a band where, at the right time, almost any kind of DX work is possible. Even with the international broadcasting, DX work can, still, and will continue to be done. A certain Extra class ham, who now does v.h.f. work, told me that he worked his rarest countries on 40. Still lots more have worked Japan, Guam, South America, Hawaii and Alaska, and gosh; who knows what else? As a matter of fact, the thing that inspired me to take up 40-meter DX, was when I heard that HK3 CQ right on my Novice frequency, at 5:00 A.M. I called him, but never worked him, until a month later via sked. Also, I used to work 15-meters, but when I found out I was "generating" harmonics, I was forced to QSY to 40. In about two months of operating on 15, my best DX I worked was FG7. Then, one morning (via sked) I topped that by working an HK3. Still two days after, I worked a WH6. The result to this is that by using 40, I topped my present DX record on 15, about 3 times as much in distance. Now, after *seeing* this (with their QSL cards on my shack wall) I don't want to go back to 15 because I can have just as much fun by using 40. Please remember, working your first JA on 10-15-20: it is expected; working your first JA on 40- (which *is* possible) is excellent! — *John M. Hagey, WN4GTI, Bristol, Tenn.*

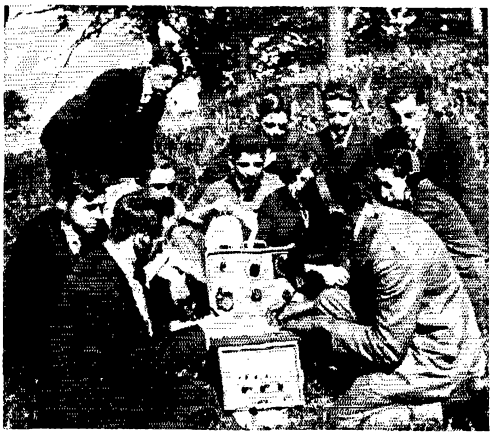
Strays

The Windblowers will hold their annual "Big Blow" on September 28 from 2:00 P.M. to 10:00 P.M. EDT. During this period of time four stations will be manned on 2 meters a.m. in four states to provide contacts with amateurs in the greater New York area. A certificate will be awarded to all who contact the four stations. The stations are: K2GOS/1 — Connecticut, W2ERZ/3 — Pennsylvania, W2ZRD/2 — New Jersey, and W2RRP/2 — New York.

Strays

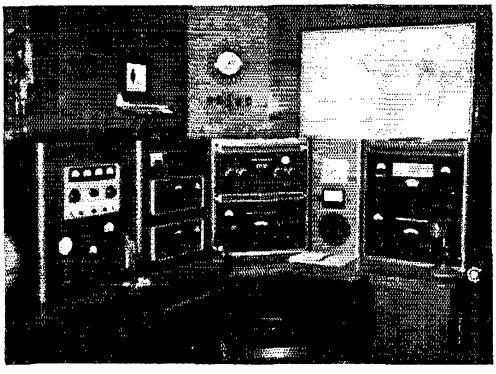


This is the handsome ceramic wall plaque which each Life Member of the League receives. Other goodies for the Life Members include lapel pins and plasticized wallet cards (at no charge), and no more renewal notices! For details on Life Membership application, see page 76 of the *July* issue, or write to Hq. for an application blank.



First Field Day? Not strictly a "Field Day" in the modern sense, nevertheless here are a group of early hams gathered around their portable equipment in Beman Park, Troy, N.Y. in 1915. Sparked by Wendell King, 2QD, probably the first ham in the Troy area (1910), The Troy Wireless Club was formed about 1911. Located first in the Troy High School, the Club was moved to the YMCA and operated under the calls of 2EH, Malcolm Williams (now K3AC), and 2SZ. When the Club finally moved to Sage Laboratory, 2SZ went with it and the RPI Radio Club still uses W2SZ. Mac Williams is shown at the top of the photo and Wendell King is operating the rig. Bill Du Bois, now W2ANM, is still very active and Albert Page, shown in the upper right was instrumental in supplying the photo. (*W1ANA*)

During an orientation session at the USAF Air Command and Staff College at Maxwell AFB, Alabama, each attending officer stood and introduced himself by giving a brief biographical sketch. Attendee W1AZM included a comment on amateur radio in his introduction. Before he had completed the next sentence, Sal Lopez, another attendee was holding up his call, YN1SL on a slip of paper. He was sitting next to Pete, yet unintroduced. It was discovered that two other amateurs were also among the class. Shown from left, are YN1SL, W6IHG, W4DCO, and W1AZM.



Here's a peek at the other fellow's shack. This one belongs to Fred Hammond, VE3HC. The view shows three different complete stations, one for the Jr. operator, VE3EIL, and the other two for the OM. With such a neat layout, there shouldn't be any interference (at least with elbows!) when the two operate simultaneously.

The World Above 50 Mc.

CONDUCTED BY BILL SMITH, *WB4HIP

50-MHz. *TE* Report

REPORTS that recorded sunspot Cycle 20 was reaching an early, if unspectacular peak in April and May[1] of this year prompted a study of *F-layer* propagation between North and South America correlated by K6EDX and K6RNQ. The results of this study and corresponding openings noted have been reported in the past several editions of this column. This past spring produced a record number of contacts between the two continents. It is unlikely that South American 50-MHz. stations ever worked such wide areas of the U.S. and Canada during cycles 18 and 19 as did LU3DCA and CE3QG during the months of March, April and May.

Tests were run each night of that three-month period, between 0145 and 0215 GMT, with North and South American stations taking turns transmitting and receiving. The band was found open for *TE* on at least 12 nights and all told the six meter band was open 41 days between the two Americas. Intensive listening showed the *TE* openings came between 0000 GMT and 0430 GMT, centering around 0230.

Another objective of the tests was an attempt to correlate between *Es* and *TE* to help explain some of the unusually long paths spanned; distances not associated with pure *TE*. Openings on March 5 between Peru and Kentucky, Tennessee and Ohio; and on March 12 between Chile and San Diego show close correlation. Numerous forms of simultaneous propagation in April tended to mask fade rates or other individual traits which provide a clue to the basic propagation mode. The April 20–21 opening, for example, exhibited single- and multi-hop *Es*, F_2 and F_2 *backscatter* for several hours, as South Americans worked as far north as Washington, South Dakota and Wisconsin. April saw 19 days when the band was open between the two continents, *TE* and/or F_2.

F_2 *backscatter* was noted on a dozen days in April. Contacts were widely reported between the 4th, 5th, 6th and 7th call districts roughly south of a line from San Francisco to Charleston, South Carolina and on at least one occasion, W3KWH, Pennsylvania, worked southern California on F_2 *backscatter*. Beam headings varied only slightly from day-to-day, and for the duration of each opening. W4s pointed their beams south to southwest, W5s aimed mostly south to slightly southwest and the 6s looked southeast to due south. The points of reflection in most cases appeared to be in the Pacific as much as 3,000 miles west of Chile and *south* of the magnetic equator. The band may have been open to Australia or New Zealand during one or more of these periods, but attempts to arrange cross-band tests, six to ten meters, failed probably due to insufficient coordination.

May proved interesting, with five days of *F-layer* propagation, and *TE* on May 5, 6 and 10, which correlated closely with *Es*. Then there was June, an F_2 opening, though short-lived, during the first week between southern California and Chile, and another opening during the v.h.f. contest that propagated backscatter contacts between the 5th and 6th call areas, and F_2 exchanges between Puerto Rico and California. Not bad for a month that shouldn't see any *F-layer* propagation at 50 MHz.! Late report: W8GZ worked LU8AY at 0000 GMT, July 31, apparently F_2.

No less than 30 daytime F_2 openings between North and South America were recorded between March 1 and the first week of June. The openings came between 1800 and 2350 GMT, the median opening time being 2103 and the median closing at 2213. The openings averaged 70 minutes duration each.

Bob Cooper, K6EDX, is on a one-year assignment in the Virgin Islands signing KV4FU with a kw. on 50 MHz.

*Send reports and correspondence to Bill Smith WB4HIP, ARRL, 225 Main St., Newington, Conn. 06111

[1] Early indications are that Cycle 20 peaked in July. However, several months will be required to be certain this is true. The possibilities of *F-layer* propagation on 50 MHz. this fall and next spring remain good.

Typical *TE* months, September to November and March to May, produce only slightly varying degrees of circuit reliability for such seemingly separate radio paths as Buenos Aires (LU) to Madeira Islands (CT3), Buenos Aires to Paramaribo (PZ), Caracas (YV) and Mexico City (XE). What all of these paths have in common, aside from the pivotal point around Buenos Aires, is a magnetic equator crossing (the magnetic equator is approximately 20 degrees south of the geographical equator) at an angle of from 90 degrees to 30 degrees, either side. A 90-degree angle path is one that crosses the magnetic equator at right angles. Experience with *TE* propagation in the Pacific area, Australia to Japan, and over Africa, Southern Rhodesia, Southwest Africa to the southern Mediterranean region, indicates that 50-MHz. *TE* covers the greatest distances between stations located on *opposite* sides of the magnetic equator when the radio path comes closest to crossing the magnetic equator at right angles. As two stations attempt to communicate via *TE* over more east-west paths, such as LU to CT3, their ability to communicate by *TE* depends upon their being located closer and closer to the actual magnetic equator. At some undetermined point either side of the magnetic equator, stations cannot communicate by *TE*. The radio paths must cross the magnetic equator or at least flow *north and south*, or *TE* apparently does not work. Stations in Peru, for example, *apparently* do not work stations around Recife or Sao Paulo, Brazil, by *TE*, even though all points are very close to the magnetic equator.

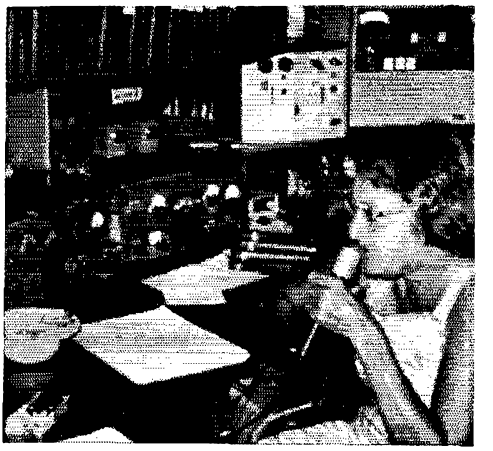
Because of the location of the magnetic equator, stations in Buenos Aires are but 31 degrees south *magnetic* latitude. Stations in Puerto Rico, however, are approximately 51 degrees *north* of the magnetic equator.

In the western hemisphere, South America is considerably *east* of North America, and CE3QG, located on the west coast of South America, is actually almost due *south* of Boston. CE3QG is about 33 degrees south magnetic, while Boston is approximately 74 degrees north magnetic. Even in the most favorable *TE* areas of the Pacific, such extremes as 74 degrees north or south are unlikely to produce *TE* propagation.

However, single-hop *E-layer* ionization from the U. S. first call area due south, landing *not* in Florida but around Turks or Caicos Islands (VP5) could provide the type of *E*-to-*TE* link-up that seemingly was responsible for 8 of the 12 openings between W5, 6 and 7 and Chile and Peru this past spring.

Phoenix is approximately 60 degrees north magnetic. Due south of Phoenix, where a *TE* signal between the two points would cross the magnetic equator at nearly a right angle, is Easter Island, CEØ, at approximately 37 degrees south magnetic. Based upon Tokyo-Osaka, 48-49 degrees north, to Perth Australia, 64 degrees south, W6s and southern W7s should be able to work CEØ *without* the assistance of a *E* link-up.

There are many similar untested though promising-looking paths. A sampling of these would include VR6 (Pitcairn Island) to XE, W6 and KH6; ZD9 (Tristan Da Cunha) to VP9 (Bermuda). As with any 50-MHz. endeavor outside of the western hemisphere, lack of equipment and sufficient motivation to make and hold schedules is undoubtedly the limiting factor on these paths.



The most widely-worked Caribbean station on 50 MHz. is W1HOY/KP4, Helen Harris, Arecibo, Puerto Rico. *(VK3ATN photo)*

We can now draw these conclusions[2] about 50-MHz. *TE:*

1) Transequatorial propagation is a nighttime phenomenon. The optimum path time between any two points, assuming crossing of the magnetic equator, and other factors set forth here, is between 2000 and 2300 local time *at the path mid-point.*
2) Transequatorial m.u.f. (maximum useable frequency) is thought to be about *1.5 times greater* than the daytime m.u.f. on the same path. A 40 MHz. daytime m.u.f., though not sufficient to support 50-MHz. F_2 signals, should result in a 60-MHz. m.u.f. *TE* path. Thus the daytime m.u.f. may be as low as 33.5 MHz. during minimum sunspot years and frequencies up to about 50 MHz. would *probably* still be open. Because of this favorable *TE* m.u.f. enhancement factor, *TE* over favorable areas of South and Central America extends several years either side of the sunspot maxima, even in relatively low-level sunspot cycles such as the present Cycle 20.
3) Between 50 degrees magnetic north and 50 degrees magnetic south (thought by some to extend to as much as 60 degrees magnetic *south*), *TE* is virtually an every-night occurrence during the months of September, October and November, and March, April and the first weeks in May. The variation from

[2] These conclusions agree closely with observations made during cycle 19 by ZE2JV and ZC4WR, reported in detail in *QST* for December, 1959, and April, 1963. For cycle 18 *TE* summary, see *QST*, May, 1950, p. 49.

VK3ATN discussed moonbounce techniques with v.h.f. column editor, WB4HIP, during the Australian's recent stateside visit.

night-to-night is not great and circuit reliability is high.

4) Use of the next lower amateur assignment, 10 meters, for liason is *not* recommended. 50 MHz. propagation via *TE* may be present when ten meters appears to be closed between the same two points.
5) The stability of *TE* propagated signals (absence or reduction of rapid flutter) seems to improve considerably for stations further and further from the magnetic equator, up to the cut-off point. Short paths, such as LU to OA, exhibit high flutter rates while longer paths, LU to XE, are usually low in flutter content, by comparison.
6) Equipment requirements are minimal, although 100 watts output and a three-element beam, in the clear, is the approximate minimum for consistent extended-path *TE* experimentation.

Transequatorial propagation on 50 MHz. was first noted during Cycle 18. During Cycle 19 a great deal about its behavior was brought to focus, largely due to the efforts of hundreds of amateurs participating in the ARRL-IGY program. As is often the case, however, each new bit of knowledge added to the collection only suggests further areas where information is lacking or is inadequate. Programs such as the spring *TE* tests between the west coasts of the American continents contribute to our knowledge of the ionosphere, but a great deal remains to be resolved.

I regret space limitations did not permit printing the entire K6EDX report compiled from more than *700* reports of some 100 individual operators. K5AGI, WA5IYX, K6EDX, K6RNQ, W6ABN and WA6HXW, and our South American friends contributed to the completeness of this report, and of course those who submitted reports to this column, all of which were kept on file and then forwarded to K6EDX for this report.

Are you ready for the coming DX season? It may be interesting! In addition to the *TE* primarily discussed here, there could be some long-haul *F2*. As a rule-of-thumb for catching these openings, be attentive when the sun is over the midway point of the path you're attempting. And don't just listen: *transmit*, because the other fellow may be listening. A careful reading of the article by K6EDX on page 19, March, 1968, *QST* is also in order. Good hunting!

OVS and Operating News

50-MHz. proved lively through the last reporting period spearheaded by the appearance of KV4FU, June 30, from the Virgin Islands. Bob, whose stateside call is K6EDX, started his one-year operation by contacting WA7CJO, Phoenix on triple-hop *Es*. Other contacts that night included K7ICW and WA7IER, both Nevada. A large proton flare on July 8 was followed by exceptional 50-MHz. conditions on the 11th when, among nearly five dozen contacts, KV4FU worked K6MIO, K6UJG, K6RNQ, W6YKM and WB6WPH over paths approaching four thousand miles! KV4FU is now running a kw. into stacked 3-element Yagis. QSL via KV4 QSL Bureau.

And July 19–21 this writer operated as ZF1DT from Grand Cayman Island, 500 miles south of Miami. Several dozen stations were worked on the 20th, including W7FN, Tacoma, a 3,200-mile path and VE1AFB, Nova Scotia. W4HJZ in North Carolina was the first station to work ZF1 on 50 MHz. One W3 was heard calling CQ and when I answered him he replied, "who are you kidding?" and refused to work me! I'll have a full report on the Grand Cayman operation next month. All contacts will be confirmed.

Literally dozens of *Es* reports were received during the past reporting period. Space does not permit recording all of them, but here is a sampling of the better DX.

KL7FNL was worked by K6RNQ on June 3 and on the 13th, WØEKB heard the Alaskan in Iowa and worked VE8BY. He also worked W1FZJ/KP4 the same day. June 20th, K6RNQ worked KL7GGZ and VE8BY. The next day K6MIO worked W1FZJ/KP4 and heard FG7XT, and K9HMB worked TI2NA. W3KWH, K3HHK, K8UQA and others worked KL7FNL June 23rd, and W3KWH also worked VE8BY. W8KNC/KL7 worked K7VSI on the 27th, and WA6NRV and K6MIO on the 30th.

In July the band cooled slightly, but the 11th was productive with the previously reported work of KV4FU. Additionally, FG7XT was heard briefly by K6RNQ, who, later the same evening, worked KL7FNL. FG7XT was worked by several W4s and 5s who were out of the American phone band. Watch those band edges, fellows, some of the popular transceivers do not have sufficiently accurate calibration for band-edge operation. We don't want to loose any 50-MHz. DXers to the FCC.

There appears to have been more multiple-hop *Es* this summer than during the past several years. This is probably at least partially due to the increased use of s.s.b. and greater band occupancy. But whatever the cause or reason, 50 MHz. provided much DXcitement this summer and promises even more this fall, winter and next spring with the

likelihood of good *TE* to South America and no doubt a few east-west *F2* openings between the coasts and into the Pacific.

Several Californians are studying what may be previously unreported form of propagation. K6RNQ says he isn't ready to draw any conclusions, but says the propagated signals peak between 300 and 330 degrees. Bob says the backscatter signals sound like aurora, but he is satisfied they do not have an auroral origin. Signals worked are usually from the San Joaquin Valley, Los Angeles or San Diego areas and appear some evenings after *Es* activity to W7 or VE. Usually the signals begin sounding much like *Es* backscatter but soon change to a rough flutter. This type of propagation occurred on June 24 and 25, and July 1, 4 and 11. K6RNQ, K6MIO, WB6UYG, WB6KAP and W6YKM are gathering information and we hope to have more to report later.

144-MHz. Es on June 20–21 flooded us with many interesting reports, the highlights of which were reported last month. K1HTV, W5ORH and myself have been collecting reports on the history making conditions and as soon as they can be properly evaluated, a detailed report will appear in these pages. Thanks to all who mailed reports; they are being used. Those two days left many meteor scatter buffs wondering if chasing bursts was *really* worth all those sleepless hours! And wait until you see the standings boxes next month.

But had it not been for the *Es*, this would have been a disappointing summer on 144. Tropo conditions in all areas of the country were reported below normal. However, the Amateur Radio Society of St. Peter's College, New Jersey, using the call W2GTF/2 during the June contest, worked more than 50 stations over 400-mile or more paths with just a 2E26 and 8-element Yagi. The contact list submitted by WB2JXE totaled 14 states, six call areas and a VE3! Other reports of tropo come from K3ASI and W4WQZ.

Please forward Perseid meteor shower reports immediately so that a tabulation can be included in the next column.

220-MHz. reports are scarce again this month. However, a large number of meteor scatter schedules were held during the late July and early August Persieds shower and I hope to be able to report the first recorded 220 m.s. contact next month. WØEYE and W6WSQ exchanged calls in July and may have made contact on random meteors just prior to the Perseids shower. Appropriate recognition awaits the two stations recording the first 220 m.s. contact.

K4GGI/1 and K1YON send the only recent operating news, both saying Tuesday night activity continues in New England.

420-Mz. activity this summer was supported by periods of excellent tropospheric conditions, and tropo should be even better this fall. K2ACQ, Lockport, New York, reports working Michigan stations on eleven different days in June, and W9WCD, Illinois. K2ACQ wants nightly schedules. On June 7th, K4EJQ, Tennessee, worked W3UJG, Maryland and VE3DKW, Ontario, and heard many others but could not attract their attention. Bunky comments on the apparent lack of random operating on nights when favorable conditions are not present. He says, "I think it's time we spent more time on the v.h.f. bands and less on 3.815 MHz." WA8VHG, Michigan, reports exceptional tropo conditions June 23rd, when he worked stations in New England, after having worked into Pennsylvania the night before.

Early July saw several nights of excellent tropo. On the 8th, K4QIF, Virginia, worked W2s, 3s and W1AJR over a 435-mile path to Rhode Island. W4FJ, also Virginia, worked W1AJR, too. W4FJ's 432 states worked now totals 12 and he is keeping nightly schedules with WA9HUV near Chicago, a 630-mile path. On the 9th, K4QIF again worked W1AJR, as the coastal inversion continued, and then added two Massachusetts stations, W1OOP and W1GAN, to bring Rusty's 432 totals to 11 states. The east-west path across the northern part of the country was wide open July 11–12. VE2HW, Quebec, worked W9ZIH, Illinois, over a 750-mile path and heard WA9HUV, near Chicago. This was followed by WA9HUV and VE2LI exchanging signal reports over 785 miles, but W9WCD later worked VE2LI to win the evening distance record, *825 miles!* Other stations worked on the 12th by WA9HUV included VE3EZC (550 miles), VE3BPR, VE3DKW, K2ACQ and K2CEH. Norm got his 13th state and best DX in June, working KØIJN (No. 13) and VE2LI, 780 miles.

K1PSR in New Hampshire will soon be on 432 with a 4CX250B, and W4VHH, South Carolina, has returned running 500 watts and a 32-element extended collinear after nearly two years absence from 432. He reports regular 95-mile contacts with K4GL, also South Carolina, and wants nightly schedules with others. At Lemont, Pennsylvania, K3CFA has completed an array of twenty-four 5-element Yagis!

K8REG, Dayton, Ohio, says tropo conditions were good the entire week of July 14. On the 20th, he and WØDRL in Topeka, Kansas contacted over a 625-mile path for what they believe to be the first Ohio-Kansas 432 success. K8REG says the contact came as the result of weeks of scheduling. K8REG runs 300 watts output to a 32-element extended collinear.

K6HCP and K6MIO are finishing a 128-element circularly polarized extended collinear for moonbounce tests with VK3ATN and others. VK3ATN is confident that his rhombic will work on 432, and will use the California signal to plot the rhombic's 432 pattern. In Puerto Rico, a 100-foot copy of the Arecibo dish should be in service at W1FZJ/KP4, as you read this. VE3BPR, Sam's chief welding technician, visited Puerto Rico in late July, to aid with the finishing touches. The dish will have a moveable feed mounted on a 60-foot tower. This could be the banner year for 432 moonbounce with the likes of W1FZJ/KP4, VK3ATN, K6MIO and K6HCP aiming skyward.

1215 MHz. is quite active in the metropolitan Chicago area. WA9HUV reports the following stations on regularly: W9ZIH, 200 watts, 7-foot dish; W9WCD, 120 watts, 7-foot dish; W9OKB, 100 watts, conical dish; WA9HUV, 100 watts, 7-foot dish; WA9NKT, 30 watts, plane parabola; WA9CGZ, 30 watts, and K9CNN, 10 watts. WA9HUV has completely rebuilt a 7-foot Channel Master u.h.f. television dish with excellent results. He says it is necessary to cover the surface with a metal screen, such as hardware cloth, or double the number of horizontal elements in the dish surface. WA9HUV did the latter, because the modified dish weighs less and has less wind drag than when covered with hardware cloth. The feed system must also be replaced. Dipole and reflector feeds are the most popular, but W8NMT is using a coax-fed circular waveguide. WA9HUV recommends using rotators which can be accurately calibrated and have good repeatable calibration. The beamwidth of a 7-foot dish at 1296 is too narrow to tolerate other than accurate aiming.

(Continued on page 152)

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

The Amateur "Handicap"

AMATEUR radio has often been catalogued as unusual because that license we work so hard to acquire puts us all on a common ground. True it doesn't seem that way when some of us may be sitting on bales of the green stuff and operating platinum plated stations, while others are working with home brew gear made from disgarded TV chasses. We are members of O.O.T.C., and we are very young people. We're teachers, housewives, students and even TV personalities, and each and every one of us begins our activity with a "handicap." "Handicap, a device to equalize chances." We may be an Olympic decathelon champion, or a polio victim confined to an iron lung, but in order to operate our gear, each of us is confined to one room, and unless we are operating amateur TV or facsimile, we can't see the persons to whom we are talking nor do we meet them unless we attend a hamfest or convention. We know each other by our voices and our fists only, thanks to the common ground of amateur radio.

Like so many mutual interest groups within the amateur fraternity, there is an Amateur Handicapped Net which operates Monday through Friday at 1600–1800 GMT, on 14.287 MHz. While this net is for the physically handicapped amateur to meet and discuss technical problems, many YLs who are not handicapped are members through their efforts of helping others less fortunate to get on the air. They are people like Jean, and OM Dick Barber, who designed the intricate control panel for the Johnson twins (WA6QMX/WA6QMY) so that they could turn their beam, tune the transceiver, adjust audio even though they are only able to speak and roll their eyeballs physically.

Members of the net are YLs like Elizabeth and Barbara Lombardi, K1EIC and K1EIR, both sightless. Betty runs the club station in Hartford, Connecticut, with the call K1QCK. Peggy Harnois, of Westbrook, Maine, K1GSF, editor of *YL Harmonics*, spends her time in a wheel chair, Louise Wright, K1GWF, is sightless. Linda Burton, WB4GHC, Patricia Rowell, WA5ARC, and Joy Tommy, WB6ALN are also blind. Sharon Scheppke holds Technician class license WB6FME, while Rosie Rhein, W7OUE, a victim of arthritis, and Katherine Burlingham, a sightless ham, hold Advanced class licenses.

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, Calif. 91001.

Iris Faria, K6LPH, a polio victim, teaches code to a group of Boy Scouts, while Mary Randall, WA6VDS, a quadraplegic polio victim, mother of three boys, served as Den Mother of a Cub Pack while living in an iron lung. Mary paints, types and operates her rig with a mouth stick. Another polio quad is Marilyn Card, WA6NFH, and any traffic person has worked "Betty" Wilson, W6REF, a top c.w. operator, who is confined to a wheel chair, she holds an Advanced ticket, and is a former SCM. One of the best known members of the SW ARRL Division is the "Helen Keller" of amateur radio, Mary Lou Stocksill, WB6SSZ, who, though both blind and deaf, is extremely active on the air, when she isn't busy keeping house for her engineer husband and two teen-aged daughters. Other sightless YL members of this net, and extremely active wherever amateurs are found on the air, are Nada Jones, WA6YEJ, Edna Buehling, K7DJM, Dona Penrod, W7VTC, Maxine Dixon, W7VTJ, all of whom hold General class licenses.

Many of these gals were certainly entitled to take the Conditional exams, but went after their General or Advanced licenses long before the advent of incentive licensing.

True, amateur radio does start us off all on the same footing when we enter the shack and sit down in front of the key or mike, but for those who have an additional handicap of a physical disability and would like to become a member of the Handicapped Net, send name

Renata "Renny" Krause, DJ9SB, 1968 CHC Queen, with K1QHP, DL4EO, and Paul, DL9KP, President, Germany Chapter CHC #10, at the Second Annual meeting of the Germany CJC Chapter #10 at Velbert. *(Picture by DJ8OT)*

call, and whether or not an ARRL member, a brief description of the disability and any other personal data to:

Ray E. Meyers, W6MLZ
Box R, San Gabriel, Calif. 91778.

For those who would like to help these hams, the Net always needs stamps for mailing certificates, 8½ × 11 envelopes, or, you may send $6.50 to cover dues for a handicapped ham to ARRL. Ray keeps in touch with the League and will give them the names of those who might not otherwise be able to afford membership.

In accepting the Columbus Gold Medal award for humanitarian service at Genoa, Italy, October 12, 1966, Ray Meyers W6MLZ, said that the medal belonged to a lot of men, women, boys, and girls around the world who have helped him, and the better than 2000 handicapped amateurs around the world. He added "I am more impressed by the talent of these handicapped people than with their handicap."

YLRL "Howdy Days."

September 26, 27, 28, 1968

Start: September 26, 1968 1800 GMT.
End: September 28, 1968 1800 GMT.
Rules: Scores will be based on contacts with licensed women operators only. All bands and modes of emission may be used. No cross band operation. Net contacts do not count. Only one contact with each station will be counted.
Scoring: Score two (2) points for each YLRL member worked, and one (1) point for each non-YLRL member worked. *No multipliers.*
Awards: Top scoring YLRL member will receive her choice of a YLRL pin, charm, or stationary. Non-YLRL member will receive a one year membership in YLRL.
Logs must be received by October 15, 1968.
Send logs to: Claire E. Bardon. W4TVT
2238 Morgan Lane
Dunn Loring, Virginia, 22027

The long lazy days have just a month left and then we come out of our summer lethargy and settle down to school, fall cleaning, and serious operating.

"Howdy Days" is an end of summer contest, a lazy contest that lacks the hurly burly and bustle of the major ones ahead. It is a get acquainted time for the new YLs who have just received their licenses, and the catching up on news from old friends we haven't heard during the vacation period. And it is also a sort of pre-game warm-up time to get into the swing of making contacts and logging YL calls, and remembering them for the major ones coming up like YLAP only a month away. This contest was started in 1959, by Gladys, W6DXI, then YLRL vice president as a special get acquainted activity for the women of radio. So get in and join the most comfortable, easy-going, pleasant contest in all amateur radio. Where else can you make points while carrying on idle chats? It might be a heck of a good way to line up skeds for AP, too.

Annual Floridora Contest

For the entire month of October YLs in Florida will be competing in the Annual Floridora Contest. Contacts are YL to YL, and need not be Floridora members so long as *both* operators are *in Florida.* All bands may be used. Logs should be sent to the Floridora vice president

Ten-year-old Judy, WB6BGG, made a telegraph key from a coat hanger wire and a nail as a 4th-grade project, and in 1967 she had her Novice license. She received her General class in 1968. Her parents are WN6WGC and WB6ZQK.

MINOW Net annual picnic. (Front row) Jessie K7TWQ Vicki K7VSG, Pat K7OFX, Verda K7UBC. (Back row) Esther W7IXR, Alma W7FDE, Ethel W7WLX, Frieda K7PVG, Joan WA7BDD, Bobbie K7RAM. During DST the MINOW net meets on Fridays at 1500 GMT on 3.913 Mhz., and 1700 GMT on 14.313 Mhz.

When the MINOW Net held its picnic it wasn't a purely YL affair. The following OMs were there as escorts of the net members: (Front row) Ed W7FPP, Dwight K7OFW, Hugh K7PVF, Clarence, no call. (Back row) Roy W7AZ, Karl W7ZCE, Bud K7RAO, Jim WA7BDC.

Bertha Eggert, WA4BMC
1510 17th Avenue North
Lake Worth, Florida, 33460

Deadline for the logs is November 15, 1968. Prizes will be awarded for the top scores.

Sonia Rotenberg PY2SO

It all began because Sonia and Joe wanted to improve their English and the best way they could think of was listening to it spoken on the broadcasts of commercial radio programs. So they bought a general coverage receiver and settled down to listening to English. As they tuned across the bands they stumbled upon the amateur radio frequencies and that ruined any more b.c. radio for them. As Sonia puts it right then they were "hooked," and just two days after they had discovered amateur radio they had applied for membership in ARRL and had started studying code. That was five years ago, and in that time Sonia has logged over 40,000 contacts, the majority of which were made on c.w. for that is still her favorite.

Sonia Rotenberg, PY2SO.

The chief interests at PY2SO are contests, DX and rag chewing. Sonia operates both c.w. and s.s.b., while Joe adds RTTY to his interests. Also they handle traffic, particularly emergency traffic. Sonia holds DXCC-300, WAS, WAC — YL, and is a member of LABEE, RSGB, YLRL, ISSB, CHC, AHC, FOC, and A-1 Operator Club.

PY2SO is a well known call in all contests, and her record includes sixth place as single operator c.w. in 1966 and 1967 ARRL contests; K2HLB Trophy for s.s.b. and c.w. in the 1965 CQWW, which was the first CQ contest trophy to be awarded to a YL. She placed second c.w. multiband in CQWW 1966; second place c.w. 1967 YL-CM; and as we all know first place in both c.w. and phone contests in the 1968 YL-OM. QST

—···—

Feedback

WA2BHJ informs us of the incorrect listing of his call in the YL-OM contest results, page 87, *QST*, July, 1968. The call should read WA2BHJ, not WB2BHJ. Also, in the August issue of *QST*, page 86, KØCDW should be listed as KØDCW.

September 1943

. . . The cover this month is devoted to WWW, Women War Workers. The four young ladies shown are all beautiful and photogenic. The nation's womanpower is rapidly being enlisted.

. . . To further this theme, Louisa Dresser, the able Editorial Assistant, has a comprehensive article on "Women and Radio." Women are being recruited from all sorts of places and going into all sorts of jobs. Of course, many of these are hams. And a good job they are all doing, too. Factory workers, operators, technicians, instructors — name it and you'll likely find women on the job. Flock of photos.

. . . The problem of adding selectivity to an ordinary super-regenerative receiver is tackled by George Grammer, W1DF, who describes a superhet incorporating a superregen detector. It uses six tubes altogether and they are common, easily obtained types. The rig is designed primarily for WERS control stations.

. . . FCC announcements state that radio amateur operator's licenses are being extended, but no more applications for station licenses can be made for the time being.

. . . For those looking for some outlet for their suppressed desire to build things, Robert Lewis, W8MQU, describes a peak-limiting amplifier for recording. Using instantaneous a.v.c. the circuit effectively prevents over-cutting.

. . . Although written twenty-five years ago, the article on "Resonant Circuits in Antenna Systems" by Dawkins Espy, W6UBT, is just as applicable today. One can do all sorts of tricks such as causing a single radiator to act as a half-wave radiator on several different frequencies, to convert a single band, three-element beam into a two-band beam, etc. Sounds unlikely? Better read it.

. . . Our wandering Editor, Clinton B. DeSoto, W1CBD, has been down to Rutgers University and gives a case history of the goings-on there in the U.S. Office of Education ESMWT program. Wow! I had to read carefully to find what that meant. Engineering, Science and Management Defense Training. They cover a lot of ground but the pictures show a lot of radio gear involved. Wiring diagrams and math on blackboards. When Clint reports on a project, he sure covers the field.

. . . James H. Smith, RT1c, USNR describes some captured Jap transmitters and gives the complete wiring diagram. These rigs were slightly modified and used against the enemy right on Guadalcanal where they were captured. The wiring was traced out wire by wire, as no wiring diagrams came with them! Of all things, they used a UV202 as a master oscillator, although they wound up with an 861 in the final.

. . . The ban is on again concerning RADAR. Understand it's ok, if spelled backwards. — *W1ANA.*

HOW'S DX?

CONDUCTED BY ROD NEWKIRK.* W9BRD

H o w ?

All the shuffling of callsigns now going on brings to mind the yarn about stalwart old John Demetriopetropoulos who, as you may recall, went to court to change his name. The judge said he could easily agree to the advisability of some revision, name changing being such a well established American custom. "What shall we change it to, John?" the magistrate asked. John replied, "How about Jim, judge? Jim Demetriopetropoulos."

You see, Jim—er—John really didn't want to turn in his old call. The prefix, maybe, but not the suffix. Further apropos this label business W9GFF—er—W9DY draws our attention to the following worrisome article in a recent Chicago *Tribune* which, if you play the pile-ups, could explain the sudden appearance of your latest case of shingles. . . .

SO WHAT'S IN A NAME? ULCERS

Doctor Tells Peril of Alphabet Neurosis

BRISTOL, England, July 12. 1967 (AP)—If your last name begins with the letters between S and Z, you are twice as likely to get ulcers as are other people. And you are three times more prone to heart attacks.

A doctor whose last name begins with W reported this today to the British Medical Association.

Dr. Trevor Weston said the situation is all due to the strain of waiting for your name to be called. The amount of neurosis in the S to Z group, he said, is 50 per cent higher than in the A to R group.

He said his findings are based on a 10-year survey of mortality statistics at a London teaching hospital.

"It is clear that the strain of all the waiting for your names to be reached—of always being last—renders us more liable to become morose and introspective," said Weston.

"And the damage begins at school age." Weston calls the condition "alphabetic neurosis" and says it shortens life for the group by 12 years compared with the others.

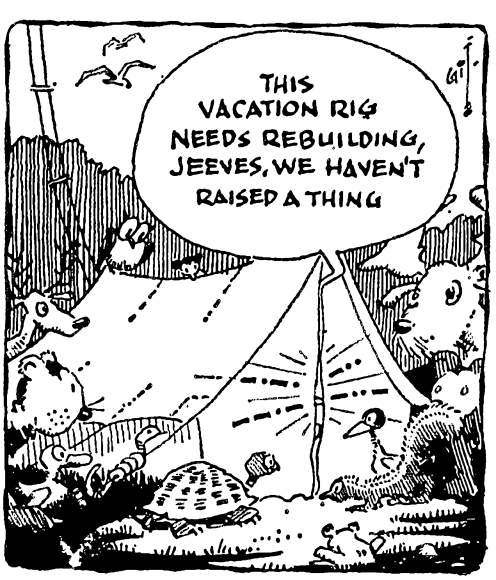
Ergo and *viz.*, W9XYZ's DX and traffic net days are clearly numbered unless he packs his bag and becomes, say, a W1A- type. But rare DX ops sometimes get tricky when pruning their queues, working from the other end of the alphabet. W9XYZ should commute?

Oh, let's admit we don't have a solution to this diabolical dilemma. *Everybody* can't be a W1A-. Just keep taking those pills, W9XYZ.

W h a t :

Another fine fall DX boom lies immediately ahead so we'll unlimber your "How's" Bandwagon for more sightseeing among the megacycles—er, megaHertzes. 'Tis 20-meter phone's turn for activity analysis. In our documentaries the numbers in parentheses are kilo-Hertzes above the lower band limit, and the digits outside parens represent GreenHertz—no, Greenwich time in whole hours. *E.g.*, "HH9DL (300) 22-23" would mean HH9DL was observed around 14,300 kHz. between 2200 and 2300 GMT. Let's try it. . . .

20 phone practitioners **W**s 1AYK 1DAL 2DY 2VOZ 3HNK 4GTS 7BE 8IBX 8YGR 9LNQ, **K**s 2UPD 4TWJ 9UIV, **WA**s 1DJG 4WIP 5PPZ 5PUQ 6JDT 8KRE 8MCQ 9TLM, **KP4**DBJ, P. Kilroy and J. Stevens account for **AP2**s AD MR (160) 19, **CE**s 2DI 3EV 3FZ 3ZN 6EF 6EQ 8CP 4, 9AT 13, **Ø**AC 4, **CN8**s BK (202) 0, AW BV FW (171) 22-0, GE HD (254) 8-17, **CP**s 1GF 5AX 5DF 6EK, **CR**s 4AJ (205) 23, 4BC (204) 7-9, 5SP (145) 22, 6BX 6DO 6IV (176), 7, 6HN (105) 21-22, 6IZ 6KL 6KT (175) 21, 6RZ 7CD 4, 7CH (210) 12-14, 7CO 4, 7DS (202) 11, 7EM (114) 20-21, 7JB 9AK (190) 13, **CT**s 1BH (223), 8, 1ER 1GP 1LN 1MW 1SH 1SQ 2AA (181) 7-8, 2AR 3, 2AP, **CX**s 1CA 2AY 2CO 0, 9CO (333) 5, **DU**s 1AN 12, 1DBT (225) 10, 1FH (190) 11-14, 1MSR (300) 21, 7GB 7IM 9FB (213) 12, **EA**s 6BC 6BG (203) 7, 8EF 8FF (109) 23, **Ø**AH 17, **EI**s 2BG (210) 5-6, 2NYC (205), 13, 8BB 20, **EL**s 2AB (333) 3, 2AJ (190) 0, 2AK 2AS 0, 2AX 2S 8J, **EP**s 2BQ 2DA (210) 3, 2JP (118) 16, 3AM, **ET3**s REL 15, USA (160) 23-4, ZU (190) 20-21, **FB8**XX 7, **FC2**CD, **FG7**s TH (182) 9, TI 3, XL (332) 0-4, XX, **FK8**s AU (244) 6, BB (325) 19, BG, **FM7**s WO (165) 12, WQ (192) 11, **FO8**s AB BQ 10, BS 4, BV 3, BK (236) 11-12, BY (202) 11 **FP8**s CS (166) 11, CY (149) 12, **FR7**s ZC (158) 14, ZD (195) 4, ZG (209) 11-13, ZL/t (210) 11, ZR ZS, **FW8**RC (248) 6, **HA5**CQ (210) 6, **HBØ**s AG (195) 3, LL (172) 21, **HC**s 1CV (140) 6, 2CF (318) 4, 2HM (178) 21-22, 2LG 2RZ (175) 5-7, 2WN 4BS (158) 7, 4IQ 5BZ 8RS (150) 3,



—Reprinted from August, 1953 *QST*.

*7862-B West Lawrence Ave., Chicago, Ill. 60656.

HH9DL (300) 22, **HI8**s JGM XCC XKS (110) 7, **HK**s 5BFQ (185) 6, 5FH 3, 5MO 5OW 6AW 7, 7YA 7YB (158) 7, **ØA**I **Ø**BKW (185) 23, **Ø**BKX (110) 8, **HL9**s KA (219) 14, KH 12, KI 13, KR (252) 18, US (201) 11, **HM**s 1AJ 2HP (182) 7, **HP**1XHG 2, **HR**s 1KAS 1XAP (160) 7, 2BOB (171) 12, 2HCM 3AA (278) 4, banned **HS**s 1AZ 3TS 3ZZ (215) 14, **HV3SJ** (278) 7, **HZ**1AB, **IS1**s GF PZ VAZ (151) 8, **IT1**s JR (266) 6, KAT TDN XAI (131) 8, **JA**s 1AEA 1BWT 1CB 2BTV 2CXF 3AFR 3BPJ 3GZN 4ZA 6BXE 7GX 7HZ 8AA 8NU 9AG ØAZE, **JH1**s ABA CDE, **JT1**KAA 5-11, WA1ARF/**KL7** afloat on old **F.I.I.**, **KA**s 1MI (200) 12, 2KS 12, 2VT 7CW (190) 19, 7YL 11, 9ZZ (245) 13, Ks 8VWM/**KW6** (210) 11, 9QIZ/**VK6** 13, ØFQW/**KL7**, **KC**s 4USB 2, 4USM 4USN 2-3, 4USV (280) 10-11, 6AO (333) 11-12, 6BY 6CQ (290) 7, **KG4**s AA AM 2, CO DP (308) 3-4, **KG6**s AAY 13, AKR ALV (272) 10, AQB (295) 10, AQG ARF (201) 11, ARJ (310) 15, ARS FA 11, NAC 10, SQ (290) 11, SS ST (340) **KH6**EDY (326) 7, **KJ6**s BZ (227) 4-5, CF (213) 7, **KL7**s BEK DNC CYH EBK EN FBO FMM FRU GGD USA, **KM6**BI (285) 5-11, **KR6**s AL 11, BD CB DI KN 12, MA MH RB RN 14, UY 11, WH 10, **KS**s 4CD 6CN (230) 4, 6CQ (261) 5-11, 6CR 11, 6CT (287) 7, **KV4**s AB BW CF EY, **KW6**s EJ (244) 11, EM (290) 11, **KX6**s AL BQ (247) 11, BU 13, DC (305) 5-10, EN (209) 11, FR (272) 10, GJ (207) 11, **KZ5**s NF NG (303) 15, NH 6, VR (335) 14, **LA**ØAD 3, **LH2**A, **LJ2**X, **LX**s 1CO (191) 20, 1DE 21, 1DU (224) 22, 1RB (200) 7, 1SJ (196) 21, 2FB (215) 17, **LZ**s 1FO 2KKH (218) 22, **M1**B (127) 4 and 18, **MP4**s BBW (193) 3, BEU (147) 21, DAT (178) 22, TCE 21, **OA**s 1CA (150) 6, 4AK 4HJ 4JR 4US (150) 6, 4XW 6BW, **OD5**s BU (125) 4, BV (146) 4, BZ (267) 3-4, EJ, **OE**s 1MEW 3SOW 6, 5AKL 7CH 5, **OHØ**s NF 15, NI (220) 2-8, **OK1**FG, **ON**8VO (230) 6, **OX**s 3DX (202) 15, 3JV 3VJ 11, 4AC 5AK (196) 1, 5AP (250) 6, 5AY, **OY**s 4HQ 4OV (250) 11, 5NS (195) 23, 7ML 7S, **PI**vKMA (231) 20, **PJ**s 2AO 2AQ (125) 12, 2CB 2CE 11, 2CU 2CZ 11, 2MI (180) 11, 3AF 3CC 3CD 3CR 5EC (192) 0-1, no-workee **PK8**BIM (150) 23-0, **PZ1**s AH (189) 11, CF BI BF 11, BW (152) 23, DA, **SK**s 4AV 6AB (150), **SL3**s ZV 5, ZZN, **SP6**AAT 0, **SV**s 1AE 1BV 1CB ØWEE (245) 22, **TA2**BK (148) 8-9, **TF**s 2WKH 11, 2WKI 2WKM (152) 22, 2WKP 2WLD 12, 3AM 12, 3EA, **TG**s 5HC 8CW 8IA (220) 7, 9AD 9DF (265) 6, 9EP 9RN 9XX ØAA (246) 8, **TI**s 2DO (256) 4, 2JIC 2JO 2PAS (330) 1, 2RAS 2W 2WA (159) 7, 2WAS (200) 6, 2XL 5CPG (195) 23, **TJ1**s AB (235) 20, AL (175) 22-0, AS (116) 21, **TR8**AG (195) 8, **TT8**AN 0, **TU2**s AF 0-1, AZ (260) 7, BA (178) 23, **UA**s 2AO (200) 7, 2KAK (215) 5, 2KAW 2KBD (259) 7, 9AS 9DT (210) 3, 9KPU 9TE 4, ØAI ØBP ØNL ØNM ØYP **UB5**s AJG EOM SJ (175) 4, WF 5, WI (125) 5, **UD6**BD (230) 3, **UF6**s BR 4, HE, **UG6**AW 1, **UI8**s LC MF, **UJ8**AC, **UL7**s JA LA, **UM8FZ** 9, **UN1**AB, **UO5**s AH AM AN 3, BO 6, KBR, **UP2**s KAB KNP (217) 5, **UQ2**KEM, **UR2**KAW, **UT5**s KTH 5, RP (165) 3, **UV3**s TQ VT, **UWØ**s IE IH, **VE8**s MA MB ML 14, RCS, **VK**s 1BA IGD (220) 13, 1RN, 4EV (175) 12 of Willis, 4ZK/9 (218) 11 in Papua, plenty of 6s and 7s, 8AV (195) 13, 9BS (221) 13-14, 9CR (200) 10-14, 9DJ (203) 11, 9GN 9JS 12, 9LC (202) 17, 9LF (226) 11, 9LR (288) 11, 9RJ (195) 13-14, 9TB (205) 9, 9VM (255) 11, 9WD (175) 11-12, 9XI (207) 14-16, ØAL (170) 10-11, ØIA 5, ØJW (215) 8-14, ØVK (151) 11, **VP**s 1FW (172) 13, 1HF 9, 1LL (332) 0-2, 1PV 12, 1RC (175) 22, 2AA (178) 11, 2AC 11, 2AL 2AM 2AZ (160) 6, 2DAI 5, 2DAJ 2GAE 2GAI (177) 10, 2GBC 2GBG (102) 10-11, 2GGR 5, 2GN 2KM (155) 4, 2LS (182) 5, 2MF (180) 23, 2MS 3, 2MV 0, 2SY (205) 5-7, 2VO (185) 22, 2VP 2-6, 2VQ 5AA (200) 23, 5CB 7DL (180) 12, 7NO 7NP 7NS 12, 8HF 8HZ (124) 21, 9DW (153) 23, **VQ**s 8AD (193) 12, 8BL 14, 8BZ (172) 14, 8CG (107) 20, 8CQ (200) 20, 8CS 9B 5, 9DH 9F 9V (195) 13, **VR**s 1G (193) 13, 1L (155) 7, 2CC (171) 7-8, 2DK (204) 10, 2EJ 9-10, 6TC (226) 7, **VS**s 5MH 6AD 15, 6AZ (192) 16, 6CO 6EA 9MB (260) 16, **VU2**s CK (180) 1, CQ DKZ (208) 15, SO SS TX, **XE**s 1DP 1FFF 1KV 1TU 1US 2JJE 2MMT, **XW8**s AX (238) 16, BQ (215) 15, BV BZ (239) 14-15, **YA**s 1DAN (194) 2 and 15, 5RG, taboo **YBØZZ** (272) 16, **YJ8**BW (165) 11, **YK1**AA (130) 6, **YN**s 1BL 11, 1GLB 11, 1JMA (305) 5, 1KL 14, 5AV, **YO**s 2BI/7 3LM 21, 7KAJ, **YS**s 1ACS 1GL (150) 6, 1JL (300) 2, 1MCG 1RV 2CEN (240) 3, **YU**s 1KG 2HA 3NEQ 3TXT 5, many YVs including 9AF, **ZB2**s A AY (162) 12, **ZC4**s GB 22, GM 4, **ZD**s 3D (188) 23, 5V (202) 14, 7D1 7FF 7KH (165) 3, 8CC (192) 20, 8RH 8RK (165) 22, 8Z (189) 0-1, 9BE (258) 15, **ZE**s 1AM 13, 1CX (220) 8, 2JE 13, 5JU 11, 8JW, **ZF1**GC, **ZL5**AA 11-13, **ZP**s 3AL 5JB 5KN 5OG 9AY (135) 0, **ZS**s 3DX 12, 9B 1, **3A2**MJC (180) 5, **4A**s 1AC 1AE 1BR 1CCW 1CD 1FFC 1HS 1IX 1J 1LLS 1RX 1YM 1YS 1WS 2VM 2AF (130) 6, 3JG (155) 6, **4S7**s NE (199) 12, PB (320) 12, **4W1**ADO, **4X4**s BL (210) 5, DJ (111) 21, FQ (217) 6, GR GV 22, UF (332) 20, VB 5, ZR, **4Z4**s HB HF (340) 4, **5A**s 1TK (216) 5, 3TW (250) 21-22, 4TV, **5H3**KJ (170) 4-5, **5N2**AAX (215) 17, **5R8**AZ, **5T5**AD (170) 4-5, **5U7**s AL (192) 21-22, AN, **5VZ**8RQ 22, **5W1**s AR (165) 17, AS 8, **5Z4**LJ, **6W8**DY, **6Y5**s AK (117) 12, AU DW (190) 0, EM GB JR OF SR (186) 0, **7P8**s AD 19, AR 7-13, **7Q7**s AM 14, PBD (192) 18, **7X**ØAH now en route our way, **7Z3**AB (242) 23, **8P6**s AF (177) 11, AZ (162) 6, BU (165) 10, BX CC 11, **8R1**s C P (190) 23, S 12, **9F3**USA (200) 13, **9G1**s BY 6, DY 22, FF 7, GD GG GJ KT 8, YJ (162) 23, **9H1**s M (196) 22, P T, **9J2**s LK (168) 21, NN (220) 7, NW, **9K2**s AM (212) 18, BG (180) 6, BV, **9L1**s GQ (202) 23, KZ, **9M8**s 2AV 2CL 12, 2CV (200) 13, 2DY 2NF (220) 15, 2RH 2SS (205) 11, 2TA 2TC 2XX 8RY (165) 13, **9N1**s BG 17, MM 16, **9Q5**s DG 17, SS, **9U5**s BB 17, CR (201) 21, HI SK (270) 19, **9V1**s CN 11-12, MS NR (220) 15-16, NV OB (166) 13-16, **9X5**s CE 22-4, IH (282) 21, **9Y4**s AR 11, DS (175) 22, LF (141 11, LO VP (175) 22 and VT (171 11. **A** savory DX summer, indeed!

—•••—

AFRICA—Newsworthy note in Halifax Amateur Radio Club's *Bulletin*, VE1FQ editor: "ZS1YF is a neighbor of Dr. Philip Blaiberg, the world's first heart transplant patient, and the doctor visits Archie's shack quite often. If you happen to be in contact with ZS1YF when the doctor is present he will send along an autographed QSL to you." . _ . _ . _ "There is no news on the licensing of another TL8 station," says ex-TL8DL, active from Bangui for more than a year. "I do not have a Stateside call but hope to obtain one after arrival in the U.S. Thanks to all for the many courtesies extended to me on the air. I further hope that my next overseas assignment will provide me with as popular a call as TL8DL." . _ . _ . _ "I'm back in Holland as PAØCZA," remarks ex-ZS6VJ, "active as usual on s.s.b. and c.w. on 10 through 20 meters." John signed PAØCZ for many years before becoming ZS6VJ . _ . _ . _ Radio Club de Bois Colombes, F5OJ, lined up four ops, an SB-101 and yagi beam for that 3V8AA project . _ . _ . _ From the once dark continent via club news sleuths: 7Q7PBD is expected to knock off for the U.K. by January but 7Q7LZ will keep after Mont., N. Mex., N. Dak., Utah and Wyoming to complete his WAS on 10 and 15 sideband with a Viceroy and TH-4. Andrew is G3LZZ, formerly 9Y4LZ. . . . 7XØAH (DL7AH) emigrates to our shores after 24 Algerian kiloQSOs. . . . 9J8AA/p is an annual field day effort by Zambia's RSZ. . . . ZD8Z (W6BHY) describes DXing from Ascension: "This has to be the spot for optimum conditions to most of the world on all bands. The housing for ZD8s HAL J NK RK and Z is to be moved soon. We're shooting for the top of a local hill." Jim credits WA8ZZK with the fat California signal on 20, W6RR as the multiband standout. . . . W2GHK's DXpedition of the Month newsletter indicates that ZD9BE may radiate around 14,260, 21,260, 21,380 and 28,550 kHz. for another year . . . W5AG, 14,210 kHz. at 1300 GMT, could pave your way toward Tromelin's FR7ZL/t. . . . Libya is easier again with 5As 1TG 1TK 2TR 2TS 3TW 4TV 5TE and 5TP abundant on 15 or 20.

ASIA—"I work only c.w. on 14, 21 and 28 MHz.," specifies XW8BP, armed with an ST-700, ST-700A and TA-33 jr. at Vientiane. "Since last November I have had five thousand QSOs." . _ . _ . _ W5VA says VU2JA welcomes additional local Bangalore QRM from new neighbor VU2OLK, formerly GM3OLK . _ . _ . _ Navyman K1TFF/mm reports a pleasant visit with

G3LPC, club station of Third Squadron, 14th Signals Regiment, Oxon, does its part to put England on the DX contest map. That's G3NWQ (ex-9V1MK) standing; seated, l. to r., are G3LQC, logger G. Parkhill and G3INE (ex-ZB1FA). G3LPC placed a respectable third to G3s SSO and GRS in the '67 ARRL Test multitop c.w. category. (Photo via W1YYM)

Nagoya DX Club hoists some cider in a DX toast with guest W6WBP. Faces around the table from the left are JA2s EFV FBC BVL CWX AXG, W6WBP, JA2s ADH JAA IFN DDN CZP and BTV. (Photo via WA2INB)

JA2AMC at NHK's luxurious Sasebo TV and radio studios. Gary sails aboard USS *Thomas* (DD-833) . . . . . JA6BJT, the most consistent Japanese signaler at W1APU's Maine location on 40 c.w., does it with 100 watts and a high in-the clear vertical dipole . . . . . W3HNK learns that 4X4UH was wounded in recent ground-wave QRM . . . . . Results of last year's 8th All-Asian DX Contest released by JARL (Japan) disclose these U.S. call area leaders: Ws 1EVT 2HTI 3WJD 4KXF 5WZQ, K6DVD, Ws 7EKE 8GQU 9EWC, WA1BBE/Ø, KH6IJ and KL7FRY. VO1AW, 3C2YU, VE3NE, 3Cs 6VO and 7BDJ did it for Canada, no fours and fives applying. By continent, JA1AEA, K6DVD, KH6IJ, PY7ACQ, UP2NK and 5H3KJ emerge triumphant. Homeland victors by call area are JAs 1AEA 2JW 3EGE 4BJO 5AB 6YCU 7FC 8QA 9BM and ØBBB. Other big scorers per country: AP5HQ, BV2A, CE2CR, CR6DX, CT10I, DJ7IK, DM2AND, EA2HR, EP2MK, F8EX, LA5YI/F, G3IAR, GM3KLA, HA8KUC, HBs 9DX ØGJ, HM5CL, HP1BR, I1VIB, LA9CE, SM2BJI, SP6FZ, SVØWFF, TA2BK, UAs 2KAP 3KBO 9KAG, UB5WF, UC2XJ, UD6BV, UF6LA, UG6EA, UH8BO, UI8CD, UJ8KAA, UL7BG, UM8AV, UQ2KCR, UR2BV, VKs 3AXK 9GN, WØGTA/LA, XE2AAG, YO8DD, YU1BCD, YV1OB, ZS6VJ, 4U1ITU, 4X4YY, 5H3KJ, 7Z3AB, 9H1AK and 9V1NV. Yanks backslid in one statistic, being outfiled by U.S.S.R. entrants 133 to 55. In '66 we had narrowed this gap at 102 to 61 following the 164-to-40 debacle of '65. Don't neglect to file your 9th All-Asian Test results with JARL by November 30, 1968 . . . . . Remember the VU/4S7 DX Contest due (c.w.) the 7th-8th and (phone) 14th-15th of this month, details in the previous "How's". Moreover, on the 2nd-3rd of November Okinawa's OARC offers its KR6 Contest on voice and code, specs here next month . . . . . From the clubs press: VS6AG's many CR9AH days appear at an end, and John may leave Hong Kong as well. . . . 9K2s AM BG BJ and BV splatter each other on 15 and 20 s.s.b., BG also swatting his key on occasion. . . . AP2AR's new *HW-100* and quad should be very well received.

HEREABOUTS—Turmoil on the "DXCC²" front: XE1AE checks in with photo No. 54, the first from Mexico; W3DJZ signs up with No. 55; and DL9OH gets No. 56, the sixth German applicant. XE1AE also matched W2RA's recent suffix stunt with a photo of "WAC" QSLs from CEØAE, KX6AE, SV1AE, VS6AE, YV5AE and 6W8AE . . . . . "Getting licensed in Trinidad is not difficult if you find the right people home," observes WA5MYR. "A letter of introduction from the wireless officer at the government radio station, a trip to the radio officer in the customs house with my U.S. license, and payment of the required fee netted me the call 9Y4ZZ. Found 10 phone very good with an SB-101 and dipole." . . . . . "A Novice informer alerts me to goodies like CR3 KR6 TJ1 5A, etc., in the 21-MHz. WN range," admits WA1CJE . . . . . 160-meter DX hounds Ws 2IU 2RAA 9CZT 9YYG ØDX ØVXO, K9s PAW YWO and others were aiming to attend last month's lowband rally at W9UCW's Minooka, Ill., antenna farm . . . . . Coincidence at K1DRN: Vern was contact No. 665 for FG7TI/FS7 and No. 665 for PJ5MM, K9GCE operating at the DX end each time . . . . . K9IDQ, committeeman for last month's ARRL Central Division Convention at Springfield, Ill., warns of a proposed Sangamon Valley DX Association down his way . . . . . "Next semester WA8VRB and I will see how much DX we can work with the modest crystal-controlled 50-watter, SX-25 and 20-meter dipole of WB8BML, newly licensed station at Okemos (Mich.) High School," threatens WA8VBY . . . . . "How's" helper P. Kilroy gives his old SX-28 a deserved rest in favor of a new HQ-180 . . . . . W4YKH-ZF1CP asserts, "I recommend Grand Cayman for a real plush DXpedition location. The prefix still is exotic enough to be in demand. Without really trying W3CER and I worked some 600 stations in forty countries and 41 states over one week in May. We were lucky enough to find a TA-32 beam stored at the West Indian Club by a visiting VE2 some years ago. This went well with our dipole." Bill had no trouble obtaining his ZF1 ticket but, since London's approval is necessary, it takes time . . . . . Local dispatches from previously credited DX periodicals: FG7XW puts Marie Galante island on 21,250-kHz, sideband. . . . New Northern California DX Club wheels are W6RGG, pres; W6NEQ, veep; and WA6AUD, sec.-trez. K6CQF carries on with *DXer* editorial tasks. . . . Florida DX Club brass now includes W4FRO, prez; WA4DDG, veep; W4HOS, sec.; W4IKL, trez; and W4BRB *DX Report* ed. with K4GRD assisting. . . . WØVXO reportedly plants a new 1.8-MHz. antenna farm down Fla. way. . . . W9WNV takes a DXpeditionary breather while doctoring in Wisconsin. . . . Juicy DX gents by the logful check into the YL s.s.b. net around 14,322 kHz. beginning about 1600 GMT. . . . Next month 4A2YP and chums may live it up among the Revilla Gigedos. . . . More St. Peter & Paul fireworks are widely anticipated this month or next. . . . PY7s APS ARM and pals may get something going from Fernando de Noronha a few weeks hence.

Twenty c.w.'s turn next month with the help of **Ws** 1AYK 1DAL 2ECO 2ICO 3HMR 3HNK 4YOK 6EAY 7BE 7ZC 8IBX 8YGR 9LNQ, **Ks** 4CFB 4IEX 8BCK, **WAs** 1CJE 1DJG 1FHU 1ION 2APG 3HRV 3IID 5MIN 5PPZ 6JDT 8MCQ 8NGD 8QJK 8VBY 9MQI 9TFM, **WBs** 2BCI 2ZNZ 6VVS, **KP4**DBJ, **VE3**GTW, **I**1s DFE and ER. Then we'll snoop further afield with (15 c.w.) **Ws** 1DAL 4YOK 7BE 8YGR 9LNQ, **Ks** 4FCB 8BCK, **WAs** 1CJE 1DJG 1FHU 2APG 5PPZ 8MCQ 8VBY, **WBs** 2BCI 6VVS, **WN4**IIF, **KP4**DBJ, **I**1DFE; (15 phone) **Ws** 2DY 4AJJ 4GTS 4YOK 8YGR 9LNQ, **WAs** 1CJE 1DJG 3HRV 3IID 5MIN 5PPZ 6JDT 8QJK 9MQI 9TFM ØFRM, **KP4**DBJ, **F3**VN/W2; (10 c.w.) **Ks** 1HDO 8BCK, **WAs** 1DJG 8MGD, **KP4**DBJ, **I**1DFE (WB6JKQ); (10 phone) **Ws** 2VOZ 4YOK 8YGR, **Ks** 4TWJ 8BCK, **WAs** 1IED 3HRV 8MCQ 8MGD 9TFM; (40 c.w.) **W3**HNK, **K4**FCB, **WAs** 1DGJ 1FHU 2APG 3IYS 8MCQ; (40 phone) **K4**FCB; (80 c.w.) **W1**SWX, **K4**IEX; (75 phone) **K4**IEX; and (160) **W1**BB, plus other reporters approaching their stationery. Mail away!

Where:

HEREABOUTS—XP1AA's operator Frank, now back home, offers, "Anyone who missed a QSL for my operation at Thule in March through May of this year can still get it by sending his card with self-addressed stamped envelope to my WA6GYR address." . . . . . "QSLd as fast as I could with limited time," declares ZF1CP (W4YKH), slowed further by printing delays . . . . . Contrary to some indication, W5LES manages nobody's QSLs but his own . . . . . W5QPX (ex-W8GIU) notifies, "FG7XY and FM7WI are not doing enough DX business to warrant my QSL services." Henceforth go direct . . . . . Your "QSLers of the Month" turn out to be CR6CK, F8TC, GW3SB, HK6BMF, KA9AA, KC4USM, KG4DO, KX6s BQ EN ER, UI8AM, VPs 1LL 2SY 5AA, YU3TXT, ZD8Z, 9M2PO, 9N1NV and 9Y4AT, with QSL tenders Ws 1MV 6CUF 9GZZ, Ks 1TWK 6ARE and VE3ACD, each commended in correspondence from "How's" helpers W2s DY IP, K1YKN, WAs 1CJE 3GCZ 5MIN 9MQI and s.w.l. Kilroy. Any reliables you'd like to see saluted here? . . . . . *'Alp!* WAØFRM needs a nudge toward QSLs from UB5IF, UM8KAB, UQ2AN, VPs 6YF and 9EU, while VU2FB is curious about one VU2QDP thought to be a Yank somewhere in his area. Hints? . . . . . WB4EQW offers QSL managerial assistance to interested U.S.S.R. DXers. Spanish-fluent J. W. Davis, 690 Weyant Av., Columbus, O., 43213, volunteers similar service, no preference indicated. . . . . *DX News-Sheet* learns that WB6HGH may assist with VP2AZ confirmations of QSOs on July 11-14, 1968, only.

AFRICA—Ex-TL8DL remarks, "During fifteen months of operation many stations have not QSLd. I will continue to answer cards on receipt at my new address [in the list to follow]. There will be a delay of about two months from the time of closing down TL8DL until my arrival in Washington. During that time no QSLs will be issued." . . . . . F5OJ requires three International Reply Coupons for each 3V8AA QSL application direct, no self-addressed envelopes necessary . . . . . Ex-ZS6VJ states, "I made a point of QSLing all contacts via the slow but sure South

OH2AM's contest crew always turns in fine multi-operator work in the annual ARRL DX Competition. In front, left to right, are OH2s SB BC KH; center, OH2BQ; rear, OH2s BH BBM BBR QV and BS. OH2AM, with 3436 c.w. QSOs and 3125 voice contacts, swept European honors for club entries in both divisions. (Photo via W1YYM)

Africa bureau except cards received direct which were answered direct. I will become PAØCZA soon but more ZS6VJ QSLs are on hand for those requiring them." . . . . . W1WQC advises, "Former 3C3FJZ/SU explains that he did QSL 100 per cent from Egypt but apparently many of the cards never reached destination." Jack's present VE3FJZ address appears in the roster to follow . . . . . *DX News-Sheet* notes that QSL aide W6CUF is shipped a log transcript by ZD8Z (W6BHY) after every thousand QSOs . . . . . P. Kilroy understands that the widow of ZS9G will attempt to conclude her late husband's QSL matters from 15 Dove Crescent, Yellowwood Park, Durban, South Africa.

OCEANIA—"Arkansas DX Association, Box 7323, Little Rock, Ark., 72207, is now managing QSLs for VK9DJ contacts by operator Graham after July 1, 1968," informs club secretary WA5OFT. "Confirmations for QSOs prior to this date can be obtained but will take a little longer. ADXA promises speedy service, s.a.s.e. a must." . . . . . "I have logs for KH6EDY operator Smitty's QSOs on June 8-15, 1968," announces KH6GLU. "I'll try to obtain other logs as soon as possible." . . . . . W6IL reminds us that VR6TC now does his own QSLing from Pitcairn, self-addressed envelope and a pair of IRCs desired with each request . . . . . VK3AEJ is to wrap up his Willis Island VK4EV QSLing upon return to the mainland, possibly in November . . . . . VK4ZK/9 of P.T., according to tuner Kilroy, is an eager stamp collector. Hint!

EUROPE—"A few words from Norway's arctic," writes LJ2X's LA9BL. "I've been very slow in QSLing but am up to date as of May 31st through our NRRL bureau. From June 1, 1968, W4NJF will take care of my cards." . . . . . WA8DEX's QSL responsibility for SM5s API and BOE began as of this June . . . . . WAØFRM's hang-up is French QSLs. "Worked at least ten, sent s.a.e., etc., and still no reply over the past two and a half years." We've found the F boys pretty thorough via the ARRL bureau, OM, but each of us seems to have a strange QSL jinx or two in this weird game . . . . . June 16, 1968, is kickoff date for the SM7TE QSL stewardship of V. Chinn, 738 Washington St., San Francisco, Calif., 94108 . . . . . G. Watts' *DX News-Sheet* has it that W/Ks may find WA4WAO helpful in glomming HBØLL pasteboards, also that W1PRI can possibly confirm F9RY/FC contacts on July 13-14, 1968, only . . . . . Rover WAØKXJ writes, "North American stations should send their QSLs for QSOs with EI2VAE/p, G5AKQ, GM5AKQ/a and GW5AKQ/a to my home address. European stations may QSL via GM3SSB, except EI2VAE/p via the IRTS (Eire) bureau."

SOUTH AMERICA—"I'm in the middle of a QSL hurricane," exclaims 9Y4LA, "having made over two thousand QSOs in this year's ARRL DX Contest." Printing delays held up Gordon's QSLing but he vows 100-per-cent reply as soon as stock is on hand . . . . . WA5MYR signed 9Y4ZZ on 28-MHz. phone in June, a feat which should place him at the very tail end of all *Callbook* listings . . . . . GD3HQR tells W6TYP that VP8JX is making out his own QSL replies in the antarctic. Don't hold your breath, though, because the next boat out isn't due till January, 1969 . . . . . WA9MQI reports a prompt KC4USM card via K1TWK.

ASIA—RSGB QSL Bureau's G2MI, in the *DXpress of* VERON (Holland) requests current addresses of former VS9 operators for the purpose of forwarding their due QSLs. VERON is told by MP4BBA that club station VS9ASP's logs were irretrievably lost on departure from Aden, hence no further confirmations can ensue . . . . . W3HNK's tenure as EP2KB QSL agent commences with QSOs of July 1, 1968 . . . . . West Coast *DX Bulletin* suggests Paul Nance, c/o Byers Realty Co., Box 1, Windy Hill Beach, S.C., 29597, as likely help toward 7Z3AB wallpaper . . . . . For direct reply, unless specifically waived, self-addressed stamped envelopes (self-addressed envelopes with International Reply Coupons when appropriate) should be included in mailings to QSL managers herein designated. This is no more than proper when seeking postal response from anybody, for that matter. WB2UKP, through WB4FUW, Ws 4KFC and 1IKE, adds: "It helps to note on the face of the envelope to a QSL manager the call of the DX station with date and time of QSO, preferably in the lower left hand corner. . . . Use Greenwich time only, and Greenwich date spelled out such as 5-June-66." Why spell out the month? Well, in some of the world "5-6" means the 5th of June, but in other regions it clearly indicates the 6th of May. This little detail alone can account for an anemic QSL returns percentage. WB2UKP continues, "If you wait a long time for a DX station's card don't get mad at his manager. Chances are he sends out QSLs right after getting logs from the DX operator. Some DX stations send logs fast but others are slow, indeed." . . . . . Time now for scattered individual offerings that could expedite DXCC memberships. As always, each recommendation is necessarily neither "official", complete nor accurate. . . .

CE7DW, Casilla 714, Puerto Montt, Chile
DI1SU/YB, Box 2469, Djakarta, Indonesia
EP2KB (via W3HNK; see text)
G5AKO-GM5AKQ-GW5AKQ (see text)
ex-HC4TB, T. Brigham, Peace Corps, 460 Westminster Ave., Haddonfield, N.J., 08033
HCØGW, Box 5498, Guayaquil Ecuador
HR1XAP, Box 94-C, Tegucigalpa, Honduras
JT2AB, P.O. Box 639, Ulan Bator, M.P.R.
K1BFA/KG6, CMR Box 1209, APO, San Francisco, Calif., 96334
K1FNA/KG6, CMR Box 1209, APO, San Francisco, Calif., 96334 (or via WA1ABW)
KG4DP, U.S. Naval Stn., Box 39, FPO, New York, N.Y., 09593
KG6SS, USCG Loran Stn., Saipan, Mariana Is., 96950
LZØs WYF YWF (via LZ1KSA)
OA6BW, C. Noe, P.O. Box 35, Ilo, Peru
PJ2CL, P.O. Box 728, Curacao, N.A.
PJ2MA, Box 162, St. Maarten, N.A.
PX1s JB PY (to F5JB)
PX1s KT WS YY (to F3KT)
SK1s AQ/1 BL/1 (via SMICXE)
SK5AA, Box 213, 721-06 Vasteras 1, Sweden
SM5s API BOE (via WA8DEX)
TG9RN, Box 892, Guatemala City, Guatemala
TI2DO, Box 2412, San Jose, C.R.
ex-TL8DL, D. L'Heureux, 5201 38th St. NW, Washington, D.C., 20015
TI2DO, Box 2412, San Jose, C.R.
ex-VE3FJZ/SU, J. Argyle, Unit 12, 196 Burton Av., Barrie, Ont., Canada
VP2AZ, W. Wyer, Winthrops Bay, P.O. Box 10, St. Johns, Antigua, W.I. (see test)
VR6TC, T. Christian, P.O. Box 1, Pitcairn Island (see text)
VU2OLK, D. Dalrymple (GM3OLK), 23 Lavelle Rd., Bangalore 1, India
W2DYW/KH6, W. Williams, Box 409, Wahiawa, Hawaii, 96786
W6FNS/KW6, D. Kettlewell, Box 61, Wake Island, 96930
WA3ILR/mm, USS *Repose* (AH-16), FPO, San Francisco, Calif., 96601

WA7IFM/KG4, FPO, New York, N.Y., 09501
XW8BP, C. S. Feng, Box 25, Vientiane, Laos
XW8CN, B. N. Garcia, Box 25, Vientiane, Laos
YO7KAJ, C. Marcel Radu, P.O. Box 108, Craiova I, Roumania
YS1VPE, Apdo. 1572, San Salvador, El Salvador
ZD7GO, G. Owen, Longwood, St. Helena Island
ZP5MO, Box 255, Asuncion, Paraguay
ex-ZS6VJ (to PAØCZA viaVERON)
4L1A, Central Radio Club, Box 88N, Moscow, U.S.S.R.
9G1GI, Box 3773, Accra, Ghana

CN8HD (via W2GHK)
EI2VAE/P (see text)
FG7XY (see text)
FM7WI (see text)
ex-FO8BU (to F5IG)
GB2IS (via G3VNR)
KA1MI (via W6ANB)
KH6EDY (see text)
LAØAD (via W2CTN)
LH2A (to LA1HL)
MP4BGU (to G3CAE)
OA4JR (via WAØNJB)
OHØAM (to OH2AM)
ON8VO (to W8BT)
OX3DX (to OZ3FD)
PAØCZA (via VERON)
PK1AA (via DL9KU)
PX1JS (to F9JS)
PX1JT (to G3JIJ)
PX1PU (to G3RXH)
SKØAL (to SM5BGK)
SM7TE (see text)
SP5GH/7 (via PZK)
TF2WKU (to WA2RSB)
ex-TU2AL (to F5SH)
VK4EV (to VK3AEJ)
VK9DJ (see text)
VQ9DH (via WA6AHF)
VS6DO (via HKARTS)
W5VZO/KH6 (to W5VZO)
XEØAEH (to K6AEH)
XP1AA (see text)
ZD5V (via XE2YP)
ZS9G (see text)
3V8AA (to F5OJ)
9Y4ZZ (to WA5MYR)

For the preceding catalog you can tip your headphones in the direction of **Ws** 1CW 1WQC 1YYM 2DY 2ECO 2GHK 3KCS 4NJF 4ORT 4YOK 5QPX 5VA 6IL 6TYP, **Ks** 1DRN 4CFB 6UFT, **WAs** 1CJE 1FHU 5M1N 5OFT 5PPZ 6GYR 9MQI 9TFM ØFRM. Mr. G. Hobbs, **F**6ADI, Canadian DX Association *Long Skip* (VE3DLC), Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DX-MB* (DL3RK), *DX News-Sheet* (G. Watts, 62 Belmore Rd., Norwich, Nor.72.T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4BRB), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham, 20, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y., 12020), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025; attn. K6CQF), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB), VERON's *DX press* (PAQs FX LOU TO WWP) and West Coast *DX Bulletin* (WA6AUD). More!

Whence:

OCEANIA—Next month NZART (New Zealand) invites amateurs throughout the world to frolic in the 1968 *VK/ZL/Oceania DX Contest* to be held (phone) from 1000 GMT the 5th to 1000 the 6th, and (c.w.) the 12th-13th, same times. Exchanging the usual RS- or RST001, RST002, etc., serials, non-Oceanian participants earn a point for each non-VK/ZL Oceanian worked per band, 2 points for each VK/ZL captured, and for final score multiply this total by the number of VK/ZL band-call areas accumulated. (Oceania contestants outside VK/ZL work both sides of the fence at 1 point per non-Oceanian and 2 points per VK/ZL, same multipliers.) Your log should clearly indicate date, GMT, call of station contacted, band, serials sent and received, and each new VK/ZL call area as worked per band (separate sheets for each band). Include a summary sheet showing your call, name, address, equipment description, and designate multi- or monoband entry classification. Whisk the works off to Contest Manager, NZART, Box 489, Wellington, N.Z., postmarked on or before January 20, 1969, to be eligible for possible certifications of outstanding performance. G'luck! . . . . W6IL says W5OLG is the chap to see about those Tuesday skeds with Pitcairn's VR6TC around 14,220 and 21,350 kHp. . . . . W5VZO/KH6 packs up his 170 watts and dipole for assignment in Japan. Bob likes code on 40 . . . . . "VR1L goes on vacation next month to return next year," tips W4ORT. "I found Bob on 14.325 kHp. He says he works no c.w." . . . . . KH6GLU apprises, "The Coast Guard hasn't funded ham gear for its Kure base since the Collins layout was sent elsewhere. KH6EDY op Smitty took the station's exciter, his own, home with him to Sevenland in June." . . . . . Pacific notes courtesy aforementioned clubs and groups: VK3AFJ may sign VK4EV with 100 watts and a dipole on Willis isle till December. . . . VR4CR, 14,018-kHz. c.w. at 0700 on week ends, may leave the Solomons next month. . . . KC6CQ should be very big on 15 this season thanks to his new quad. . . . Chatham isle is said to be the DXpeditionary target of ZL1TU and RNZAF buddies later this month.

EUROPE—East Germany's 1968 *WADM Contest*, a c.w.-only deal, takes place from 2000 GMT the 19th of October to 2000 the 20th, on 3.5 through 28 MHz. Non-DMs will work DM stations exchanging the customary RST001, RST002, etc., serials. Each DM may be worked once per band at 3 points per QSO, this total to be multiplied by the number of DM band-districts worked, for final score (the last letter of a DM's call indicates his district, 'A' through 'O', fifteen possible per band). October 30, 1968, is the deadline date for entries mailed to Contest Bureau, Radio Club of the GDR, P.O. Box 30, 1055 Berlin, GDR. This one could move you toward the DMCA diplomas administered through DM2ACB, Box 185, 27 Schwerin, GDR . . . . . Don't forget the voice wind-up of DARC's WAE DX Contest on the 14th-15th of this month, and circle the second Sunday on your November calendar for the annual International OK Contest, a code-only shebang as usual, specs here next issue . . . . . W2GOO recommends inquiry to Sezione ARI di Monza, P.O. Box 1, 20052 Monza, Italy, for the lowdown on a *Grand Prix* award based on a number of QSOs with Monza IIs AT AMC AME BFO BGB BOI CAS CNC CRE EB EGR FJ KB LG MOX TIG TMZ VGO XN ZSI ZTI or others. Autographs of prominent auto-racing drivers may appear on each diploma . . . . . HA7PJ tells WA1FHU of the new Hungarian Castle Series featuring QSL prints of 37 famous HA castles. Accumulating certain combinations of such QSLs will qualify you for dandy diplomas . . . . . YO7KAJ's August output was a special effort to collect W/K QSOs with 100 watts, a two-element quad and a ZL Special beam . . . . . M1s B D and H hold forth from San Marino but licenses are no longer issued to outsiders, at least for the present. WB6JKQ of I1DFE writes, "M1B operates phone on 10, 15 and 20 meters about ten days per month using 350 watts, an SX-146 and TA-33 jr. M1H uses c.w. only, and M1D is inactive at this time." WA1CJE says I1IJ hopes to acquire authorization for San Marino action around the middle of this month . . . . . I1DFD runs 300 watts on 7- through 28-MHz. voice, code and RTTY, mostly Monday nights, representing Amateur Radio Club of Vicenza . . . . . W3KCS found Fs 2PY and 5JB enjoying rare DX sport as PX1s PY and JB in late August. Andorra's local QRM builds higher every summer. Fs 3KT 9RU 1WS and 8YY also joined the stampede as PX1s KT RU WS and YY . . . . . "I'm not the most active DXer," admits LJ2X's LA9BL, "but prefix chasers will find me on 20 sideband when conditions permit. LJ2X is a Norwegian Forces training station." . . . . . G. Hobbs, whose call escaped us, notes that the operator of antarctica's UV3BC/M formerly signed UAØAZ on Dickson island . . . . . WAØKXJ lauds EI9AR, Gs 3WCK 6KQ, GM3SSB and others for hospitality offered during his recent U.K. sojourn as G5AKQ and EI2VAE/p . . . . . Continental comment via club newshawks: SM5s ACQ and WI guest-operated OY6FRA in July. . . . JX6RL departs Jan Mayen but ex-JW2BH may become JX2BH to fill the void. . . . QSLs from CT1RS and another Coimbra station confirming QSOs between June 25 and July 15, 1968, may qualify you for the Coimbra Festival diploma from Box 210, Coimbra, Portugal. . . . OK5PRAGA was the DX handiwork of OK1MP and friends at Prague's June World Stamp Exhibition. . . . LH2A is manned by LA1HL at University of Norway's physics department, Trondheim, using a Galaxy and ground-plane on 20 sideband. . . . SM7TE and others try hard for ZA and 3V8 DXpeditionary credentials. . . . GM3VAG/p hopscotched among several rare Scotch counties in July but the accent was on 160 and/or v.h.f.

QST

I1DFD, Amateur Radio Club of Vicenza, holds a lively open house at Caserma Ederle with army specialist Mark Brown, second from left, as official host. Calls I1DFA through I1DFL are granted for operation by qualified U.S. military-affiliated personnel in Italy.

Operating News

GEORGE HART, W1NJM, Communications Manager
ELLEN WHITE, W1YYM, Deputy Comms. Mgr.
Administration: LILLIAN M. SALTER, W1ZJE
Contests: ROBERT HILL, W1ARR
DXCC: ROBERT L. WHITE, W1CW
Training Aids: GERALD PINARD

The Active Season. Traditionally, September is the beginning of the active season in amateur operating. The kids go back to school, vacations are about over, everybody settles down into the daily grind that are their lots during most of the year. To some, it's good to be back in the saddle. To others, it's something to be borne until *next* summer.

What the "daily grind" means to most operating amateurs is an increase in the amount of time they can spend on the air, and more regularity in doing so. That elusive DX can be tracked down and chased. Those regular traffic schedules can be resumed. Plans can be made for maximum contest participation without interference from balmy weather and atmospheric static — not to mention domestic static. Not too long away, now, is the time when it will feel good to be indoors, in a warm shack with transformers humming and signals crisp and clear in the cold night air outside.

So don't feel too bad about the end of the summer. It has its bright side. Plan to get in on some of the ARRL-sponsored operating activities this season. Of course there are the usual contests (SS in November, DX in February-March, VHF in January, June and September, CD Parties in October, January, April and July), but there are also continuing activities such as traffic nets, AREC and RACES tests and drills put on by your local people, and club meetings and club-sponsored activities.

There are over 250,000 amateurs holding licenses. If all of them operated at one time, our bands would be several deep on most spot frequencies — but we sure would have occupancy! Besides occupancy, however, what we need is activity — useful, worthwhile activity to back up occupancy. So how's about using your amateur ticket this season? Have a go at one of the contests, or finish up that DXCC, or, even better, set aside one night a week to take part in a net. Most people are able to do this for bowling, for church work and other worthwhile purposes. What night do you have free? Use it for something worth while; we suggest a traffic or emergency net. Try it, you'll probably enjoy it.

New Poll Survey. About the time you read

OPERATING EVENTS (Dates in GMT)

ARRL-IARU-SCM-Affiliated Club Operating Events

September	October	November
5 **Qualifying Run, W6OWP**	2 **Qualifying Run, W6OWP**	6-7 YL/AP, phone (p. 87, last issue).
7-8 **VHF QSO Party** (p. 49, last issue). VU2/4S7 DX Contest, c.w. (p. 103, this issue).	5-6 Massachusetts QSO Party (p. 122, this issue). VK/ZL/Oceania DX Contest, phone (p. 105, this issue).	7 **Qualifying Run, W6OWP**
7-9 Washington State QSO Party (p. 128, this issue).	5-7 California QSO Party (p. 130, this issue). RTTY SS (p. 70, this issue).	9 **Frequency Measuring Test,** OOs only.
14 **Frequency Measuring Test** (p. 95, last issue).	12-13 VK/ZL/Oceania DX Contest c.w. (p. 105, this issue).	9-11 **SS** (phone)
14-15 WAE Contest, phone (p. 98, July *QST*). VU2/4S7 DX Contest, phone (p. 103, this issue).	12-14 **CD Party** (phone)*	10 International OK DX Contest
14-16 Zero District QSO Part (p. 118, this issue).	16 **Qualifying Run, W1AW**	14 **Qualifying Run, W1AW**
16 High-Speed Code Test (p. 109, this issue).	16-17 YL/AP, c.w. (p. 87, last issue).	16-18 **SS** (c.w.)
17 **Qualifying Run, W1AW**	19-20 Boy Scout Jamboree WADM Contest	**1969**
21-23 Pennsylvania QSO Party (p. 110, this issue).	19-21 **CD Party** (c.w.)*	Jan. 4-5 VHF SS 25-26 SET
26-28 YLRL "Howdy Days"	* League Officials and Communications Dept. Appointees only.	Feb. 1-2 DX, phone 15-16 DX, c.w.
28-29 VE/W Contest (p. 63, this issue).		Mar. 1-2 DX, phone 15-16 DX, c.w.

this, there should be in circulation, in the quarterly CD Bulletin, an analysis of a recent poll survey (the second such) conducted among ARRL appointees. Other operating amateurs will be interested in what questions were asked and how the appointees voted.

First, let it be mentioned that this is neither strictly a poll nor a survey, but a combination of both — a poll to get yes or no answers to certain questions, a survey of opinion on each of them. About one in every five returned poll sheets contained comments — some merely scribbling on the poll sheet (which we *asked* them not to do), others lengthy two-and- three-pagers. Just reading the comments is a most interesting and enlightening experience, as well as a somewhat frustrating one when it is occasionally realized that the commentator has completely missed the point of the question. Returns have been heavy — heavier this time than on the previous poll. Separate comments have been more numerous. It means more work sorting, tabulating, counting but it is definitely worth it in the survey of comments received.

The poll count itself indicates that the appointee group (probably the most active of any amateur group, organization-wise) for the most part is against proposed changes, although in most cases the voting is close. According to the present count (based on 650 returns), most are against making technicians eligible for EC appointment, against combining ORS and OPS into a single traffic-handling appointment, against abolishing OVS and making present holders OPS, against new station appointments based on DX and contest operating, against substituting date of ARRL member expiration for birthdate in the SS exchange, against cancelling all SET traffic at the end of the SET period, against including CB stations and operators in the AREC. Of the eleven questions, only four received affirmative nods, and some of these were not too emphatic: Creation of a new Official Mobile Station appointment, substitute power classification in place of precedence in the SS exchange, change CD party hours to avoid the very late ending time, and observe a set rule regarding distance and attendance for club-member participation in club aggregate scores in the SS, VHF-SS and DX Contest.

Some of the comments took the headquarters severely to task for having the temerity to make

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for June Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	7024	1830	1634	196	10864
W3CUL	218	2921	2890	39	6068
K5TEY	10	2833	2731	5	5579
W7BA	11	1544	1442	98	3095
K0ONK	217	1087	1030	62	2396
W9MM	3	981	980	0	1964
WA9CNV	4	934	923	11	1872
W5OBD	29	727	725	0	1481
W6RSY	15	768	443	238	1464
W6GYH	82	663	632	26	1403
WA7DXI	22	668	617	25	1332
K5BNH	8	673	577	51	1309
W3VR	108	502	478	1	1087
K9IVC	11	467	400	6	884
WA9MHU	47	418	277	128	870
WA2UWA	15	380	370	2	767
W3EML	16	396	290	3	705
K7RQZ	34	306	241	60	641
WA5TYH	5	339	243	42	629
W6MLF	403	114	110	2	629
WA2IGQ	31	291	254	37	613
W3FGQ	13	315	241	42	611
WA4UAZ	18	282	252	30	582
W6VNQ	20	304	247	0	571
WA7EYN	23	282	245	18	568
WB2FUW	42	260	235	19	556
WA9QKP	21	242	273	6	542
WA8SQC	8	272	245	14	539
WB4GTG	34	251	241	3	529
WA7HSJ	2	263	243	20	528
W7ZIW	31	260	219	9	519
W0LCX	4	284	222	4	514
WB4DXX	28	243	238	3	512
WA4SCK	31	240	230	8	509
W1EFW	50	263	185	7	505
W6YBV	6	246	216	35	503

More-Than-One-Operator-Stations

Late Report:				
K0ZZR (May)	247	273	87	273 880

BPL for 100 or more *originations-plus deliveries*

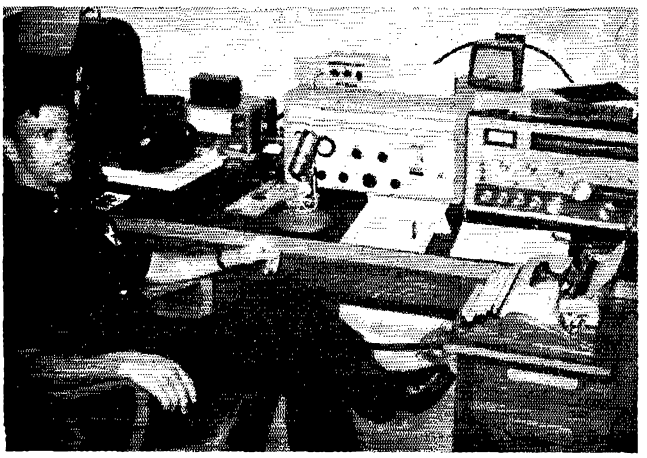
WB6SQZ 250	W6DSC 138	WA7BDD 105
WA7ICA 242	WA6BYZ 132	WB4GTI 104
WA9QNI 183	WB6HVA 119	WA4UQQ 101
WB6UMT 173	W3TN 113	WA8HDM/7 100
W9ESJ 163	W1DKD 109	Late Report:
WA1GGN 150	WB4ESE 105	WA5DMT (May) 120

More-Than-One-Operator-Stations

WB2RWD/2 440 K6MCA 290 K0ZZR 255 K6QEH 160

BPL Medallions (See July, 1968 *QST*, p. 99) have been awarded to the following amateurs since last month's listing: WB2RKK, WB2UVB.

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



Meet Your SCM

New Mexico SCM Kenneth D. Mills, **W5WZK**, has an interest in amateur radio dating back to 1952 when he was first licensed at the age of 14. Ken holds the post of Assistant Director and is active in RACES, AREC, MARS, the Caravan Club, the Albuquerque Amateur Radio Club and the Mesilla Valley Radio Club of Las Cruces. Station gear consists of an Invader 200-SSB, a Mohawk receiver and mobile 2-meter f.m. When time permits, he enjoys horseback riding, target shooting and ping pong.

some of these proposals. Actually, it should be pointed out that in most cases the proposals originate somewhere in the field, the headquarters is merely passing them along.

One thing that is encouraging is that among the comments are quite a few which express pleasure at "being asked." It seems that there are many with definitely-formed opinions on certain subjects who never express them unless they are specifically asked to do so. There are also others who never thought much about a specific question until it is posed, then find they have definite opinions about it.

Let this be a general invitation to League members, and to all other amateurs reading this, to let us know your feelings about any operating matter. We *are* interested. Note we say "operating" matter, and this must be distinguished from overall policy matters, about which you should confer with your director. A general poll is not very often practical, but the pulse of the amateur body can be monitored by the tenor of comments received, spontaneous or otherwise. If we don't get yours, we don't know how you feel.

— *W1NJM.*

DXCC Notes

Announcement is hereby made of two additions to the ARRL Countries List — Blenheim Reef and Geyser Reef. Since there is no apparent claim by any country to these reefs, no prefix will be shown. Confirmations for contact only after May 4, 1967, will be accepted for DXCC credit starting September 1, 1968.

The operation of VQ8CBN on Nelson's Island in the Chagos posed a difficult problem for the Awards Committee as concerns country credit. The status of Nelson's Island became confused during the transfer of Chagos to the British Indian Ocean Territories, to the extent that even the Administrator of BIOT states that Nelson's Island's "status before the recent amending order in council was not technically clear." The Committee has thus concluded, admittedly somewhat arbitrarily, to accept VQ8CBN cards for credit towards the Chagos Island listing.

DX CENTURY CLUB AWARDS

From June 1, through June 30, 1968, DXCC certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

W6ZJY....317
K4HJE....241
JA6BXA....212
GC2FMV...165
WA3HUP...150
HP1AC....145
KA2JP....140
DL3XH....135
MP4BFK...135
KP4CLB....130
HB9ADC...122
JA6VA....112
K8CMO....112
SP6AXF....110
VE3AZZ....110
DJ5VH....109
FW5RC....109
WA8EBW...109
OZ8BZ....107
WA4VTV...107
WA9QXY...106
JA1EGM...105
4X4KP....105
JA5LI....104
K1IKN....104
K3OTY....104
K6TVL....104
WB2YJS....104
W3BQN....104
WA3HGV...104
WA8ORF...104
WA8GBE...104
G3VYF....103
YU4OB....103
DK1HP....102
DL1JC....102
K9CMB....102
OK3KII....102
SM3DKO...102
WA1AGQ...102
WB2NVJ...102
WØDAK....102
OE2LEL....101
VK9KS....101
W1DAL....101
W4FVY....101
K2VCO/3...100
K5CDS....100
W4JGW....100
W6DR....100
WA8NYR...100
WA8PYD...100
WA9MQI...100
VE6ZB....100
Z86BMD...100

Radiotelephone

K4HJE....241
DL9RE....182
DJ5IH....160
W3HTO....147
DL5LR....140
KA2JP....135
DL9HC....133
W4UAF/6...119
HC1TH....114
VE2ALA....110
WA4VHL...109
WB6BMW..109
K8CMO....107
VE3GHL...107
WB4DJI....106
W4FOD....105
8R1P....105
K3OTY....104
WB4EWU...104
WA7GHK...104
WA8ORF...103
WA4VTV...102
W1DQ....101
VK9KS....101
WA3HGV...101
5W1AS....101
K1KNQ....100
K3FDL....100
LA3K....100
WB2FMK...100
W3BAB....100
WA5PRJ....100
W7FF....100
W7CRT....100
W7VRO....100

Endorsements

Endorsements issued for confirmations credited from June 1, 1968, through June 30, 1968, are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

330
VE2BV
W9JUV

320
KP4RK
W1OJR
W3MWC
W6ANN

310
W4HUE
W8KIT
W9FKH

300
W3HQJ
W2YCW
W4FRO
W4VMS
W5NW
W7HDL
W8LUZ
W8LY

280
JA4BJO
W4HOS
W6FET
W7BGH

260
W1FJJ
W9LJU

240
DL1CF
JA6DCE
W1JMT
WA2LMW
W6ZYR
W7DQM
ZL1HW
7XØAH

220
KØTYO

PY1BTX
W2HUG
W3JW
WA2LMW
W8GGE

200
K1KDP
K4RSM
K8ICK
VE8ZB
W2ABM
W3HTO
W4UHC
W7VRO
WA9GXL

180
DJ2XP
K1YPN
K2ZCD
WA2FJW
W6QQW
WAØDUB

160
DJ5IH
F3SM
GM5AFF
I1HL
JA1GTF
K1PVB

K9DKU
K9TRP
SM5FC
VQ4WLH
WB2ZKJ
W6KNE
WA6TKQ
ZL2VN

140
K5OLJ
K6IPV
K9PZD
OZ5CV
VE3BBB

W1EZM
WA1CJE
W2GA
W4CZS
WA5OUW
W6MI
WA9LUD

120
DL8QP
K1SUB
K1YKN
K3TCY
K5YUR
K7NHG

K8EJN
W1DMD
WA1FCP
WA1GYP
W3JX8
W4LF
WB4FJO
W7GYF
W7QB
W7ZHZ
W8VQM
W9DYZ
W9YVM
WØBUL
WØPJB
ZD8HAL

Radiotelephone

310
ON4DH

300
K8CFU

280
W4VMS

260
JA4BJO
K1UDP
K6EC
W3AEV
W6TZD

240
K2JMY

VE3MR

220
JA6DCE
PY1JR
W1HR
W1JMT
W4BFR
WØIJM

200
OZ5JT
W1FJJ
W3VLG
W6OHU
W6VNH

180
K2GPL

VE3ELA
W6FET
WB6UJO

160
K1PVB
K9TRP
OZ8EA
WB2ZKJ

W4KOU
W8GKM
W8HXR
WA9IYG
6Y5GG

140
I1BH

I1HL
K5OLJ
K9BTU
WB2NYM
W3CM
W8WRP
WAØOAH
YV4QG

120
WB2MWW
W3IF
WB4AMT
W4CZS
W4OKO
W7KOI
WØBUL
WAØJTE

HIGH-SPEED CODE TEST

(Sept. 16, 1968)

The Connecticut Wireless Assn. announces its twentieth semi-annual high-speed code test, to be conducted simultaneously on seven different frequencies on 80 and 40 meters by five stations throughout the U.S. The date is Sept. 16, the time to start listening 0115 GMT. (This works out to 9:15 P.M. EDST, 8:15 P.M. CDST, 7:15 P.M. MDST and 6:15 P.M. PDST on *Sept. 15!*) The stations and approximate frequencies to listen for are as follows: W1EIA on 3637 and 7120 kc.; W5QMJ on 3665 kc.; K6DYX on 3690 kc.; W6EOT on 3640 and 7115 kc.; WØFA on 3653 kc. All stations transmit identical text in as close synchronization as possible.

Speeds transmitted are 40, 45, 50, 55 and 60 w.p.m., five minutes at each speed, in that order. We start at 0115 GMT with a call-up to enable listeners to find the best signal at their locations, and to plead for a clear channel. At 0130 very important instructions for copying and submitting copy are transmitted, at approximately 30 w.p.m. At 0150 the 40 w.p.m. text will be transmitted. Then follows a five-minute relaxation period, and at 0200 we transmit 45 w.p.m. Following the same pattern, the 50 w.p.m. transmission is at 0210, 55 w.p.m. at 0120 and 60 w.p.m. at 0230. Some of the stations will stand by for QSOs or comments after the tape is finished.

Starting August 19, W1EIA will transmit an announcement of this test at 0130 GMT, just prior to the regular code practice transmission.

Remember, it's a *Sunday*, not a Monday, evening, if you are still struggling along on obsolete, outmoded, confusing, variable local time.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Sept. 17 at 0130 GMT. Identical texts will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted Sept. 5 at 0400 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example!* In converting, 0130 GMT Sept. 17 becomes 2130 EDST Sept. 16. Each month the ARRL Activities Calendar notes the qualifying run dates for W1AW and W6OWP for the coming 3-month period.

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 qualifications is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Code practice is sent daily by W1AW at 2330 and 0130 GMT, simultaneously on all listed c.w. frequencies. At 0130 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests. At 2330 GMT daily, speeds are 10 13 and 15 w.p.m. The 0130–0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130–0220 GMT practice on those dates:

Date Subject of Practice Text July *QST*.

Sept. 20: *League Lines*, p. 10
Sept. 24: *Digital Logic Devices*,* p. 17
Sept. 30: *The Clipboard*, p. 28
Oct. 3: *Some Ground Rules For Sweep-Tube Linear-Amplifier Design*,* p. 30
Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition
Oct. 9: *Reinserting the Carrier*, p. 91
Oct. 11: *Sideband Techniques*, p. 92

* Speeds will be sent in reverse order, highest speed first.

W1AW SCHEDULE, SEPTEMBER 1968

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.–1 A.M EDST, Saturday 7 P.M–2:30 A.M EDST and Sunday 3 P.M–10:30 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate you must have your *original* operator's license with you.

GMT*	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0020-0100[4]	.....	.....	3.555[6]	14.1	14.1	7.08[6]	14.1
0100	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0105-0130[4]	.....	145.6	3.945	145.6	50.7	1.82	21.41
0130	**Code Practice Daily[1] 15-35 w.p.m. T ThSat., 5-25 w.p.m. MWFSun.**						
0230-0300[4]	.....	.....	3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS[3]	.....	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]
0310-0330[4]	.....	.....	3.625	14,095	3.625	14.095	3.625
0330	Phone-OBS[2]	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone OBS[2]
0335-0400[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0400	CW-OBS[1]	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0420-0500[4]	.....	.....	3.555[6]	7.08	3.945	7.08[6]	3.555
1700-1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900-2000	.....	14.28	7.255	14.28	7.255	14.28	.....
2000-2100	.....	14.1	14.28	14.095	21/28[5]	7.08	.....
2200-2300	.....	21/28[5]	21.075[6]	21/28[5]	7.255	14.28	.....
2300	.....	.....	.....	RTTY-OBS[3,7]	.....	.....	.....
2330	**Code Practice Daily 10, 13 and 15 w.p.m.**						

[1] CW,OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21,075, 28.08, 50.7 and 145.6 MHz.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 28.7, 50.7 and 145.6 MHz.
[3] RTTY OBS (bulletins) on 3.625, 7.045, 14.095, 21.095 and 29.015 MHz. 170/850 cycle shift optional in RTTY general operation.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 MHz.
[6] W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.
[7] Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1QIS W1WPR. * All times/days in GMT, general operating frequencies are approximate.

ATLANTIC DIVISION

DELAWARE—SCM, John L. Penrod, K3NYG—SEC-PAM: W3DKX. RM: W3EEB. The W3HC Memorial Field Day Trophy is on display at Delaware Electronics. K3VWP, K3VWQ and WA3IXM operated from Ft. Delaware on Pea Patch Island during the Fourth of July. W3BDP added No. 23 to his states worked on 2 meters. K3GKF shipped out 135 OO notices in the first quarter. W3WR is now on the s.s.b. mode. W3EEB is experiencing rig problems on v.h.f. K3CNH is active again on v.h.f. and wishes skeds with stations to the northern part of the state. Amateurs who wish to volunteer for the 1969 Delaware Hamfest, please drop me a card saying so. Net reports: DEPN, QTC 2, QNI 60; DSMN, QTC 5, QNI 44; DTMN, QTC 4, QNI 43. Traffic: **(June)** W3EEB 169, WA3GSM 19, W3DKX 15, WA3DUM 6, WA3HWC 6, K3NYG 4. (May) W3EEB 121, WA3FYS 2.

ELEVENTH PENNSYLVANIA QSO PARTY

September 21-23, 1968

Rules: (1) *Time:* The contest begins at 2300 GMT Saturday Sept. 21 and ends at 0300 GMT Monday, Sept. 23. (2) *Suggested Frequencies:* 3575 3880 7075 7280 14075 14280 21075 21325. Check phone bands on even numbered GMT hours. (3) Each station may be worked once on each band and mode. (4) *General call:* CQ PA and Pennsylvania stations sign de PA. (5) *Exchange:* Stations send QSO number, RS(T), and ARRL Section or country, Pennsylvania stations send their county. (6) *Awards:* Certificates will be awarded to the first place station in each ARRL Section and country with second and third place certificates where justified. The highest scoring Pennsylvania and non-Pennsylvania station will receive a special award. NARC members are ineligible for awards. (7) *Scoring:* Pennsylvania stations 3 points per out-of-State QSO, 1 point per Pennsylvania QSO multiplied by the number of ARRL sections and other countries. Out-of-state stations, 1 point per QSO multiplied by the number of Pennsylvania counties. (8) *Entry:* A copy of the log showing QSO number, station, date, time, band, mode and station worked should be submitted to the Nittany Amateur Ralio Club, P. O. Box 60, State College, Pennsylvania, 16801. Entries must be postmarked no later than October 21, 1968.

EASTERN PENNSYLVANIA—SCM, George S. Van Dyke, Jr., W3HK—SEC: W3AES. RMs: W3EML, K3MVO, K3YVG, W3MPX. PAMs: K3MYS, K3WAJ. V.H.F. PAM: W3FGQ. EPA, QNI 284, QTC 313; PTTN, QTC 214; PFN, QNI 407, QTC 413; EPAEP&TN, QNI 518, QTC 264; EPA V.H.F. (6), QNI 116, QTC 91; EPA V.H.F. (2), QNI 38, QTC 12. OVS reports were received from K3WEU, WA3IAZ, WA3BJQ, W3CL and W3FGQ; OBS reports from WA3AFI, K3WEU and WA3EEC; OO reports from K3WEU, W3KEK, K3PSW, K3MYS, K3RDT, W3NNC, W3FGQ and K3NOX. The OOs generally report that ham signals are clean and well operated and a credit to all hams. BPL this month was made by W3CUL, W3VR, W3EML and W3FGQ. Field Day messages were received from: W3ABT/3, WA3CCP/3, W3QV/3, W3JKH/3, WA3HEO/3, W3MTK/3, K3SPX/3 K3IUB/3, WA3ERJ/3, K3SSC/3, W3CTC/3, WA3JKH/3, W3SK/3, W3YP/3, W3KGN/3, WA3EXB/3, K3MNT/3 and WA3AFI/3. WA3AFI reports losing two hours ducking lightning. New officers of the North Penn Amateur Radio Club are K3HNW, pres.; W3GTC, vice-pres.; WA3AHZ, secy.; W3EWE, treas. W3ICC reports a very successful AREC event providing radio links for the 50th Anniversary Parade of the Croydon Fire Co. #1. W3CUL is getting new outlets set up to keep the traffic moving. W3VR even gives up vacations for ham traffic. W3EML must be setting some kind of record for continuous BPL. W3FGQ reports a few band openings helped v.h.f. traffic totals. K3MYS reports work is interfering with traffic-handling. WA3INC passed the A ticket exam. W3MPX reports new frontiers on the phone traffic nets. K3MVO still is doing better than most of us in half a month. K3YVG reports 1 Tech. and 8 Novices graduated from the class conducted by K3YVG and K3UIU. WA3ATQ is busy with long-haul traffic. WA3GAT got his quad airborn and working fine. K3MDG is 100% mobile for the summer. K3WEU is now in Canaan, Me. Look for him on 6. WA3BSV went back to summer camp. W3OY visited the Goldcoasters while in Florida in March. The WX has taken down the W3KEK antenna. Let's hope with the nice weather all antenna repair jobs will have been completed and you will be ready for fall and winter DX and contests. Traffic: W3CUL 6068, W3VR 1087, W3EML 705, W3FGQ 611, K3MYS 462, K3NSN 430, WA3CTP 308, WA3INC 258, W3MPX 173, K3MVO 112, K3YVG 110, WA3HIT 109, WA3ATQ 98, K3VBA 95, WA3AOJ 82, W3FPC 79, WA3IUV 78, WA3HDI 73, WN3JCJ 65, WA3GLI 60, W3HK 60, WA3AFI 56, W3KJJ 52, WA3FCP 42, WA3EEC 34, WA3GAT 34, K3MDG 30, W3VAP 28, K3BHU 22, K3WEU 22, WA3EMQ 17, WA3JGS 12, W3HUR 11, K3RUA 11, WA3BSV 10, K3FOB 10, K3HKW 10, W3HNK 10, W3CL 8, WA3IAZ 4, W3OY 4, WA3BJQ 2, K3NOX 2, W3ADE 1, W3EU 1, W3FAF 1, W3KEK 1, K3PSW 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ—SEC: W3LDD.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI Ave.*	*Mgr.*
MDD	3643	2300Z	Daily	30	240	10.1	WA3HTQ, RM
MDDS	3643	0030Z	Daily	30	97	5.2	W3CBG, RM
MEPN	3920	2200Z	M-W-F	21	64	22.2	K3IAG
		1700Z	S-S				
MDCTN	3920	2200Z	S-T-T-S				W3SRC, PAM
MTMTN	145.206	0100Z	M thru S	20	32	11.0	W3IFW

New appointee: WA3IYS as ORS. K3NOQ, who joined the Md. State Police Force a few months ago, has been reported as newly married. No wonder he has been missing from the MTMTN lately. WA3EOP has disproved the "Once a Technician always a Technician" by passing his General on July 5. WA3JMR/3 reports 4600 points in the June V.H.F. Contest. WN3KQV starts his Novice career with a report to the SCM. WA3IRQ is rebuilding his antenna system. W3GN worked 56 stations in 14 sections in the June V.H.F. Party. K3UMM is now W3QW. W3TN is once again MDC's lone BPLer. W2NIY/3 is a full-fledged MDCer now as W3EOK. WA3AJR has taken a step up to Advanced Class. W3FBE, club station at NSRDC, now has achieved DXCC. WA3JBY combines his traffic activity with playing in an orchestra. New AREC members are WN3KAA, WN3JAD, WA3KLK and WN3ILD. W3FU received a DOD Certificate of Merit for Armed Forces Day. He reports 10 intruder stations on the amateur bands, plus 3 pages of special 7-Mc. listening and logging. In performing his "Intruder Watch" functions, W3FU is providing a public service to 2000-plus ARRL members in the MDC section. I wonder if some of the other MDC ARRL members could spare a little of their "rag-chewing" time for this worth-while project. Traffic: WA3EKP 348, WA3HTQ 227, W3TN 195, WA3IYS 162, W3ATQ 103, K3GZK 90, W3CBG 87, K3JYZ 82, W3ECP 43, W3PQT 40, WA3ERL 32, WA3JBY 28, WA3IRQ 20, W3PRC 18, WA3HSU 11, K3QDC 10, W3FU 4.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2LVW. RMs: WA2KIP, PAM and NJPN Net Mgr.: W2ZI. NJN reports QNI of 368 and traffic total of 284.

• 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.

NJPN reports 472 QNI and 198 traffic total. Our Net Mgr., W2ZI, has returned from a very pleasant and interesting trip to the Land of the Midnight Sun and other European ports. W2YPZ and his XYL spent several weeks touring places of interest in Canada. W2PEV, Asst. Net Mgr., spent a very enjoyable vacation in New England and kept in touch via mobile rig. WA2ASM is back on the air after a little rig trouble caused by a lightning surge during an electrical storm. W2SJI and his XYL are now full-fledge Floridians and are located in Deltona, Fla. W3RIR visited W5MLU, of Ville Platte, La., recently. He was joined by W5LQN, of Hot Springs, Ark. W5MLU is the former W3GNM and W5LQN is the former W3DEA, both of Trenton, N.J. K2GYM, K2ARY and WA2JRD are now Advanced Class license holders. Extra Class ex-W2QZE is now W2SM. K3YLP moved to Pennsville and is now W2EFS. At long last the N.J. State Legislature has passed the amateur license plate bill giving hams within its borders the privilege of displaying the amateur call letters in the form of and in lieu of plates. These should be appearing on cars very soon. Traffic: WA2ABY 254, W2PU 171, W2YPZ 63, WA3KIP 61, W2ZVW 41, WB2VEJ 29, WA2WLN 7, W2IU 2.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: W3KPJ. PAM: K3VPI (v.h.f.). RMs: W3KUN, W3MFB, W3UHN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 7:00 P.M. local time. KSSN will resume operation Oct. 1, 1968, at 6:30 P.M. local time. The big news this month is the 11th Annual Pennsylvania QSO Party to be held Sept. 21 through 23. See elsewhere this section for particulars. The upgrading of the license class by the large numbers is very gratifying. The following is evidence: The Nittany ARC announces the following upgrading: K3CFA and K3AHT to Advanced; K3UMT and K3UGQ to Advanced; WA3IFE, WN3JUV and WN3JUU to General Class. The Two Rivers ARC announces the following upgrading: W3SYR, WA3HMV, WA3AZY, WA3AYC, WA3OQ, all to Advanced Class; also from the same club WA3KLO, who is blind, received his Conditional/General Class license. The Steel City ARC announces the following upgrading; W3GZI and WA3HOE to Extra Class. Congratulations to all those who are moving up the ladder. K3SKE advises he will be operating from Japan for the next three years under the call KA2KS and advises the fellows interested in certificates that there are a few KA/JA awards available. W3ZUH (DL5MI) and K3PUR (DL5OP) are back in the State College, Pa., area after spending two years in Germany for their company. W3ZUH (DL5MI) is going back for a few months the end of July. W3RBC changed his name to W3OU. It is with deep regret that we give up K3PYS to the Chicago area traffic nets. K3PYS moved to the Chicago area to work and WPA lost one of its biggest support timbers. Traffic: (June) W3NEM 164, W3KUN 120, WA3IPU 80, W3LOS 78, WA3GQJ 63, K3HKK 63 (W2KAT, K3AHT ops), WA3AKH 54, K3SOH 37, K3PYS 22, W2KAT/3 18, WA3ELB 18, WA3HSI 16, K3ASI 11, K3SJN 8, WA3GPK 5, W3YA 4, W3LOD 3, K3RZE 1.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN SEC: W9RYU. RM: W9EVJ. PAMs: WA9CCP and WA9RLA (v.h.f.). Cook County EC: W9HPG.

Net	*Freq.*	*Times*	*Days*	*Tfc.*
IEN	3940 kc.	1400Z	Sun.	13
ILN	3960 kc.	0000Z	Daily	191
NCPN	3915 kc.	1200Z	Mon.-Sat.	
NCPN	3915 kc.	1700Z	Mon.-Sat.	363
Ill. PON	3925 kc.	1700Z	Mon.-Fri.	
Ill. PON	145.5 Mc.	2000	M.W.F.	1013
Ill. PON	50.25 Mc.	2000Z	Mon. Thurs.	No report
TNT	145.36 Mc.	2100	Sun.-Fri.	No report

The Ninth Regional Net handled a traffic count of 528 during June. From all the advance reports received on Field Day activities, indications are that a record may be set with high scores. A fine array of talent was on the Central Division Convention program held in Springfield, Ill. The social events for the ladies were enjoyed by all. W9CWH and WA9ENA were appointed Asst. ECs by WA9EXP, EC of a Cook County Division. WA9UHA received his WAC certificate, and also is picking up new sigs with a four-element widespaced 15-meter beam. WN9VLP has a new TR-4. The Big Thunder Amateur Radio Club Mini-Hamfest was held in Belvidere and many an eyeball QSO was held. WA9ZEZ is a new Technician heard on the bands. W9ZEN received his CP-35 during the last proficiency run and also a perfect copy certificate of merit from the Secretary of Defense for the Armed Forces Day message. New officers of the Maine East High School Radio Club are WA9RLF, WA9RPD and WA9WHH. WA9RPD has a new Heath HW-100. W9GFF, K9DQU, WA9ESO and WA9KHR were elected officers of the Radio Amateur Megacycle Society (RAMS). WN9UOT is now WA9UOT. W9JCK won a trophy for the highest out-of-state score in the Florida QSO Party. The Hamfesters 34th Annual Midwestern Hamfest was held Aug. 11 at Santa Fe Park in Willow Springs. This column's sympathy goes to W9SXL, McLean County EC, upon the death of his wife June 16. EC W9LDU plans to equip his AREC gang with Clegg 22ers, with frequency on 146.25 Mc. K9TXJ has been appointed as an instructor to the Renshuden Judo Club in Palestine, Ill. WA9CNV is back with the traffic gang. WA9CNV and WA9MHU are the BPL certificate recipients for this month. Traffic: (June) WA9CNV 1872, WA9MHU 870, K9KZB 264, K9BAO 231, W9HOT 195, WA9OTD 177, W9YH 166, K9AUD 138, W9EVJ 87, W9NXG 71, W9JXV 58, WA9PPA 54, WA9SPA 54, W9DOQ 51, W9LDU 42, WA9WNH 41, WA9PFB 35, WA9SFB 35, WA9QBM 27, W9PRN 26, WA9QXT 26, WA9LDC 24, WA9QVU 20, WA9KQD 14, K9TXJ 13, WA9RCQ 11, W9LNQ 10, W9IDY 8, K9HRC 5, K9HSK 4, W9SXL 3. (May) W9JXV 140, WA9QXT 6, WA9SFB 4.

INDIANA—SCM, William C. Johnson, W9BUQ—Asst. SCM: Mrs. M. Roberta Kroulik, K9IVG. SEC: WA9KWH.

Net	*Freq.*	*Time*	*Tfc.*	*Mgr.*
IFN	3910	1330 Daily, 2300Z M-F	301	K9IVG
ISN	3910	0000Z M-F, 2300Z Sat.-Sun.	936	K9CRS
QIN	3656	0000Z Daily	185	W9HRY
IPON	3910	1250Z Sun.	41	K9EFY
IPON	50.7	0200Z Mon.-Thurs.	114	WA9NLE

It is with deep regret that I report W9BBN as a Silent Key. Due for annual endorsement in Sept. are ECs W9IGW, W9JSV; OPSs W9EJW, WA9MFY, W9YYX; ORSs WA9FDQ, K9HYV, W9VAY; OVSs WA9ABI, W9BUQ, WA9CJR, W9FJI, WA9JWL, W9MHP, W9YDP; OOs W9GEL, WA9ITB; OBSs K9DOF, W9RTH. Field Day messages were sent to the SCM by W9LJ/9, WA9NYW/9, W9INL/9, WA4SBZ/4, W9REG/9, K9VHF/9, W9YB/9, W8WWI/9, WA9HQB/9, K9JSI/9, W9QYQ/9, K9STN/9, W9SWC/9 and K9DHN/9. New officers of the Kekionga ARC of Fort Wayne are WA2DVE, pres.; WA9HWJ, vice-pres.; WB2MIY, secy.; WA3GYX, treas. WA9AUM received his DXCC. W9AQW, W9VNE/9 and K9DDB teamed up Field Day for a total of 1380 contacts. The Winslow Amateur Radio Society's weekly ragchew is held at 1530 GMT Sun. on 3940 kc. WA9TJS is visiting in Wisconsin. The OMIK Amatuer Radio Assn. held its Annual Meeting at Fox Lake. K9FZU received an ARRL 35-w.p.m. Code Proficiency certificate. WA9JQL's station consists of a Drake R4A, a T4X and a Henry 2K amplifier. K9DHJ's station consists of an HT-44, an SX-117 and a high gain Hy-Tower. WA9UNO received his Bachelor of Science Degree from Purdue University. WA9IHT has an HT-32B. The Purdue ARC Summer Net meets at 0100 GMT on 7220 kc. and at 0200 GMT on 3925 kc., Tue. WA9AMU sold his HT-37 and is sticking to c.w. with a DX-40, an HA-5, an HA-1 keyer and a Warrior kw on c.w. K9YBZ has the Pacemaker installed. QIN Honor Roll; W9BDP 29, WA9FDQ 27, K9VHY 26, WA9MTY 22, W9QLW 22, WA9MXG 21, WA9KAG 18, K9HYV 15, WA9KAG, mgr. of the River Forecast Net, reports June traffic of 32. W9PMT, mgr. of the Hoosier V.H.F. Nets, reports June traffic of 55. *Amateur radio exists because* of the service it renders. BPL certificates went to W9MM and K9IVG. Traffic: (June) W9MM 1964, K9IVG 884, WA9LTI/WA9MTY 380, WA9MXG 251, K9CBY 150, WA9VFM 147, K9STN 146, W9HRY 129, W9QLW 111, WA9KAG 104, K9HYV 96, K9CRS 82, WA9TJS 78, W9BUQ 58, K9HZY 49, WA9GTZ 43, K9VHY 43, W9YYX 40, W9UEM 30, W9FWH 24, WA9KYG 24, K9KTB 22, WA9AXF 21, W9CMT 21, W9LG 21, W9RTH 20, W9DOK 19, W9SNQ 19, K9RWQ 18, WA9MFY 17, WA9AUM 16, K9OXA 16, K9FUJ 15, WA9QEQ 14, WA9WME 14, W9CUC 13, WA9BHG 12, W9PMT 12, K9JQY 10, W9BDP 8, K9GBR 8, K9YFT 8, W9DZC 7, K9ILK 7, W9BJQ 5, W9AQW 4, WA9JIX 4. (May) WA9VFM 183, WA9KOH 29, WA9BHG 19.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9NGT. PAMs: W9NRP, WA9QKP, WA9QNI, WA9IZK and K9DBR. RMs: W9DND, W9CBE and K9KSA. Nets:

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
BWN	3985 kc.	1200Z	Mon.-Sat.	363	226	W9NRP
BEN	3985 kc.	1700Z	Daily	574	124	WA9QKP
WSBN	3985 kc.	2200Z	Daily	1156	484	WA9QNI
WIN	3662 kc.	0015Z	Daily	186	71	W9DND
WSSN	3780 kc.	2330Z	Daily	158	28	K9KSA
WRN	3625 kc.	2330Z	Sat.	20	0	W9CBE
SWRN	50.4 Mc.	0200Z	Mon.-Sat.			K9DBR
SW 2RN	145.35 Mc.	0130Z	Daily	245	41	WA9IZK

Net certificates went to WA9TUP for WSSN, WA9YBM for BEN. Renewed appointments: W9NLJ as ORS and WA9LWJ as OPSs. The WRN RTTY Net has moved to a new time as shown above, and the manager reports it is off to a good start. BPL certificates for June were earned by WA9QNI, W9ESJ and WA9QKP. W9NLJ is now Extra Class. WA9RAK is working as an alternate on TCC. WA9SAB and WA8SGH are active on 29.6 f.m. W9RTP has a new SB-101. The net managers would like to see more check-in all the nets. Don't forget to *bring 'em back alive*. Traffic: WA9QKP 542, WA9QNI 359, W9ESJ 354, W9CXY 222, W9DND 166, K9CPM 151, W9DYG 130, WA9NBU 124, K9FHI 87, K9JPS 81, WA9-RAK 72, W9NRP 54, W9AYK 48, K9KSA 43, W9RTP 39, WA9PKM 34, W9KRO 30, W9DXV 26, W9ODD 21, K9TBY 16, K9GSC 13, W9CBE 12, W9IQW 2. WA9TXT 2.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØ-TCK—SEC: WAØIEF. RMs: KØORK, WAØEPX. PAMs: WAØMMV, WAØHRM. MSN meets daily on 3685 kc. at 2330Z. MJN meets Tue.-Sun. on 3685 kc. at 0000Z. Noon MSPN meets Mon.-Sat. on 3945 kc. at 1705Z, Sun. and holidays at 1400Z. Evening MSPN meets daily on 3945 kc. at 2315Z. WØFFX renewed his EC appointment for Kanabec Co. WAØODB renewed as OPS. Congrats to the following new ticket-holders: Generals—WAØRKO, WAØTQT, WAØUQC. Conditional —WAØTLN. Technician—WAØUAE, Novice—WNØs UWB, UWT, UWU, UWV, UWW, UWX, UWY and UWZ. Ten Field Day groups sent FD messages to the SCM. A detailed report from the Worthington ARC states that 9 members operated WAØRVN/Ø from Ocheyden, Mound, the highest point in Iowa. A severe electrical storm forced them to abandon the site for 6½ hours, after which they resumed operation. The Minn. Wireless Assn. operated from Isle Royal, Mich. Our congratulations and thanks to those operating in the Tracy Tornado emergency, for handling traffic in an efficient and orderly manner. BPL Awards went to KØZZR for both June and May traffic. Traffic: (June) KØZZR 418, KØZRD 258, WAØMMV 225, WAØIAW 81, WAØOEJ 70, WØTCK 58, WØBUC 56, WAØGAZ 48, WAØHRM 39, WØHEN 38, KØZBI 38, WAØIYM 36, WAØEPX 35, WAØDOT 34, KØFLT 33, WØFDK 32, WAØJPR 31, WAØKWO 31, WØUMX 30, WAØODB 29, WAØJKT 25, WØBE 23, WØ-KNR 17, WØBUO 15, WØIYP 15, WAØEBZ 14, WAØSSN 13, KØZXE 13, WAØNQH 10, WØKLG 6, WAØDFT 5, KØDEF 4. (May) KØZZR 880, WAØRXM 37, KØCNC 14.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM —This report was submitted by WAØELO in the absence of WØDM, who is on a western tour. A new call in Minot is WAØUTS (Conditional). K7ZFW is trying to put an antenna up in Garrison.

Net	*Freq.*	*Days*	*Time/GMT***	*QTC*	*Mgr.*
RACES	3936.5	M-F	0030	94	KØSPH
PON	3915	Sat.-Sun.	2330		
		Sun.	1500	?	WAØHUD
NDN	3650	Sun.-Tue.-Thurs.	0300	7	WAØELO

**One hour earlier during Daylight Time. Traffic: WAØ-HUD 40, KØSPH 32, WAØELO 26, WAØJPT 21, WAØTBR 10.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW —SEC: WAØCPX. PAM: WAØCWW. RM: WØIPF. It was a blow to all who knew him to hear of the death of KØTNM. He will be missed much on the traffic nets. The Prairie Dog ARC's State Picnic was held Aug. 17 and 18. Congratulations to WAØLLG for earning the Ham of the Month Award for May and June. WAØRIQ and WAØPJF served our section by their help with the Tracy disaster. WNØUFS passed the General Class test. WAØPNB and KØFQH have obtained stand-by generators. Net reports are down a little but not bad for the summer. So. Dak. Late Session Phone Net, 937, 39 and 90; Early Session Phone Net, 264, 5 and 24; Sioux Two Net, 15, 2 in 4 sessions; So. Dak. Morning Net, 331, 11 and 27. Traffic: WAØPNB 450. WØVYY 9, WAØPZA 7, WØDJO 5, WAØCPX 4.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: WA5IIS. PAM: WA5PPD. RM: W5NND. W5LZU received a letter of commendation from the Mayor of Hot Springs for his work during the recent tornadoes. The Fort Smith Area ARC reports a good Field Day with steaks served Saturday night. FD messages were received from K5VBF/5, W5BAB/5, W5YM/5, W5ANR/5 and W5DTR/5. The S.E. Arkansas ARC has elected Jerry Deadman, pres.; and WA5LUW, vice-pres.; reports the *Grid Drive*. WA5QPI is manager of a new Arkansas Teenage Net, which meets daily on 3815 kc. at 2230 GMT and invites anyone to check in. W5SMS has a new homebrew kw. on the air. Net reports for June:

Net	*Freq.*	*Time*	*Sess.*	*Tfc.*	*Stations*	*Mgr.*
OZK	3790	0000Z	30	44	229	W5NND
RBN	3815	2330Z	30	105	684	WA5PPD
APN	3885	1100Z	25	11	461	K5ABE
APON	3925	2130Z	11	153	11	W5MJO

Top OZK stations were W5NND 26, W5QOO 22, W5DTR 18, WA5NOC 18 and W5MYZ 16. Local emergency plans need much exercise to keep in shape. Let's get the AREC organized and then keep it active and in good shape. Traffic: (June) W5OBD 1481, K5AJM 324, WA5AVO 202, WA5PPD 119, W5NND 117, W5MJO 90, W5DTR 58, WA5KEF 54, W5SMS 20, WA5LYA 13, W5ELF 10, WA5-EIT 5. (May) WA5DMT 190.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: K5ANS/5. V.H.F. PAMs: WA5-DXA, W5UQR.

Net	*Freq.*	*Days*	*Time/GMT*	*Net Mgr.*
LAN	3615	Daily	2330/0300	W5MBC
Delta 75	3905	Sun.	1330	WA5EVU
LaPON	3915	Sun.	1300	W5KC
LaRTTY	3612.5	Sat.	0100 (Sun.)	W5GHP

W5PM is enjoying the cool summer in Maine, Quebec and New York State. WA5GVB was La. winner in the Pa. QSO Party. New officers of the Westside ARC are W5EKF, pres.; K5USU, vice-pres.; W5VUH, secy.; W5KOQ, treas.; W5OUD, act. mgr. The three amateur radio clubs of the Greater N.O. area combined in an all-out publicity campaign via TV, radio and newspapers for FD. As a result many visitors attended their FD setups. We deeply regret to record the passing of W5DGB, of Plaquemine. W5ERR reports good results with the FET converter. W5BUK was La. winner in the Ga. QSO Party. WA5NYY reports Jefferson ARC had a successful FD. The OOTC seafood dinner was a huge success. W5BV is a new member of OOTC. WA5PWX was presented the Most Valuable Member Award by the Westside ARC. Those who made their reports to the SCM which are not included here, will be in next month's column. traffic: WA5PWX 73, WA5NYY 57, WA5GVB 51.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—The Miss. Sideband Net had a fine get-together at Lake Enid with about 80 present. The purpose of the meeting was primarily to elect a new net manager, present awards and give the Board of Directors an opportunity to meet. The new net manager is WA5TUD. WA5KEY received a standing ovation on his retirement as net manager. It was my pleasure to present the W5EPT Memorial Citizenship Award to WA5OHQ. "RB" has contributed a great deal to the net. It sounds good for amateur radio to welcome so many new calls, including WA5UOG, WA5UFP, Novices WN5VLV, WN5UKQ, WN5ULB, WN5ULY, WN5VOE and WN5VQT. Check into our nets: Gulfcoast Sideband Net, 3925 kc., daily at 1830 CDST with W5JHS as net manager, and Mississippi Sideband Net, 3947.5 kc. daily at 1915 CDST with WA5TUD as net manager. I was glad to have a fine eyeball with K5MFY. MSBN report: 30 sessions with 925 check-ins, 85 formal messages completed, 38 minutes average time.

TENNESSEE—SCM, Harry A. Phillips, K4RCT—Asst. SCM: Lloyd Shelton, WA4YDT. RM: WA4YEM. PAMs: WA4CGK, W4PFP, WA4EWW, WA4CRU.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*	*Mgr*
TSSB	3980	M-Sat.	2330Z	25	1333	180	WA4CGK
TPN	3980	M-Sat.	1145	30	1134	153	W4PFP
		Sun.	1300				
ETPN	3980	M-F	1040	20	449	50	WA4EWW
TCN	3980	Thurs.	0110	4	(W. ni. CDT)		W4OGG
TPO	3980	Sun.	2330	5	74	10	W4AST
TN	3635	Daily	0000	30	162	98	WA4YEM
TTN	7290	Daily	2100	30	296	111	WA4CRU
ETVHF	50.4	M-W-F	2300	12	185		WA4TJJ
ETVHF	145.2	Tu.-Th.	2300	8			K4FKO

Congratulations to WB4CXL on receiving the Tennessee Amateur of the Year Award sponsored by the Tenn. Council of Clubs. Congratulations to WB4GTI on making the BPL in his first two weeks of traffic-handling. W4AST has moved to Hendersonville and will be operating with the call K4RTA. Everyone is invited to check into the Tenn. Post Office Net. WB4HYY has taken an extended vacation to Fla. Sorry to lose WB4EKI to

(Continued on page 115)

EIMAC

3-500Z's used in Drake's linear amplifier for 2 kW PEP at 3.5-30 MHz

The R. L. Drake L-4B linear amplifier shown here uses two of EIMAC's new 3-500Z zero-bias triodes in grounded grid circuitry to achieve 2-kW PEP SSB input and 1-kW dc input on CW, AM, and RTTY. Drive power is 100 watts PEP and 75 watts CW, AM, and RTTY.

Drake chose EIMAC 3-500Z's because these rugged, compact, high-mu power triodes are ideal for grounded grid operation. They can provide up to 20 times power gain in a cathode driven circuit. And the two tubes have a total plate dissipation rating of 1000 watts.

For more information on EIMAC's line of power tubes for advanced transmitters, write Amateur Services Department, or contact your nearest EIMAC distributor.

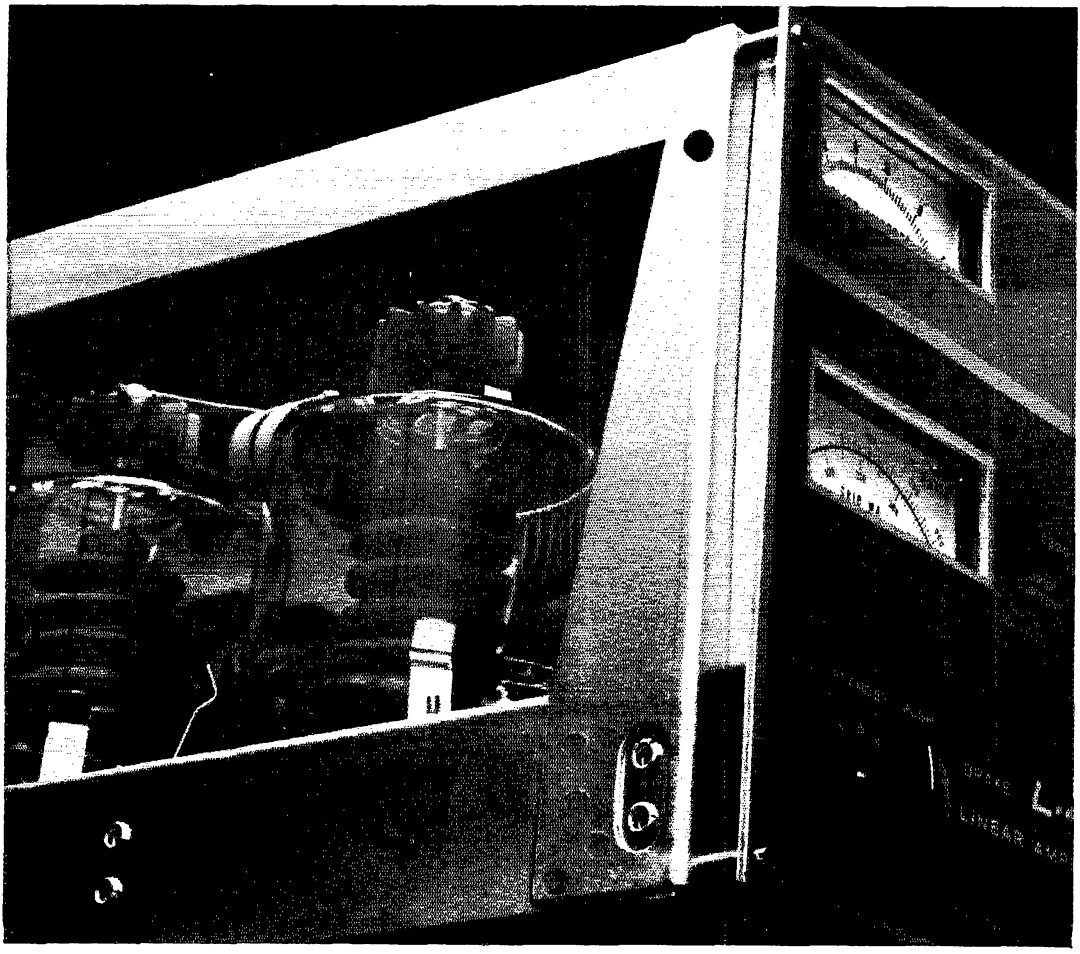
3-500Z TYPICAL OPERATION*

DC Plate Voltage	2500 V
Zero-Sig DC Plate Current**	130 mA
Single-Tone DC Plate Current	400 mA
Single-Tone DC Grid Current	120 mA
Two-Tone DC Plate Current	280 mA
Two-Tone DC Grid Current	70 mA
Peak Envelope Useful Output Power	500 W
Resonant Load Impedance	3450 ohms
Intermodulation Distortion Products	-33 dB

*Measured data from a single tube

**Approximate

EIMAC
Division of Varian
San Carlos, California 94070



EIMAC

3-400Z's used in prototype 6-meter linear amplifier for 2 kW PEP at 50 MHz

The prototype Swan linear amplifier shown here uses two EIMAC 3-400Z triodes in grounded grid circuitry to achieve two kilowatts PEP input at 50 MHz. Drive power is less than 100 watts PEP. The prototype amplifier features a tuned cathode circuit for low intermodulation distortion, and uses a pi-network plate tank circuit. The new linear may be driven with modern six-meter SSB transceivers, and offers real operational economy at 50 MHz.

Swan chose EIMAC 3-400Z's because these compact, high-mu power triodes are ideal for grounded grid operation. They can provide a power gain as high as 20 in a cathode-driven circuit.

For more information on EIMAC's line of power tubes for advanced transmitters, write Amateur Services Department, or contact your nearest EIMAC distributor.

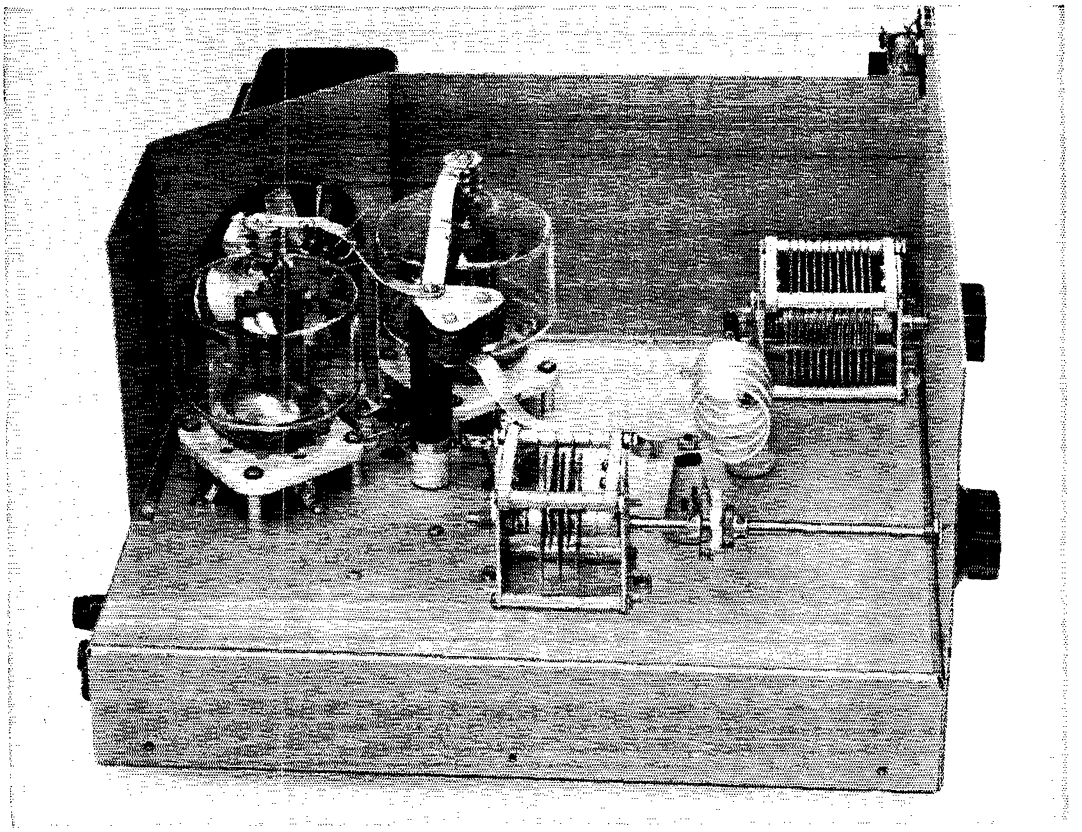
3-400Z TYPICAL OPERATION (Minimum IM Distortion Products at 1 kW PEP Input)	
DC-DC Plate Voltage	2500 V
Zero-Sig DC Plate Current*	73 mA
Single Tone DC Plate Current	400 mA
Single Tone DC Grid Current	142 mA
Two Tone DC Plate Current	274 mA
Two Tone DC Grid Current	82 mA
Peak Envelope Useful Output Power	560 W
Resonant Load Impedance	3450 ohms
IM Distortion Products	−35 db**

* Approximate

** −35 db or more below one tone of a two tone test signal.

We have a new brochure entitled "Linear Amplifier and Single Sideband Service." Write for your copy.

EIMAC
Division of Varian
San Carlos, California 94070



the Air Force. W4RUL (Greenville) operated FD with 3 rigs, W4PQP/4 (Nashville RATS) 3 rigs, W4AM/4 Chattanooga, W4BS/4 (Memphis) 1 rig, W4EM/5 (Memphis) 1 rig, W4IGW/4 (Humboldt) 2 rigs, W4COY/4 (Dresden) 3 rigs, W4TRC/4 (Kingsport) 3 rigs, W4WVJ/4 (Louden County) 3 rigs, W4TZJ/4 (Tullahoma) 1 rig, W4BBB/4 (Knoxville) Oak Ridge 5 rigs. The International Harvester ARC, WB4HPC, will handle traffic from an exhibit at the Mid-South Fair Sept. 20-28. Traffic: W4FX 256, W4OGG 166, W4SQE 153, WB4ESE 120, WB4GTI 114, WA4YDT 101, WA4YEM 99, W4WBK 70, WA4CRU 51, WB4HYY 50, WA4ZBC 39, WB4ANX 38, K4MQI 38, W4PFP 32, W4HLR 24, W4PRY 21, WA4GLS 19, K4TXK 16, WA4YFG 13, W4AST 12, W4TYV 11, WB4BGU 10, WA4TWL 10, K4OUK 9, WB4EKI 8, K4UMW 8, K4PUZ 7, WA4EWW 5, W4ODR 4, W4SGI 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, K4HY—SEC: W4OYI. Appointments: WB4HUS as ORS. Endorsements: W4CSN as EC, WA4IBG as OPS, W4NBZ as ORS, W4OYI as SEC.

Net	Freq.	Days	GMT	QNI	QTC	Mgr.
KRN	3960	M-F	1030	305	26	K4KIS
MKPN	3960	Daily	1230	404	101	K4TRT
KTN	3960	Daily	2300	753	552	WA4AGH
KYN	3600	Daily	2300/0200	—	—	W4BAZ
FCATN	50.7	T-W-S	0200	—	—	WB4BKG

Note the new call for the SCM. Clubs reporting active in FD were the Northern Kentucky Radio Club, Blue Grass Amateur Radio Club, Henderson Amateur Radio Club, Louisville Active Radio Operators, with WB4GPC, WB4HQW, WB4HUS and WN4HYY operating as the Swampwater Amateur Radio Club. The Owensboro Amateur Radio Club ran into a conflict between FD and the annual Canoe Derby and the Canoe Derby won since communications in that event are an important public service and safety function. Those participating were WA4MXD, W4OYI, K4SWL, W4TOY and W4VJV. W4WNH is working in New Mexico this summer and is reporting 2-meter activity from there. WA4WWT has his CP-40 certificate from the CWA. Traffic: (June) WA4UAZ 582, W4BAZ 268, WA4DYL 235, WB4HUS 223, WA4AGH 119, W4OYI 93, WA4VUE 90, K4HY 89, WB4IOU 82, WA4WWT 77, W4YOQ 67, W4TOY 60, K4TRT 56, WB4AIN/4 45, W4EON 39, WA4GHQ 37, WB4BKG 30, WB4FGE 21, W4KJP 20, K4VDO 19, K4UMN 17, W4SZB 16, WA4MXD 14, W4VJV 8, K4HOE 6. (May) WB4AIN/4 64.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: W8MPD. RMs: W8FWQ, W8RTN, WA8OGR. K8KMQ. PAMs: K8GOU, K8JED. V.H.F. PAMs: W8CVQ, W8YAN. Appointments: W8MPD as SEC; K8GOU as PAM; WA8VJE as EC; W8FZ as OBS; WA8GRI as OVS; W8GAI, K8HKM, W8IXJ, W8WQH, W8YAN, W8ZLK as ORSs; W8QPO, K8VDA, W8YAN as OPSs. Silent Keys: W8NMM, W8WFA. BPLer: WA8SQC. Net reports:

Net	Freq.	Time	Days	QNI	QTC	Sess.	Mgr.
QMN	3663	2200	Dy	496	301	30	W8FWQ
WSSB	3935	2300	Dy	865	313	30	K8WRJ
UPEN	3920	2230	Dy	360	28	30	K8ZSM
PON-DAY	3935	1600	M-Sat.	238	152	25	WA8OGR
PON-CW	3645	2300	M-Sat.	95	29	24	VE3DPO
B/R-MEN	3930	2130	M-Fri.	986	234	25	W8ZBT
M6MTN	50.7	2400	M-Sat.	199	38	24	WA8LRC
NOON 50	50.41	1600	M-Sat.	195	1	24	WA8PTI

The new call of the FARL secy. is WA8ZWX. K8EXV and K8NBF both are recovering from initiation in the "Heart Attack" Club. W8LJG now lives in St. Clair Shores. W8ZL finally came home to U.P. WA8RSL is back in Beaumont Hospital. Seen at last OT night: WN8ARH, WB8AGM, WA8OXK, W8BEZ, K8AOU, WA8IML, WA8JRJ, W8MPD, WA8OYG, WA8PSD, WA8RSU, K8SGA, W8SS. WA8RSD, W8PCA. WA8TGO, WA8VIF, WA8VOG, WA8VRJ, W8VWY, WN2YJY, WA8YBV, WA8YOQ, K8ZJU, WN8ZNS and WB6LCC/8. W8RWK has a new HW-16. For RTTY? WA8PRJ has the tower up and W8NRX is back on the air. WA8ZGR has the new TX6-2 working fine. WA8HJR bought a sixer to match his twoer. WA8NYK, WA8SIQ and K8DX made a quick trip to Heath. Murphy's Law hit WA8VAR (also FX) on FD. WA8EMJ is building a home in Roseville. W8IAX has installed a new TR-108. WA8HFV is in St. Mary's Hospital with a respiratory condition. W8JI moved back to Ohio. New officers of the B/R and MEN are W8OWG, mgr. and K8LJS, Asst. W8OWG worked W3WE on c.w. Same name, same initials. Traffic: (June) WA8SQC 539, K8KMQ 211, W8GAI 163, W8IXJ 157, WA8VBZ 152, W8MO 136, W8NOH 126, WA8OGR 124, W8IWF 120, WA8PII 101, K8GOU 84, K8MXC 65, WA8LRC 53, WA8LXY 51, W8FX 45, K8ZJU 44, W8BEZ 41, K8JED 41, WA8KRH 38, W8TDA 33, K8BYX 32, W8UFS 30, W8EU 29, W8FWQ 29, W8YAN 24, W8RTN 21, WA8VGQ 18, W8ZBT 16, W8JTQ 13, W8OWG 13, W8DSE 12, K8CIP 10, W8IIKT 9, K8VDA 8, WA8VBL 6, W8WVL 5, W8KEB/8 2, W8TBP 1. (May) W8CUP 5, W8DQL 4.

OHIO—SCM, Richard A. Egbert, W8ETU—Asst. SCM: Roger Barnett, K8DDG. SEC: W8OUU. RM: W8IMI. PAM: K8UBK. V.H.F. PAM: WA8ADU.

Net	QNI	QTC	Sess.	Freq.	Time	Mgr.
BN	502	282	59	3580	2300 & 0200Z	W8IMI
OSSBN	1483	832	57	3972.5	2245Z	K8UBK
06MTRN	132	54	30	50.6	2300Z	WA8ADU
OSN	128	61	28	3580	2225Z	WA8VNU

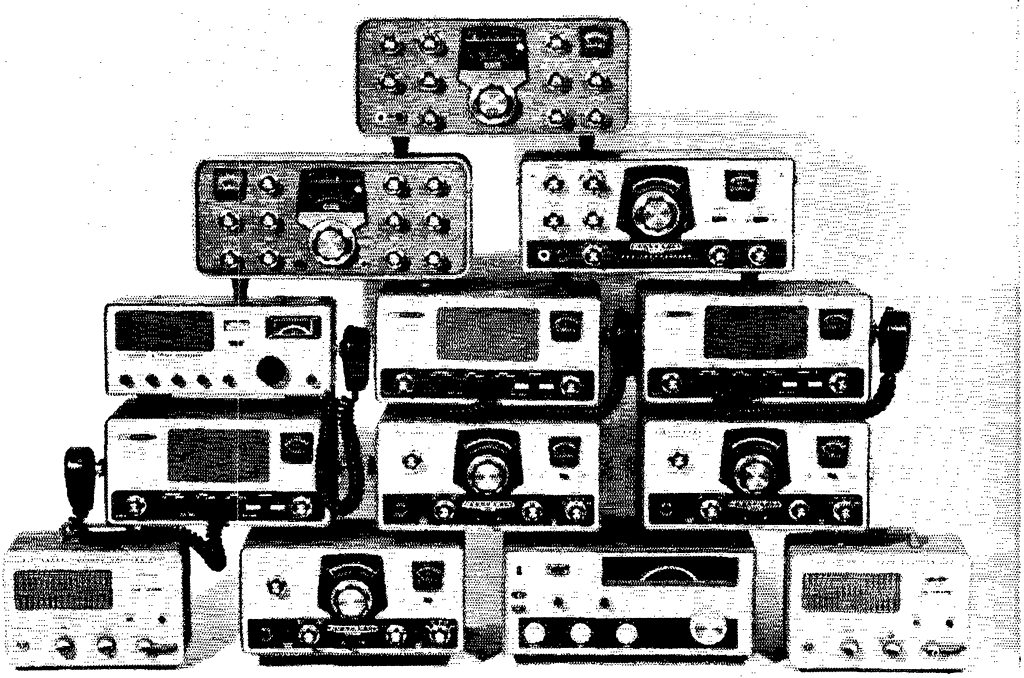
FD messages have been received from W8FY, W8BI, W8DYY, W8NCM, W8TV, W8ICS, W8QIH, W8JSU, W4FU/8, W8RCC, W8PO, K8TII, W8TO, W8ODJ, W8RTR, W8NP, WA8HOM, K8QIK, W8CEA, W8QLF, K8QPY and K8LUC. All were in good shape when received and nearly all indicated some AREC members in the group. One group of Novices did an outstanding job on Field Day. Signing the call WN8ACF, some twenty members of Columbus ARA's General code and theory class made 106 contacts in the one-transmitter class. They organized the activity themselves; used their own gear and power plant. A new Advanced Class licensee is WA8VEV; new Extra Class is WA8DUL. W8PO attended the Western New York Hamfest where Clarence D. Tuska was speaker. Tuska was one of the original founders of the ARRL. W8PO asked for an autograph and got the following written message: "I am pleased to send my very best regards to the Ohio amateurs." The Parma Radio Club *Bulletin* reports that PRC is a 100% ARRL affiliated club. W8BAH's AREA tells of a "Retiree Net" in the Cleveland area on 50550 kc. at 10 A.M. every morning except Sun. K8NQA is net control and invites all to check in. Please report your ham activities and achievements. This column is a good place to do your bragging on a section-wide basis. News should reach me as near the first of each month as possible. ECs are always in short supply. We are yet quite a way from our goal of an active EC for each county. When we invite a likely prospect to be an EC, he sometimes protests that he doesn't feel able to do the job; or the hams in his community aren't interested in AREC; or AREC has already fallen on its face here in Podunk; or any of scores of reasons to decline the job. ECs aren't born. They develop like most other capable leaders. They make mistakes, are subjected to some abuse at times and face frustrations. Most effective ECs are hams whose most outstanding qualification for the EC job is the simple desire to see the job done. Lack of experience is no reason to shy away from an EC appointment. The basic ingredient for good performance as an EC are willingness and initiative. Many hams who would like to participate in an active AREC program are only waiting for someone to indicate a willingness to be a leader. Followers are not hard to recruit once there is a leader. How about you? Are you satisfied with the AREC program in your community? Is there one? If you don't have an EC, be one. If you don't have an active EC, maybe you should be one, anyway. Traffic: WA8AUZ 351, W8RYP 292, W8IMI 281, WA8VNU 183, W8QZK 170, W8ERD 152, W8QCU 114, WA8UPI 111, WA8TYF 88, WA8MTS 86, W8QXQ 85, W8GOE 83, W8CHT 70, W8LRE 63, WA8LAM 58, W8OE 55, WA8UTX 53, K8DDG 42, W8LT 42, WA8RWK 42, WA8ADU 38, K8LGA 31, WA8MHO 31, W8HNP 27, W8WDU 22, WA8LVT 20, K8DHD 16, W8PMJ 15, W8TV 15, WA8KPN 11, W8WEG 10, W8ELE/8 9, W8ETU 7, K8QYR 6, WA8AJZ 5, W8VYU 5, W8EEQ 4, WA8SHP 4, W8VND 3, WA8HON 1.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Graham G. Berry, K2SJN—Asst. SCM: Ruth E. Rice, WA2VYS. SEC: W2KGC. PAM: WB2VJB. RM: WA2VYS. Section nets: NYS, 3760 nightly at 2400 GMT; ESS, 3590 nightly at 2300 GMT; NYSPT&EN, 3925 nightly at 2200 GMT. *Appointments*: All appointees, please send in certificates for renewal if not now up to date. Club secretaries, please put your SCM and Asst. SCM on mailing lists for club papers, meeting notices, etc. During the summer all 3 nets held annual picnics. The WARA's officers for the next club year in Westchester County are W2CJ, pres.; WB2MOI, vice-pres.; WB2MOJ, secy.; WA2WDH, treas. Advancement notes (congratulations): WB2UEQ to Extra, WA2RAU, WA2YEC and WA2VTR,

(Continued on page 118)

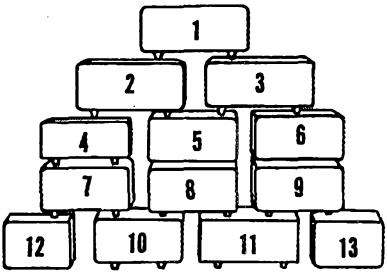
WHO MAKES MORE TRANSCEIVERS THAN HEATH?



NOBODY

(any way you look at it)

There Are 13 To Choose From



1. The SB-101 — the transceiver everyone wants and thousands already have. 180 watts input PEP on USB/LSB, 170 watts input on CW. Operates 80 thru 10. PTT or VOX. Linear tuning with 1 kHz dial calibration & virtually no backlash — ideal for crowded nitetime bands. Front panel switch selection of either the standard USB/LSB 2.1 kHz SSB filter (2:1 shape factor) or the optional 400 Hz CW filter. The amazing versatility of the SB-101 can be extended even further with the optional SB-640 LMO. Get on the air with the best — get the Heathkit SB-101.
kit SB-101, 23 lbs. **$370.00**

2. The SB-110A — the "no compromise" 6 meter rig. 180 watts PEP USB/LSB input, 150 watts CW input. 1 kHz dial calibration. Famous Heath LMO. PTT or VOX control. Same crystal lattice filter as SB-101. Built-in 100 kHz calibrator. Switch select either crystal controlled transceiver or crystal controlled transmit with variable tuning receive-CW or cross-mode. Go six meters for less, and still get the best — go Heathkit SB-110A.
kit SB-110A, 23 lbs. **$299.00**

3. The HW-100 — Heathkit's newest 5 band transceiver and second only to the SB-101 in performance and value. Work 80 thru 10 meters; 180 watts input PEP SSB, 170 watts input CW. High quality crystal lattice filter. Built-in 100 kHz calibrator. Patented Harmonic Drive™ dial mechanism. Solid-state (FET) VFO. PTT or VOX. Triple Action Level Control. Make friends & influence people — buy the HW-100.
kit HW-100, 22 lbs. **$240.00**

4. The HW-17 — the better way to go All Solid-state 2 meter AM for less. Perfect for local rag chews, nets & DX, as well as CAP, MARS & CG Auxiliary. 25-30 watts input. Solid-state, dual-conversion receiver. Pre-built, pre-aligned FET tuner. Four crystal sockets plus provision for external VFO. Battery-saver switch & built-in speaker — well suited for rugged mobile work. Overwhelm your friends on 2 with the HW-17.
kit HW-17, 17 lbs. **$129.00**

5. The HW-18-1 — the only way to go! This CAP SSB rig is inexpensive and effective. Covers 4450 to 4650 kHz and provides 200 watts PEP input on USB; 25 watts input with carrier for compatibility with AM stations. Crystal filter sideband generation. 1 uV sensitivity; 2.7 kHz selectivity. 2 crystal-controlled channels, switch selected. PTT mike and mobile mount included.
kit HW-18-1, 15 lbs. ... **$119.95; wired HWW-18-1,** 15 lbs. **$179.95**

6. The HW-18-2 — A 4450 to 4650 kHz MARS transceiver at a fraction of the cost you've had to pay before. 200 watts input on either USB or LSB (you specify); 25 watts input with carrier. Fixed tuned for simple PTT operation. Crystal filter IF for high selectivity. Switch select either of the two crystal controlled channels. ALC holds output constant under varying voice levels. Complete with PTT & mobile mount. Get fast, efficient MARS communication with the HW-18-2.
kit HW-18-2, 15 lbs. **$109.95**

7. The HW-18-3 — Good news on 160 M rigs, OM!! 200 watts input on LSB; 25 watts input with carrier. Just select either of two crystal controlled channels and push-to-talk — what could be easier! One microvolt sensitivity and 2.1 kHz selectivity. Relayless transmit/receive switching. Automatic Level Control. Easy construction, fast alignment. See you on 160 with the HW-18-3.
kit HW-18-3, 16 lbs. **$109.95**

8. The HW-22A — the famous Heathkit 40 Meter Single Bander. 200 watts PEP input on either USB or LSB. Choice of power supplies for fixed or mobile operation. Front panel mike input, gain control & bias adjustment for easy change over. Slow AVC action for ideal SSB reception. 1 uV sensitivity, 2.7 kHz selectivity. Temperature compensated VFO. High quality crystal lattice filter.
kit HW-22A, 15 lbs. **$104.95**

9. The HW-32A — the world's best 20 Meter Single Bander. Operates either USB or LSB — 200 watts PEP input. ALC input for use with external linear. Run fixed or mobile, using either of the two accessory power supplies. Change over is easy, thanks to the front panel mounted mike input, bias adjustment & gain control. Built-in S-meter, PTT, VOX and ALC. Your best buy on 20.
kit HW-32A, 15 lbs. **$104.95**

10. The HW-12A — The popular Heathkit 80 Meter Single Bander. The world's best 80 meter value by far. 200 watts input on USB or LSB. Ten-tube superhet receiver with 1 uV sensitivity, 2.7 kHz selectivity and slow AVC action for superior sideband reception. Operates PTT or VOX. Built-in S-meter and ALC. Easy to change from fixed to mobile. Is there a better buy on 80? Not at this price.
kit HW-12A, 15 lbs. **$99.95**

11. The HW-16 — A high performance CW rig for the newest novice or most experienced old brass pounder. Optimum CW operation on the first 250 kHz of the 80, 40 & 15 meter bands. Power input adjustable from 50 to 90 watts. True "break-in" operation — solid-state TR switching and receiver muting. Crystal lattice filter for extra sharp selectivity of 500 Hz. You're on top of the action when your rig is an HW-16.
kit HW-16, 25 lbs. **$99.50**

12. The HW-29A — One of the very popular "Benton Harbor Lunch Boxes" — this one for six meters. There's a lot of action in this little package. The crystal controlled AM transmitter has a husky 5 watt input — ideal for local nets, CAP or MARS operations. The tunable superregenerative receiver with RF stage has 1 uV sensitivity. Get on 6 with the HW-29A.
kit HW-29A, 9 lbs. **$44.95**

13. The HW-30 — The other "Benton Harbor Lunch Box", 2 meter transceiver. Interested in VHF? There's no better way to begin than with this one. Features 5 watt input to the AM transmitter and 1 uV receiver sensitivity. Comes complete with ceramic mike, meter jack and power cables for mobile operation. Can operate on USCG Auxiliary freq. of 143.28 MHz.
kit HW-30, 9 lbs. **$44.95**

FREE 1969 HEATKIT CATALOG

Describes these and over 300 kits for stereo/hi-fi, color TV, amateur radio, shortwave, test, CB, marine, educational, home and hobby. Save up to 50% by doing the easy assembly yourself. Mail coupon or write Heath Company, Benton Harbor, Michigan 49022.

HEATHKIT

HEATH COMPANY, Dept. 9-9
Benton Harbor, Michigan 49022

☐ Enclosed is $_____, plus shipping.
Please send model (s)_____
☐ Please send FREE Heathkit Catalog.
☐ Please send Credit Application.

Name_____
(Please Print)
Address_____
City_____ State_____ Zip_____
Prices & specifications subject to change without notice. AM-201

Advanced. New members of ESS in the section are WA2-BUF and K2BIG. WB2RBG is the new NCS for Albany County. The AREC (6M) Net reports a new kw. rig set to go. FD messages came in from K2YCJ/2 and WB2ZAV and WB2YCM, together/1. WA2HGB and WA2ZPD head for graduate college; WA2AUI now is a lt. in the USA after June USMA graduation. K2SJO is looking for nominations for "Miss Amateur Radio" for the Hudson Division Convention to be held at the Hilton Motel in Tarrytown Oct. 12-13. See you all there. W2TPV is back from the service and operating on NYS. W2HF is working on a 44-element Yagi for 432 Mc. K2YCJ/1 reports handling priority traffic from a mobile into NYSPT&EN during FD with 5 minutes from start to delivery. WB2NVJ made DXCC and WA2RAU is now 300-plus on the Honor Roll. WB2VQK and WB2WVY have APX-6s on 1240 using cone antennas. K2JNG has 10 watts out on 1296. WB2GXF is looking for early a.m. and late afternoon activity from 144-Mc. mobile. Many thanks from both your new SCM and Asst. SCM to W2EFU for making the take-over easy and to everyone who sent messages of congratulations. Traffic: WA2BHN 481, W2EAF 113, WA2VYS 111, WB2VVS 69, WB2VJB 41, WB2FOA 36, WA2HGB 27, K2SJN 22, W2TPV 13, W2-ANV 12, WA2WGS 12, WA2CRW 10, WB2UEQ 10, WA2-JWL 2. (May) WB2VJB 47.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW.

NLI*	3630 kc.	1915/2200	Nightly	WA2UWA	RM
NLIVHF*	145.8 Mc.	1930	MTWTF	WA2RQF	PAM
NLIPHONE*	3932 kc.	1600	Daily	WB2ZET	PAM
NLS(Slo)*	3715 kc.	1845	Nightly	WB2UQP	RM
Clear Rise	3925 kc.	1100	Daily	WA2GPT	Mgr.
Mic Farad	3925 kc.	1300	Ex. Sun.	K2UBG	Mgr.
East U. S.	3683 kc.	0001	Nightly	K2UBG	Mgr.
All Sve	3925 kc.	1300	Sun.	K2AAS	Mgr.
NYSPTEN	3925 kc.	1800	Daily	K2AAS	Mgr.

Section Nets. All times shown above are local. Gee, where did the goldurn summer go? Once again it's time to light off the number one power supply and see what the humidity did to the rig. If there are no blue flames or other surly signs of distemper, why not zing on up to the old AREC or NTS net frequency and salute the gang with a hearty round of good old traffic. Listen, by the way, please note the late session of NLI at 2200 local. This mates with the late session of the region net and makes it possible for the guys who dine in the neighborhood of 1915 hours to still get into an NLI session. Isn't *that keen?* Although WB2DRW had to graduate on Field Day Sunday, it wasn't a total loss for what should pop out of the graduation gift package but a doggone EICO 753! WB2DZZ got back from NYU dorm life just in time to get in on a good old bug-eatened, sunburned, NYUARC-type Field Day. WB2-QIL spent a good part of the summer in history at Post College. W2EW is looking for a couple of agile-type youngsters to shinny up the good old tree with the other end of his antenna. K2UBG, indomitable Mike Farad and Eastern U.S. Mgr., was heard mobiling through South Jersey last July on a vacation-type trip. Listen, WA2GPT allows that points should be given to stations serving as NCS. The points, she contends, should be applicable to BPL or whatever point system may eventually replace BPL. The essence is that the NCS function be given traffic-handling recognition. So, why don't you scribble your comments (including your own peachy-keen method of assigning points) on a scrap of paper and mail it to me. W2PF reports that a bunch of QCWA guys entertained OA4J (W2UD) and HCQD at an NYC luncheon last June. A QCWA 50 Year Award was presented to OA4J. You know, HCQD was tickled pink over having been able to spend about two months visiting hams he'd worked from his Florence, Italy, QTH. WB2JJW played Field Day with W6ECQ (ex-K2ORA), who returned to this land for about a month. W2FUK, our revered old Hudson DD, motored to Florida with the TR-4 and family and visited up with K4KR/W2KR and W4LEP (ex-W2OBU), the most recent other revered old Hudson DDs. Gosh! WB2WCS has a 6&2 beam that's been grabbing all the June DX that abounds. WA2QJU reports that the Kings 10-Meter AREC Net is anxiously looking for all you Kings 10-meter guys to make you a part of the AREC team. How about it? W2NXB has thrown an end-fed ZEPP into the fray on 160 meters so that more of you guys and dolls can hear his Official Bulletins. Hey, don't forget the Hudson Division Convention at Tarrytown, N.Y. on Oct. 12 and 13! Traffic: WA2UWA 767, WB2RWD 440, WA2GPT 385, K2UBG 187, WB2DRW 129, WB2-DZZ 123, WB2AEK 57, WB2QIL 30, WB2UQP 27, W2EW 24, W2EC 20, WB2JJW 13, W2PF 8, WB2WCS 5, WB2YKL 5, W2DBQ 4, WB2DLJ 3.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2-CVW. SEC: WA2ASM.

ARPSC Section Net Schedules

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr*
NJN	3695 kc.	7:00 P.M.	Dy	30	368	284	WA2KIP
NJSN	3740 kc.	8:00 P.M.	Dy	22	81	44	WB2RKK
NJEPTN	3928 kc.	6:00 P.M.	M-Sat.	30	472	198	W2ZI
NJPON	3928 kc.	6:00 P.M.	Sun.	—	—	—	WA2TEK
NJAN	50,300 kc.	8:00 P.M.	M-F	20	283	48	WA2KZF
PVETN	145,710 kc.	7:30 P.M.	Dy	30	347	327	K2KDQ
ECTN	146,700 kc.	9:00 P.M.	Dy	30	227	147	WB2IYO

RMs: WB2BVE and WB2RKK. PAMs: W2PEV, K2PEV, K2KDQ, WA2KZF, WA2TEK and WB2IYO. Endorsements: WA2IGQ as OPS and WA2CCF as EC for Englewood and vicinity. WB2TQK passed the Advanced Class exam and his brother is now WN2GHC. WN2DZE received his Tech. Class license and is now also WA2-DZE. WN2CUR passed the General Class exam and is putting up a tri-band quad. K2IEF made DXCC with 102 and a complete homebrew setup. WB2ZSH is installing silicons in his rig. WN2DVN's station includes a Drake 2NT and a 1A. WB2AMV added RTTY and a four-element 20-meter beam to his station. W2ABL passed the Extra Class exam. WB2SCT is on with a T-60 and an SX-140 receiver. The Windblowers V.H.F. Society's annual Big Blow will be held on Sept. 28 from 2 to 10 P.M. Contact the four stations, K2GOS/1 in Conn., W2ERZ/3 in Penn., W2ZDR in N.J. and W2-RRP/2 in N.Y. for a certificate. WB2UIR will attend S.I.T. this fall. WB2EES has been appointed RO for Roxbury Township C.D. He also has joined Army MARS. WN2EPK, WN2EPR and WA2BGJ have a 40-*meter net underway.* WN2DMI received his CP-15 sticker. WN2DPN put up a new trap vertical. WN2DPV is on 15. W2BVE reports Army MARS will continue the RTTY and f.m. classes this fall. Contact him for additional information. We would like to hear from more of you. The reporting has dropped off. Traffic: (June) WA2IGQ 613, WB2FUW 556, WB2RKK 425, K2KDQ 195, WB2DDQ 180, WB2ZSH 159, WB2VLC 149, WB2NSV 130, WB2FIT 112, WA2TBS 110, WA2ACJ 101, WB2BXK 99, WB2IYO 59, WA2ASM 57, WB2UIR 53, K2EQP 38, W2QNL 32, W2CVW 28, WA2CCF 26, K2DQT 25, W2EWZ 23, W2LQP 23, WB2CGI 21, WB2-BKC 20, WB2JWB 20, WA2NJB 16, WB2AMV 11, WB2BCS 11, WB2EES 11, K2ZFI 11, W2JDH 9, WA2-VQP 9, W2TFM 6, WB2WNZ 6, WA2CRF 5, WN2DRJ 5, WA2KZF 4, WB2YPQ 2, WN2EUX 1, WB2RUM 1. (May) WA2IGQ 357, WB2NZU 120, WB2AMV 79, WB2-BXK 19, WA2GLI 13, WA2VQP 13, WB2BCS 12, WB2CGI 10, WB2RUM 4, WB2YPQ 3.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. PAM:

ZERO DISTRICT QSO PARTY

Sept. 14-16, 1968

sponsored by
The Roosevelt H. S. ARC of Des Moines

Rules: 0100-0500 GMT Sept. 14, 2300 GMT Sept. 14 to 0300 GMT Sept. 16. All bands may be used as well as both c.w. and phone. Stations may be worked once per band (phone and c.w. are considered separate bands). Calls CQ Ø.

Exchanges: Ø stations send QSO number RS(T) county and state, all others send number, RS(T) and state, province or country.

Scoring: One point per contact all stations multiply by the number of states (maximum 8) added to the number of different counties (maximum 682) worked. Ø stations use the sum of states, provinces and foreign countries, in addition to Ø district as a multiplier.

Awards: Certificates to first and second place in each state, province and foreign country and to the top scorer in each Ø district county.

Frequencies: 1815 3575 3950 7075 7230 14,075 14,300 21,075 21,290 28,600 and u.h.f. and v.h.f. bands. Novices try 3720 7165 and 21,110.

Any station interfering with traffic will be disqualified.

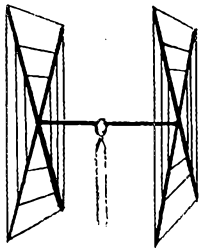
Logs showing dates, times, stations worked, exchanges, bands and modes and claimed scores should be sent no later than Oct. 14, 1968 to the Roosevelt H.S. ARC, WAØQJX, c/o Jeff Schwartz, WAØNVM, 648 Fifty-sixth St., Des Moines, Iowa 50312, please include s.a.s.e.

GOTHAM ANTENNAS ARE MUCH BETTER! OF COURSE YOU PAY MUCH LESS

How did Gotham drastically cut antenna prices? Mass purchases, mass production, product specialization, and 15 years of antenna manufacturing experience. The result: The kind of antennas you want, at the right price! In QST since '53.

QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3---



CUBICAL QUAD ANTENNAS — these two element beams have a full wavelength driven element and a reflector; the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16′ square.

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10′ × 1¼″ OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Steel wire, tempered and plated, .064″ diameter.

X Frameworks: Two 12′ × 1″ OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞″ OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

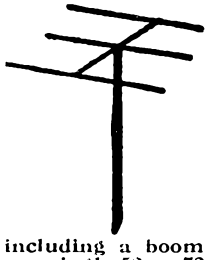
Now check these startling prices — note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD	$35.00
10-15 CUBICAL QUAD	30.00
15-20 CUBICAL QUAD	32.00
TWENTY METER CUBICAL QUAD	25.00
FIFTEEN METER CUBICAL QUAD	24.00
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS! WN4DYN



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36′ of tubing for *each* 20 meter element, for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞″ and 1″ aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20	$16	4 El 10	$18
3 El 20	22*	7 El 10	32*
4 El 20	32*	4 El 6	15
2 El 15	12	8 El 6	28*
3 El 15	16	12 El 2	25*
4 El 15	25*	*20′ boom	
5 El 15	28*		

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . . $18.95

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

WØNGS. RM: WØTIU. The Hamilton Co. ARC hosted the Annual 160-Meter Picnic, at which WØMMZ won the hidden transmitter hunt. KØQKD lost his car when it accidentally rolled down an embankment by itself. New officers of the Story Co. ARC for '68-'69 are WAØMVH, pres.; KØYLO, vice-pres.; WAØMUG, secy.; WØIII, treas.; WØJIG, comm. mgr. Story Co. AREC members aided in communications during the Isaac Walton FD on May 19. WØEKB reports 50-MC. activity high in June. He also reports a new 4-state 6-meter net on 50.125 Mc. at 2200 GMT Wed. WØPFP, in the V.H.F. Contest, had 125 contacts in 42 sections; he also has 42 states confirmed on 50 Mc. WAØOTE has several new countries confirmed as of June; he now has 120. He also is a new OPS. Field Day messages were received from the following: WØJTA, WØKUS, WØMG, WØDX, WØAWW, WØIII and WAØNJS. Roosevelt High ARC (Des Moines) is sponsoring a QSO Party Sept. 13-16.

Ia. 160-Meter Net	QNI 607	QTC 7	Sess. 30
IA. 65-Meter Net	QNI 1337	QTC 173	Sess. 25
TLCN (May) C.W. Net	QNI 117	QTC 18	Sess. 30

Traffic: (June) WØLCX 514, WØCZ 255, WAØDXV 102, WØFDM 38, WØLGG 23, WAØIYH 17, WAØMIT 13, WAØOTQ 13, WAØOTE 8, WAØAIW 7, KØTDO 4, KØQKD 3. (May) WØEMA 14.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RMs: WAØMLE, WAØJFV. V.H.F. PAMs: WAØCCW, WØHAJ, WAØLSH. WØINH reports a fine time at the Rocky Mountain ARRL Convention. WAØKDJ and WAØFEE have been on the sick list lately. Warm weather, vacations and just plain laziness kept some of us from reporting this month. Let's hope activity does perk up after all have recouped from FD. Low Band AREC Zone 7, 9 and 15 Nets. QNI 77, QTC 2. AREC Zones 13 AREC Net, QNI 42, QTC 3. Kans. EC Net. QNI 31. QTC 21. Kans. PI Net, QNI 38, QTC 3. QKS, QNI 158, QTC 46. Kans. P.O. Net, QNI 772, QTC 1119. WX Net, QNI 640, QTC 144. 2 special sessions tornado alerts were held June 20 and 24 with a total QNI 42. Zone 11 AREC 75-Meter. QNI 187, QTC 46. 2-V.H.F., QNI 15, QTC 6. A real fine report was received from S.W. Kansas. Zones 7, 9, 11 and 15 compiled QNI 114, QTC 12. NC Kans. 2-Meter Net. QNI 37, QTC 2. Field Day reports were received from WORC, KØTKF, WAØRJE, WØKQU and WØERH. Traffic: WØINH 187, WAØLLC 145. WAØNFP 93, KØVLZ 91, KØBXF 72, WAØJOG 63. WØPSN 58, WØZJY 55, WAØPQL 47, WAØNDZ 39, KØEMB 38, WAØCCW 34, WAØKPE 29, WAØJQV 16, KØFIG 10, WAØOUT 10, KØUVH 10. KØFPC 6, WAØJFV 6, WØFDJ 4, WAØRQG 3, WAØRTK 2, WAØTAS 2, WAØKHN 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØGS—SEC: WØBUL. WAØELM is in the hospital at Rochester, Minn. WAØOZO has volunteered to be manager of MTTN until Dave returns. The Des Moines Roosevelt H.S. ARC again is sponsoring the Ø District QSO Party this year, Sept. 13-16. New officers of the Ruskin H.S. ARC (WAØTKV) are WAØPUL, pres.; WNØUHT, vice-pres.; WNØUVM, secy.; and WNØUID, treas. New members from the radio classes are WAØPFU, WNØULQ, WNØUVL and WNØUVM. WAØTTV, club sponsor, is Adv. Cl. WAØJIH has moved to Omaha. WAØEMS is at UMC for the summer, keeping WØZLN active there. WAØFLL passed the Adv. Cl. test. KØJPJ is working as radio operator for the Greene Co. sheriff, WØWWO is Adv. Cl. New calls from the PHD ARC classes are WAØSOJ, WAØSOK, WAØSOL, WAØOTR, WNØUTB, WNØUTC, WAØUDS and WNØVAV. KL7DHD/Ø is a new member of PHD. PHD Net certificates go to WAØRMX, WAØLHO, WAØONF and WAØSRF. WØRMF as a new two-element quad. KØVBD has a new Valiant. KØONK was appointed assistant editor of *QRK-5*, the MARS newsletter. Field Day messages were received from WORFD and KØOYM by the SCM. SEC WØBUL received FD messages from WØBRN, WØHCY, WØERE and KØOGM. WØBUL also pres. of the Tri-State ARC, is now 120 on both his DXCC certificates.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr*
MEN	3885	2230Z	M-W-F	13	130	11	WØBUL
MON	3585	2400Z	Daily	30	169	113	KØYBD
MNN	7063	1800Z	M-Sat.	25	61	27	WØOUD
MoSSB	3963	2300Z	M-Sat.	25	426	345	WØRTO
MoPON	3933	2100Z	M-F	20	202	170	WØHVJ
PHD	50.4	2430Z	Mon.	4	82	10	WØKUH

Traffic: KØONK 2396, KØYBD 281, WAØHTN 222, KØRPH 128, WØOUD 126, KØJPS 105, KØAEM 95, WØHVJ 76, WØBV 73, WAØHQR/Ø 69, KØVVH 30, WAØFMD 29, KØREV 26, WAØKUH 15, KØGOB 12, WAØJIH 12, WØBUL 10, WØGS 10, WØRTO 7, WØZLN 6, KØJPJ 4, WAØFLL 3.

NEBRASKA—SCM, V. A. Cashon, KØOAL—SEC: KØODF. Monthly net reports for June: Nebr. Emergency Phone Net, WAØGHZ, QNI 1121, QTC 391. Nebr. Morning Phone Net, WAØJUF, QNI 925, QTC 40. West Nebr. Phone Net, WØNIK, QNI 589, QTC 29. Nebr. C.W. Net (NEB), WAØQMZ, 0030Z and 0300Z sessions. QNI 25, QTC 8. Nebr. Storm Net, WAØLOY 2330Z session, QNI 748, QTC 120; 0030Z session, QNI 638, QTC 51. Cornhusker Teenage Net, WAØOCW, QNI 222, QTC 17. AREC Phone Net, WØIRZ, QNI 179, QTC 3. AREC C.W. Net, WAØEEI QNI 11. My sincere thanks for your vote of confidence for the SCM position. I will do my best. Also thank you for the support received while SEC. The new SEC, KØODF, has a group of the finest ECs and AREC members that one could work with. Let's all continue to work together. Traffic: WAØIBB 424, WØHTA 257, WAØGHZ 256, WØLOD 181, KØJTW 82, WAØLOY 78, WAØTID 42, KØJFN 22, KØIXY 18, WAØOQX 18, KØJFO 15, WØPQP 13, WAØGVJ 12, WØBFV 11, KØDGW 11, WAØPCC 11, WAØPIF 10, KØFRU 8, WØNIK 8, KØSFA 8, WAØJUF 7, KØJPP 5, WAØEEI 4, WØYFR 4, WØEGQ 3, WAØSCS 3, WØVEA 3, WØHOP 2, KØOAL 2, WAØPSN 2, KØODF 1.

NEW ENGLAND DIVISION

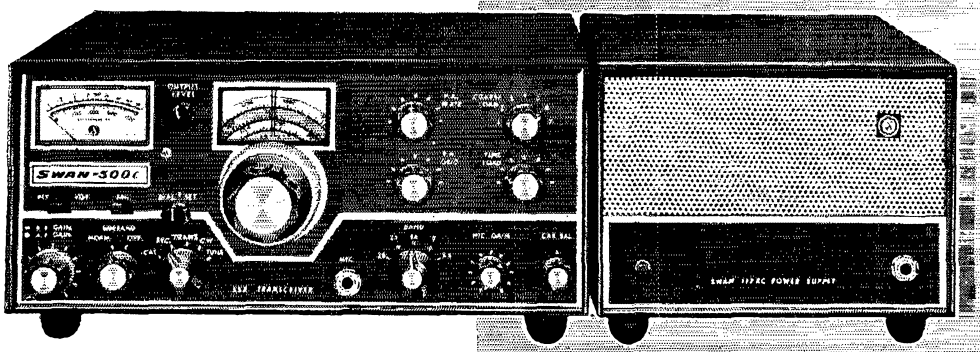
CONNECTICUT—SCM, John J. McNassor, W1GVT—SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. V.H.F. PAM: K1SXF. Net reports for June:

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845	30	267	421
CPN	3880 M-S	1800 Sun.	1000	28	461	165
VHF 2	145.98	M-S	2200	19	86	36
VHF 6	50.6	M-S	2100	20	238	43

High QNI: CN—K1TKS, W1EFW, WA1HGF and WA1GGN. CPN—W1GVT 26, K1SXF 24, W1YBH and K1YGS 23, K1CEC 20, WA1IWN 19, K1EIC 18, WA1FXS and WA1IEK 17, K1DGK and K1UWO 15. SEC W1PRT distributed another fine PI-CONN Bulletin to all ECs. Your help is needed and greatly appreciated. Please let him know if you are interested in a Sept. meeting. Our N.E. Director, W1QV, provided excellent representation for our Division at the recent Director's Meeting. My sincere thanks to all who sent in Field Day Messages—hope you enjoyed it and made a good score. Club bulletins are always interesting. Wish there were more amateurs as interested and able as WIADW, editor of the Candlewood ARC *Newsletter*. The Talcott Mt. U.H.F. Society is making steady progress on its Moon-bounce project. The IRN Bulletin by W1EFW has considerable information on traffic work and NTS. The *Murphy Message* is a very complete newsletter of Murphy's Marauders. To become a member contact W1ARR or W1YYM. K1TFF, in JA-Land, met JA2-AMC and visited the Sasebo Japan TV station. W1-ENZ is on 2 meters with a transistorized rig brought home from DL-Land. Congratulations to: K1UBE and WA1CYS on Extra Class; W1EFW and WA1GGN on June BPL; K1GUD and K1LMS, now OMs with XYLs! Traffic: (June) W1EFW 505, WA1GGN 266, WA1IGF 191, WA1HSN 174, K1TKS 164, W1WCG/1 135, WA1GIX 120, W1AW 110, WA1IEK 98, K1SXF 61, WA1FNJ 59, W1GVT 56, WA1IEG 30, W1ARR 45, WA1IWN 33., WA9QVU/1 31, W1QV 29, WA1GFW 28, W1YBH 25, W1BDI 14, K1YGS 14, K1CEC 12, WA1FXS 9, W1-BNB 6, W1CTI 6, W1CUH 4, WA1GLS 4, WA1FGN 2, W1WEE 1. (May) W1WCG 89.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—W1AOG, our SEC, received reports from these ECs: W1s ZMO, UJF, RPF, K1DZG, WA1-DXI. For details on the Operation Portable Award, sponsored by Boy Scout Troop 94, Scituate, write to W1DKD. WA1BFD has his Advanced Class license worked DX on 6 and is camping out down on the Cape. WA1HDQ-DPX was up on Mt. Mansfield, Vt. and worked 6 s.s.b. with a three-element Hi-Hopper and had a grand time. In June we had 103 new hams: 63 Novices, 23 Technicians, 2 Conditionals, 7 Generals, 7 Advanced and 1 club in this section. The 6-Meter Cross Band Net had 28 sessions, 127 QNIs, 8 traffic. W1NF worked SP9CEM and UB5KQV on 14 Mc. The Wellesley ARS, W1TKZ/1, operated Field Day from the Town Hall lawn with good luck. K1PRB is chairman of the technical assistance committee, which meets every Wed. to help anyone with rig problems or construction projects. WN1JMR is on 80 and chasing DX on 15 with a T-60 and an SB-300. The South Shore Club held its last meeting until the fall. W4DGA-W1RTW write to say "hi." Congrats to K1RAW as the "Ham of the Year" at Swampscott. K1DZG is back from VO1- and VE1-Land mobile. WN1JKJ has a DX-60B and is on 15 and 40. WN1JNJ has a DX-60 and a Drake 2B

VALUE ENGINEERED



SWAN 500 C

There must be some very good reasons why Swan has become the leading manufacturer of transceivers for the amateur radio service. One of the most important reasons is our dedication to the principles of Value Analysis.

Value Analysis is the process of examining a product to find ways of improving its performance, reducing costs, or whatever can be done to make the product a better value to the buyer. It is surprising how often this leads to greater simplicity, improved reliability, and overall consumer satisfaction.

At Swan our engineering department is constantly applying these principles in an intensive search for improvements in our products. The 500C transceiver is an outstanding example of the results. It combines all the features you require in a complete SSB-AM-CW transceiver with performance, quality, and reliability second to none. Yet the price is substantially less than competitive gear. There's really no secret or mystery about this. We believe that the 500C is the most completely "Value Engineered" transceiver on the market, and this is why we are in the lead. Visit your Swan dealer soon, and see for yourself.

500C Amateur Net **$520**
117XC POWER SUPPLY . . . **$105**

SWAN
ELECTRONICS
OCEANSIDE, CALIFORNIA
A Subsidiary of Cubic Corporation

SWAN SPEAKS YOUR LANGUAGE

ASK THE HAM WHO OWNS ONE

and a tri-band dipole working on DX. W1AOG went up to VE1-Land. The Newton C.D. group is going to hold theory-only classes for those wishing to advance their licenses. W1DYS has his HW-100 power supply built. W1RM is building a garage. W1s RNG and CFU are working on filters to eliminate Newton's new BC station's harmonics. W1LMU is building a small 6-meter mobile rig. W1AYA/1 is from Barnstable. WN1JHL is working on a service project for his Eagle badge in scouting. The Framingham RC held its banquet. The Capeway RC met at W1GPL's. K1MAK has a Hy-Gain Ballun. W1ZXG has a new tower. Appointments endorsed: W1DWY as EC, W1DOM as OPS. WA1FSI will be at her dad's, W2AXL, doing some operating. W1SMO took part in the Armed Forces Day Test. W1DAL made DXCC. WA1FHU worked UG6JJ for his 150 country. WA1CRA is on 20 c.w. with his new Eico 753. W1AEC had an auction. Raytheon hams have four nets on for ragchewing and traffic on 3960, 14,325, 21,380 and 28,800. W1MOJ is in charge of this. The one on 14,325 is used for traffic back home for workers out on Kwajalein and Meck Islands. W1MX now has a skeleton crew but K3QDD says they have two 1RN skeds and one EAN. They also have a new v.h.f. room. K1WVW is on the 6-Meter Cross Band Net. K1ZCU is going to Lowell Tech. this summer. New YL hams: WA1ILP, WA1ILM, WA1ILR, WA1JMK, WA1JNH, WN1JOX, WA1JQE, WN1JQP, WN1JSK and WA1-JSZ. WA1JKL is the call of the Bridgewater-Raynham HS RC in Bridgewater. Traffic: (June) W1PEX 412, WA1EYY 387, W1OJM 281, W1DOM 225, WA1FAD 219, K1CLM 154, W1EMG 139, W2DKD 120, WA1FSI 94, W1MX 83, W1CTR 54, W1DAL 45, WA1FHU 41, WA1-DEC 27, WA1DPX 26, WA1HHK 26, WA1DED 21, W1AOG 14, WA1AJN 12, W1CT 12, W1QFO 11, K1OKE 10, W1AEC 1, W1LE 1. (May) W1SMO 50.

MASSACHUSETTS QSO PARTY

October 5-6

All amateurs are invited to participate in the fourth Massachusetts QSO Party, sponsored by the M.I.T. Radio Society, W1MX.

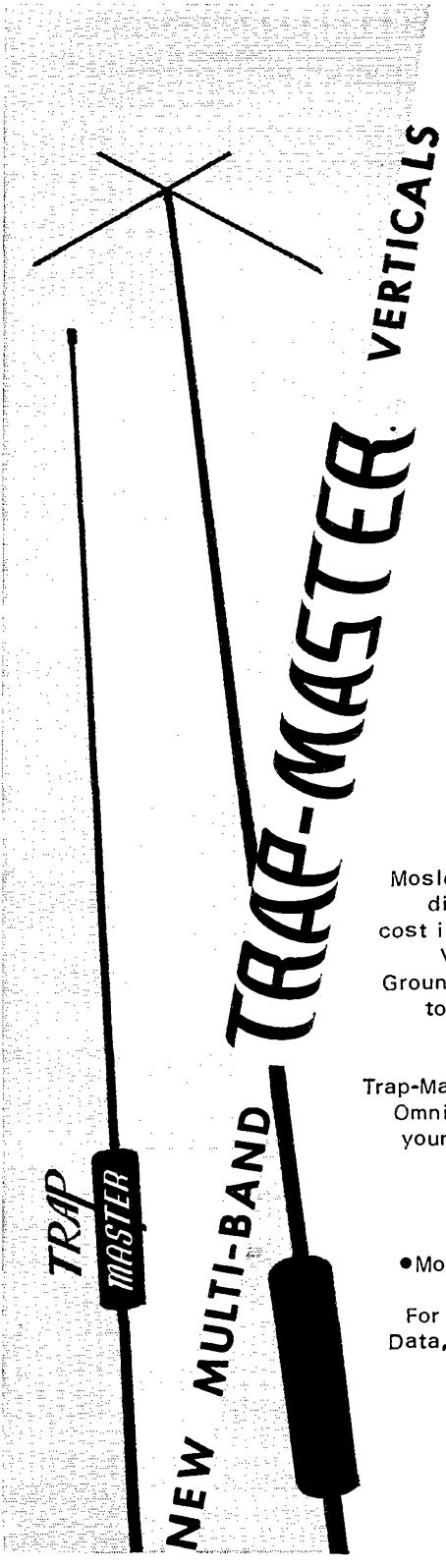
Rules: (1) Party will begin at 2300 GMT on Sat., Oct. 5, 1968, and will end at 0500 GMT on Mon., October 7. There are no time restrictions. (2) A station may be contacted only once per band. Each phone and c.w. segment shall be considered a separate band. Crossband contacts are not allowed. (3) The general call will be "CQ MASS"; and Massachusetts stations will identify themselves by signing "DE MASS" followed by their call. (4) Each exchange shall consist of: a QSO number, RS(T), and county (for Massachusetts stations), state or province. (5) Logs should show: date and time of contact in GMT, station worked, signal report sent and received, QSO numbers sent and received, county, state or province, frequency and type of emission. A multiplier counts *once* in the contest regardless of band. Foreign stations count for QSOs with Massachusetts, but not for multipliers.

Scoring: (6) Count one point for each report received and one point for each report sent and confirmed, for a total of two points for each completed exchange. Massachusetts stations multiply the number of QSO points by the number of different states and Canadian provinces worked to determine TOTAL score. Outside stations multiply the number of QSO points by the number of different Massachusetts counties worked (maximum of 14) to determine TOTAL score.

Awards: (8) Certificates will be awarded to state, province and county winners at the discretion of the Contest Committee. (9) All logs must be postmarked by November 4, 1968, and mailed to: M.I.T. Radio Society, W1MX, Box 558, 3 Ames Street, Cambridge, Mass. 02139. Include an s.a.s.c. to receive contest results. A valid entry must include a signed statement that the operator observed all regulations of his country. Decisions of the Contest Committee are final. Logs cannot be returned.

Suggested Frequencies: C.w. 3560 7060 14060 21,060, 28,060. S.s.b.: 3960 7220 14,290 21,410. Novices: 3735 7175 21,110.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1CLF. RM: W1BJG. PAM: WA1FLG. Traffic nets: Sea Gull Net meets Mon. through Sat. at 1900 on 3940 kc.; Pine Tree Net meets daily on 3596 kc. c.w. at 1900. WA1FCM is helping with liaison to the PTN with



Great Things are Happening with Verticals at Mosley

- All New 3 and 5 Band Operation
- Improved 4-Band Performance
- New Simplified Ground Mount
- Versatile Ground or Roof-Top Installation

Mosley's World-Renowned TRAP-MASTER traps offer a new dimension in Vertical Performance . . . plus easy, low cost installation. Three New RV-Series Verticals with the Versatility of Six! New design — from the Simplified Ground Mount (no longer is a concrete footing necessary) to the addition of a 'Top Hat' where it counts most for a low, low angle of roof-top radiation.

Trap-Master Verticals will take you places . . . Outstanding Omni-Directional Radiation — Top DX-Ability. Whatever your needs, Mosley has a New RV-Vertical designed and engineered to give you a real 5-9 signal.

- Model RV-3C for 10, 15, and 20 Meter Bands
- Model RV-4C for 10, 15, 20, and 40 Meter Bands
- Model RV-5C for 10, 15, 20, 40, and 75/80 Meter Bands

For detailed Brochure on Specifications and Performance Data, see your nearest authorized Mosley dealer, or write factory direct: Dept. 170

Mosley Electronics, Inc. 4610 N. Lindbergh Blvd., Bridgeton, Mo. 63042

traffic. He surely is a welcome addition to Duff and the boys. W1BJG, W1GU and K1TZH are the old faithful three down on the PTN. Traffic: W1BJG 387, WA1FCM 36.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1-SWX/K1DSA—SEC: K1QES. PAM: K1APQ. RM: K1-BCS. The NHEPN meets at 0000Z on 3945 kc. Sat. night. The NHVTN is on 3685 kc. at 2330Z Mon. through Fri. WA1IIH is now ORS and received his VTNHN certificate. Heard on 6 meters: W1ALE, K1-DWK, K1EEH, K1HFW and WA1FSZ. Heard on 2 meters: W1BXM and K1GQH. Welcome to new hams in N.H.: WA1JNF, WA1JPR, WA1JQL, WA1JQY, WA1-JQZ, WA1JRI, WA1JRO, WA1JRQ, WA1JRU, WA1JRV, WA1JRW, WA1JRW, WA1JRX, WA1JRY, WA1JRZ, WA1JSA, WA1JSB, WA1JSC, WA1JSD, WN1JJU, WN1-JKO, WN1JOP, WN1JOZ, WN1JPA, WN1JPB and WN1JPY. K1QES reports 115 check-ins for NHEPN, 175 for MVAREC and 5 sessions of the Belknap County AREC Net. The latter is the only active net in northern N.H. K1WKP/K1QLZ is now Extra Class. XE1BN needs N.H. for WAS. Look for him on 20 c.w. or phone around 1200Z. K1PSR is building a new rig with a 4CX250B for 432 Mc. plus a Varactor diode doubler. K1UZG reports 66 check-ins and 63 traffic for VTNHN. K1PSR worked 18 stations and 6 sections on 220 Mc. in the recent V.H.F. Test. K1BWB/1 operated Field Day with the following operators: W1JNC, W1SHJ, WA1ERG, WA1FNQ, WA1CBP, WN1JEA, K1BWB, WN1JDZ and WN1JKO. W1YWC and his XYL have a new addition to the family. Traffic: (June) K1QES 3. (May) K1QES 11.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. RISPN report: 30 sessions, 387 QNI, 71 traffic. The following clubs sent reports to the SCM on Field Day: W1SYE/1, K1NQG/1, W1AQ/1 and W1OP/1. The W1AQ Club of Rumford had a very successful Field Day in Lincoln, R.I. FD chairman K1AMG was pleased the preparations made in advance were successful and the stations were in operation in a minimum of time. K1LXQ and his committee did a fine job of preparing the food with the able assistance of W1FNH, who cooked the chicken, and W1WAC, who carried the ice. The antenna committee included K1-HMO, K1CBO, K1PEL, K1CZD, K1AGA and WA1s HXN, ICO, ICR, IOZ, ICQ and IIM. RM W1BTV is interested in all c.w. operators who would be willing to participate in the C.W. Net. He is located at 66 Victory Street in Cranston, R.I. The SCM is interested in club news for *QST*, so if you have any drop him a line. Traffic: W1BTV 117, W1TXL 79, K1YEV 50, WA1-CSO 31, K1VYC 31, WA1EEJ 30, K1TPK 13.

VERMONT—SCM, E. Reginald Murray, K1MPN—

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*Mgr.*
Gr. Mt.	3855	2130Z	M-S			W1VMC
Vt. Fone	3855	1300Z	Sun.			W1UCL
VTNH	3685	2230Z	M-F (May)	66	63	K1UZG
VTCD	3990½	1400Z	Sun.	34	4	W1AD
Carrier	3855	1200Z	M-F	167	—	W1KKD
VTSB	3909	2130Z	M-S	608	44	W1CBW
		1230Z	Sun.			

Welcome to new Novices WN1JKQ (Burlington), WN1-JLG (Richford), WN1JOB (Rutland), WN1JOG (Irasburg) and congrats to new Conditional WA1JMA (Averill). WA1GKS, in Rutland, recently worked the South Pole on 80-meter mobile. K1NEI had a good showing in the YL-OM Contest. WA1GUV is in the service. K1YZK has a seeing eye dog. Traffic: (June) K1BQB 239, W1MRW 22, K1MPN 19, W1FRT 9, WA1-GUV 8, WA1GKS 7, W1FS 2. (May) W1FRT 47, K1UZG 19, WA1GUV 8.

WESTERN MASSACHUSETTS—SCM, Norman P. Forest, W1STR—RM: W1DWA. Total traffic 88, number of sessions 26. Attendance in order of activity is K1-WZY, W1DVW, W1ZPB, W1BVR, W1STR, WA1ABW, K1AEC, W1MNG, WA1ISJ, K1IJV, WA1DNB, W1AMI, K1GOS. Montachusetts announces a new slate of officers: K1YLU, pres.; W1IPZ, 1st vice-pres.; W1-VBT, 2nd vice-pres.; WA1ACR, secy.-treas. W1QKX was chairman of the Field Day activity at the HARE site in Ashburnham. W1IDS retires to Florida. K1LYU will start working on his Master's Degree. The HARE group is pushing homebrew with emphasis on 432 and 1296 Mc. Hampden County Radio Assn. has a new list of officers: K1LDT, pres.; K1ANF, vice-pres.; WA1DNB, secy.; K1EFH, tres.; WA1GOK, K1WVX, WA1IUL, W1LJQ, WA1FKE, K1BZM, W1IUB and K1-WXU, directors. The VARC had K1ZQB for its July 14 club picnic. Congratulations to Chet Pieda, now WN1JRT, and his son who passed the Novice Class exam during Field Day which was given by WA1DCH.

You can earn more money if you get a Government FCC License

...and here's our famous CIE Warranty that you will get your License if you study with us at home

NOT SATISFIED with your present income? The most practical thing you can do about it is add to your Electronics know-how, pass the FCC exam and get your Government License.

The demand for licensed men is enormous. Today there are over a million licensed broadcast installations and mobile transmitters on the air, and the number is growing constantly. And according to Federal Law, no one is permitted to operate or service such equipment without a Government FCC License or without being under the direct supervision of a licensed operator.

This has resulted in a gold mine of new business for licensed service technicians. A typical mobile radio service contract pays an average of about $100 a month. It's possible for one trained technician to maintain eight to ten such mobile systems. Some men cover as many as fifteen systems, each with perhaps a dozen units.

Opportunities in Plants

And there are other exciting opportunities in the aerospace industry, electronics manufacturing, telephone companies, and plants operated by electronic automation. Inside industrial plants like these, it's the licensed technician who is always considered first for promotion and in-plant training programs. The reason is simple. Passing the Federal Government's FCC exam and getting your License is widely accepted proof that you know the fundamentals of Electronics.

So why doesn't everybody who "tinkers" with electronic components get an FCC License and start cleaning up?

The answer: it's not that simple. The Government's licensing exam is tough. In fact, an average of two out of every three men who take the FCC exam fail.

There is one way, however, of being pretty certain that you will pass the FCC exam. That's to take one of the FCC home study courses offered by the Cleveland Institute of Electronics.

CIE courses are so effective that better than 9 out of every 10 CIE graduates who take the exam pass it. That's why we can afford to back our courses with the iron-clad Warranty shown above: you get your FCC License or your money back.

Mail Coupon for Two Free Books

Want to know more? Send the coupon below for free copies of our school catalog, "How To Succeed In Electronics," describing opportunities in Electronics, together with our special booklet, "How To Get A Commercial FCC License." If coupon has been removed, just send your name and address to us.

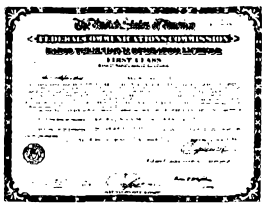
ENROLL UNDER NEW G.I. BILL
All CIE courses are available under the new G.I. Bill. If you served on active duty since January 31, 1955, or are in service now, check box in coupon for G.I. Bill information.

Cleveland Institute of Electronics

WARRANTY

OF SUCCESS IN OBTAINING A GOVERNMENT FCC LICENSE

A Cleveland Institute of Electronics FCC License course will quickly prepare you for a Government FCC License. If you don't pass the FCC exam after completing your course, CIE will refund all your tuition. You get an FCC License...or your money back!



Matt Stuczynski, Senior Transmitter Operator, Radio Station WBOE: "I give CIE credit for my First Class Commercial FCC License. Even though I had only six weeks of high school algebra, CIE's lessons made Electronics easy. I now have a good job in studio operation, transmitting, proof of performance, equipment servicing...and am on my way up."

Thomas E. Miller, Jr., Engineer, Indiana Bell Telephone Company: "I completed my CIE course and passed my FCC exam while in the Navy. On my discharge, I was swamped with job offers from all over the country. My only problem was to pick the best one, and I did—engineer with Indiana Bell Telephone. CIE made the difference between just a job and a management position."

CIE Cleveland Institute of Electronics
1776 East 17th Street, Cleveland, Ohio 44114

Cleveland Institute of Electronics
1776 E. 17th St., Cleveland, Ohio 44114

Please send me without cost or obligation:

1. Your 40-page book "How To Succeed In Electronics" describing the job opportunities in Electronics today and how your courses can prepare me for them.
2. Your book "How To Get A Commercial FCC License."

Name _____ Age _____
(Please Print)

Address _____

City _____

State _____ Zip _____

☐ **Check here for G.I. Bill information**

Accredited Member National Home Study Council
A Leader in Electronics Training...Since 1934

QT-68

K1KDP has a new linear amplifier. His DX count is now 245 worked. W1ZPB's Mt. Hermon Club now has a Model 19 RTTY working. Also, a new Heathkit tube tester working. Endorsement: W1BVR and W1ZPB as ORSs. The HCRAI had 24 at the June Field Day exercise with a total score of 6192. CMARAI has a couple of nets going, Sunday morning on 50.7 at 10 A.M. and on 28.690 Mc. at 7:30 P.M. Fri. local time. W1WNN is acquiring f.m. units for the new stations interested in transceivers at modest cost. If interested check with K1WNN. Traffic: W1EOB 180, W1DVW 52, K1WZY 52, W1STR 39, W1ZPB 34, K1AEC 29, W1DWA 27, WA1-ABW 21.

NORTHWESTERN DIVISION

ALASKA—SCM, Albert F. Weber, KL7AEQ—KL7-FLS reports she kept a two-week nightly sked with Tom Nash's Mt. McKinley climbing party, *reporting* its progress to W7ULR and W7HLF. The NARC had a ball on Field Day, but had to disqualify itself because of a mixup in converting to GMT. The Arctic Club spend FD doing its usual shepherding job on the Yukon 800 Boat Race. The class for new hams in the Fairbanks area will be getting under way as soon as school takes up again and it looks like the hard core will be about 80 CBers, plus. The cooperation between the hams and CB operators is starting to pay off. To date about 20 of them have taken the step. Now that everybody in Fairbanks is moving to the tops of hills, KL7FKX is abandoning his hilltop and moving into the flats. Traffic: KL7CAH 82, KL7FLS 22, KL7FRZ 13.

IDAHO—SCM, Donald A. Crisp, W7ZNN—SEC: K7-HTX. The FARM Net convenes on 3935 kc. week days at 0200 GMT. The Idaho C.D. Net convenes week days at 1415 GMT on 3991 kc. K7KBX reports good results from several all-band "V" beams which give all-direction coverage. K7KBX has a new 2-meter f.m. installation. K7QKA is moving to Portland, Ore. W7JFA was admitted to the hospital. W7IY is recovering after a stint in the hospital. The Lewiston-Clarkston Club set up three stations at Winchester Park for Field Day. The club has a potluck dinner afterwards. The Sandpoint Club also participated in Field Day. W7IUO has been appointed EC for Franklin County. WA7BDD earned her third BPL award *in about a year's time.* FARM Net report for June: 20 sessions, 592 check-ins, 110 traffic handled. Traffic: WA7BDD 257, K7OAB 8, W7ZNN 7, K7CSL 2.

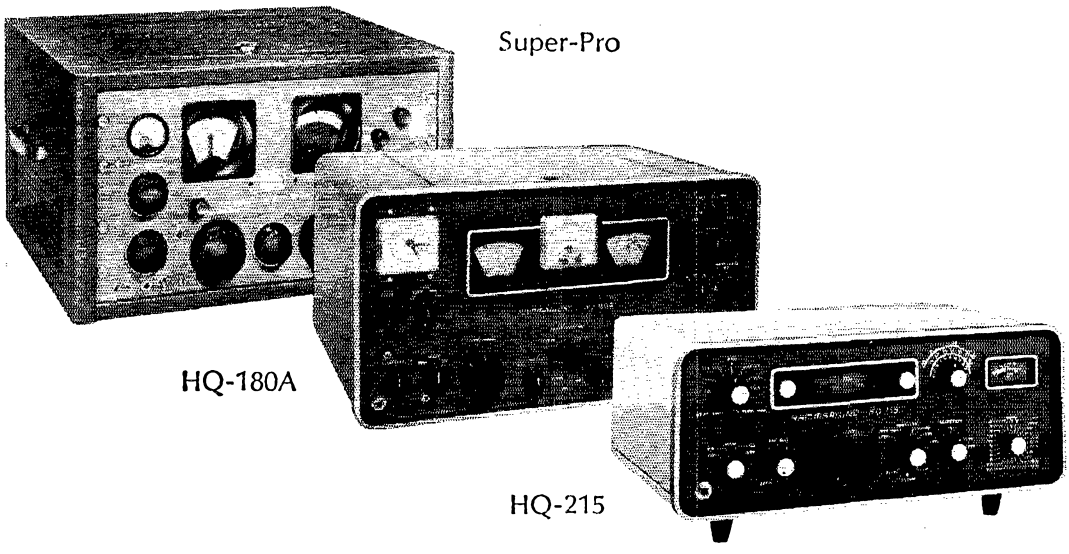
MONTANA—SCM, Joseph A. D'Arcy, W7TYN—SEC: W7RZY. PAM: W7ROE. RM: WA7DMA.

Montana Traffic Net	3910 kc.	0100	M-F
Montana PON	3950 kc.	1515	Sun.
Montana RACES	3996.5 kc.	1600	1-3 Sun.
Missoula area Section Net.	3890 kc.	1600	Sun.
Montana Section Net	3950 kc.	1700	Sun.

Appointments: W7EKB. Endorsements: K7SVR, W7-JRG. Please check your certificates and make certain they are current. The following amateurs earned Degrees from Montana State University at Bozeman: WA7AZN, WA7BAT, K7EGC, WA7EHD, K7HOS, K7JBH and K7SMT. Field Day stations on in the state of Montana were W7ED, WA0ATY/7, K1AII/7, W7FO/7, K7ECA/7, W7EKB/7 and K7EOG/7. W7AST, of Hamilton, is now W7KE. W7JRG's final score in the V.H.F. Contest was 117 contacts in 23 sections for a score of 2691. WØEYE has heard Ken's signals on 220 Mc. via aurora contacts which have been made with WØEYE on 432 and 144 Mc. An auction was held down in Billings at the Yellowstone Radio Club. W7RZY and K7CHA have just returned from a trip around the Western U.S. They attended the YLRL Convention in Denver. The Butte Amateur Radio Club has been doing the ground work and collecting data to install a 2-meter repeater in the Butte area. Traffic: W7EKB 47, W7EGJ 46, W7LBK 26, K7PWY 22.

OREGON—SCM, Dale T. Justice, K7WWR—RM: W7ZFH. PAM: K7RQZ. Section net reports: W7ZFH reports for the OSN for June, sessions 21, traffic 40, check-ins 104. WA7AHW reports for the AREC Net, sessions 30, maximum number of counties 18, traffic 51, contacts 91, QSTs 2, check-ins 825. Field Day reports: K7LIX operated from Serpentine Point near Grants Pass with five operators. K7WWR operated from Bald Peak State Park with three operators. K7CCH operated from Bandon State Park with six operators. K7CBP operated from Hell for Long Flat near Klamath Falls with nine operators, all AREC members. W7OTV operated from Skyline near Portland with three AREC operators. W7SAA operated from Jory Park near Salem with fifteen operators, one AREC member. WA7FTN ran 185 Telephone relays from S. E. Asia on the MARS circuits. WA7BYP has his big rig on the air.

Super-Pro & Sons



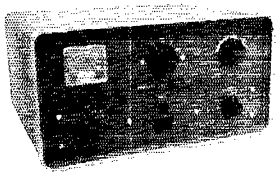
Ask a commercial radio operator—*he knows* the Super-Pro! Ask a military communicator—*he knows* the Super-Pro! Ask a ham—*he knows* the Super-Pro! Continuously updated, the Super-Pro is still a standard for commercial communications world wide!

In the best Super-Pro tradition, all Hammarlund receivers offer you the same high standards of performance and quality!

The *all new solid state* HQ-215 Receiver is setting records of performance unmatched by radios costing many dollars more! The HQ-180A and HQ-145A Receivers are tops in their price range and give you high sensitivity with your choice of selectivity—from 540 khz to 30 mhz.

The HQ-110A and VHF models are the only receivers you can operate from 160 through 2 meters with everything built in!

Feature-full, the improved HX-50A Transmitter permits novice and extra class alike, unmatched operating versatility!



The HXL-ONE 2000 watt PIP Linear Amplifier is not called "Big Mouth" by its owners without good reason!

Hammarlund equipment is built by the people who man our military production lines—with a heritage beginning in 1910.

So if it carries the name of Hammarlund —it's got to be ~~good~~. GREAT!

Send for full specifications—we'll happily tell you how to "Ham" with Hammarlund!

THE HAMMARLUND MANUFACTURING COMPANY, INCORPORATED

A subsidiary of Electronic Assistance Corporation

MARS HILL, NORTH CAROLINA 28754

Also he is NCS on RN7 again. K7BPR is now Extra Class and K7RFO (his XYL) is Advanced Class. WN7-KDU is a new Novice in Eugene. Coos County Novices WN7JAU, WN7JAV and WN7JAW are ready for their General Class exams. WA7BYD has his Advanced Class ticket. W7ADF took in the National Convention at San Antonio and the Hemistair. WA7IBC is working in Northern California and gets on s.s.b. when the work load allows. Traffic: (June) K7RQZ 641, WA7BYP 148, WA7EXH 115, W7ZFH 97, K7OUF 81, K7USZ 48, WA7-HKV 40, WA7DOX 21, WA7AHW 20, K7WWR 20, K7-RFO 18, W7DEM 15, W7MLJ 7. (May) WA7EXH 17, WA7DOX 8.

WASHINGTON STATE QSO PARTY

Sept. 7-9, 1968

The third annual Washington State QSO Party sponsored by the Boeing Employees' Amateur Radio Society, K7NWS, will be on the final weekend of the Washington State Amateur Radio Week, and will start at 2300 GMT September 7, and end at 0500 GMT September 9, 1968. All amateurs are invited to participate.

All bands may be used, c.w. and phone (phone classified as both a.m. and s.s.b). Stations may be worked once each band and each mode. Washington stations score one point for each contact (including contacts with other Washington stations). All others score two points for each contact with a Washington station. Washington stations multiply total QSO points by number of different states. Canadian Provinces and countries worked. All others multiply total QSO points by the total of different Washington counties worked. Washington stations send QSO number, RS(T) and county. All others send QSO number, RS(T) and state province or country. General call "CQ WASH" Washington c.w. stations should identify themselves by signing de (call) WASH K. Phone say "Washington calling". Certificates will be awarded to the highest scoring station in each state, province, country and Washington county. Worked Five Bears certificates are also available to anyone working five club members before, during or after the QSO Party. Working club station, K7NWS, will provide gold seal endorsement sticker for either certificate. Suggested frequencies: c.w. 3560 7060 14060 21060 28100; a.m. 3990 7260 14230 21310 28600, s.s.b. 3960 7220 14290 21290 28700, Novices 3735 7175 21110. Logs must show dates, times in GMT, stations worked, exchanges sent and received, bands and modes used, and scores claimed. Each entry must include a signed statement that the decisions of the contest committee will be accepted as final. No logs can be returned. Log sheets and scores must be postmarked no later than October 5, 1968 and sent to: Boeing Employee's Amateur Radio Society in care of Contest Chairman Willis Propst, K7RSB, 18415 38th Avenue South, Seattle, Washington 98188.

WASHINGTON—SCM, William R. Watson, W7BQ—SEC: W7UWT. RM: K7CTP. PAM: W7BUN.

WSN	3590 kc.	Daily	0145Z	QNI	309	QTC 623	Sess. 29
NTN	3970 kc.	Daily	1830Z	QNI	750	QTC 345	Sess. 30
WARTS	3970 kc.	Daily	0100Z	QNI	451	QTC 118	Sess. 11
NSN	3700 kc.	Daily	0300Z	QNI	273	QTC 121	Sess. 30

Sept. activities include Amateur Radio Week Sept. 1-8, the Washington QSO Party Sept. 7-8 and the Walla Walla Hamfest Sept. 22 at Jefferson Park. SCM W7BQ attended the QCWA Annual Meeting in Tacoma and addressed the group. SEC W7UWT sent in an FB semi-annual report of 20 active ECs in the reorganized AREC. Reports of 3 rescue assists were reported from the AREC. WA7EYN and WA7HSJ made the BPL column. WA7ICA is going regularly with servicemen traffic from SEATAC Airport. W7AXT is filling OBS requirements for the QCWA in Northwest. New appointment: WA7EYN as ORS. The Skagit Club is well into its summer camping activities by groups with many diversified campers and trailers, with ham gear of course. W7BUN took over the publication of the *Parasite* again. The Richland Club assisted in the Atomic Cup Races July 13-14. A newly-revised list shows 30 affiliated Clubs. The Lower Columbia AR Assn. and the Skagit ARC were recorded as 100% membership clubs on the Honor Roll. Because of change of plans the Northwest Technical Net will reconvene Sun., Sept. 14 at 4 P.M. PDST with amateur

BE CAREFUL, IT'S LOADED

New 500-Watt 5-Bander from NRCI only $399.95

For $399.95, you can't buy a more potent package than the new NRCI NCX-500 transceiver. This versatile 5-bander is packed with the performance extras that give you the sharpest signal on the band, plus an enviable collection of QSL's. Check it out!

- 500-Watt PEP input on SSB, grid-block keying on CW and compatible AM operation.
- Receive vernier, with tuning range greater than ± 3kHz.
- Separate product and AM detection.
- Sidetone monitor, plus built-in code practice oscillator.
- Generous overlap for adjacent-channel MARS coverage.
- Fast-attack slow-release AGC in all modes.
- Rugged heavy-duty 6LQ6's.
- Crystal-controlled pre-mixing with single VFO for effective frequency stability, plus identical calibration rate on all bands.
- Crystal lattice filter for high sideband suppression on transmit, and rejection of adjacent-channel QRM on receive . . . plus solid-state balanced modulator for "set-and-forget" carrier suppression.
- Universal mobile mount included.

AC-500 Power Supply— $95 **Great things are happening at NRCI**

NATIONAL RADIO COMPANY, INC.
NRCI
37 Washington St., Melrose, Mass. 02176
617-662-7700 TWX: 617-665-5032

Extra material, and will shift to 3 P.M. local time when the long skip starts in later. A reminder to club station trustees: After Nov. 22 the club station can only operate on the band segments consistent with the type of license held by the trustee plus band segments consistent with class of license held by the operator. The rank of LOs has risen to 54 with increases in all types *of appointments.* K7SSJ is working DX on 20. Among the many new Generals are WA7IUT and WA7-HDZ. WSN reports a good month of traffic activity. Operation of PAN on 40 meters has built up 40-meter requirements for RN7 traffic stations heretofore only concerned with 80. Traffic: W7BA 3095, WA7DXI 1332, WA7EYN 568, WA7HSJ 528, W7ZIW 519, W7KZ 318, W7AXT 274, W7PI 254, WA7ICA 244, K7CTP 162, W7BQ 139, WA7DZL 136, W7IEU 105, WA7HKR 90, WA7EDQ 67, W7BTB 62, W7MCW 59, W7GYF 53, WA7ACQ 47, WA7HMC 45, W7OEB 37, K7TCY 36, WA7BDB 30, W7-FHN 29, WA7BMA 28, K7KPA 27, K7EFB 22, W7BUN 20, W7APS 19, W7IKG 18, W7AIB 16, K7SUX 9, W7JHR 8, K7REK 8, W7ZHZ 3, WA7CYY 7, W7HMA 6, WA7-ILC 6, K7MGA 5, K7OXL 5, W7EXM 3.

PACIFIC DIVISION

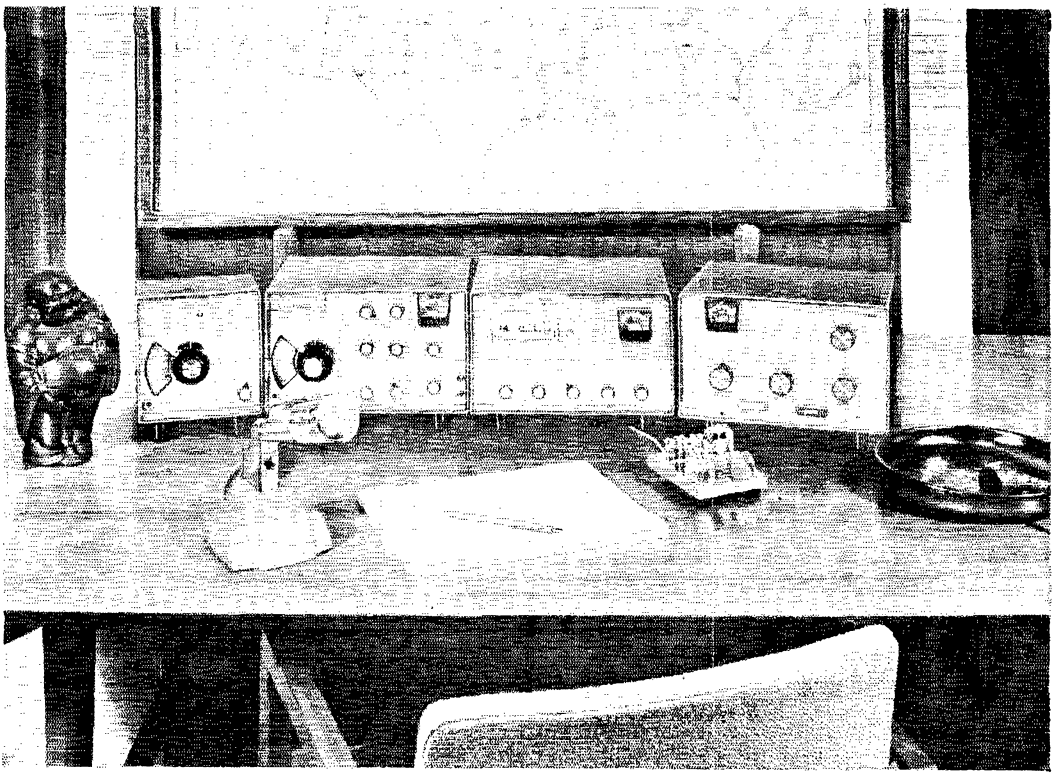
EAST BAY—SCM, Richard Wilson, K6LRN—The new address of your SCM is 629 Blue Ridge Dr., Martinez, Ca. 94553. W6WFR was killed July 6 in an auto accident. Vic will be missed by all. *WB6DHH* passed the Advanced Class exam. The Mount Diablo ARC operated from Mt. Diablo lower parking lot and made over 11,000 points. Field Day messages were received from the SARO/W6AEX, the Hayward RC/-K6EAG, the MDARC/W6CX and from Art, VE2-AQV/W6. W6ZF still is sending the Pacific Division bulletin the 2nd and 4th Mon. at 0400Z (8 P.M. DST) on 3540 kc. Traffic: (June) K6LRN 7. (Apr.) W6ZF 5.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: KH6-GHZ. PAM: W4UAF/KH6. V.H.F. PAM: KH6EEM. RM: Vacant. RACES Nets (40, 10, 6 and 2 meters) coordinate with KH6AIN.

Net	*Freq.*	*Time (GMT)*	*Days*
League Appointees	7.290 Mc.	0700Z	Wed.
Friendly Net	7.290 Mc.	2030Z	M-F
Pacific Interisland Net	14.330 Mc.	0830Z	M-W-F

May I extend a warm welcome to our new appointee, W4UAF/KH6. The Honolulu ARC newsletter has many new features, many columns and more pages. For interesting reading catch WH6WOW's letters to the editor. KH6AD, ex-KH6GEW, W6EDG. KH6AD recently returned from a trip to see his new grandson on the Mainland. W5QFO/KH6, ex-K2UQZ, ex-K3VMV and ex-W5QFO Corpus Christi, reports that activity is stirring around KH6AHQ, the Barbers Point Club station. W4UAF/KH6 reports that his daughter Maureen was accepted and has left for the U.S. Navy Officer's Candidate School at Newport, R.I. KH6CXP reports the Honolulu ARC did real well with 23 operators in the five transmitter class on Field Day. One of those operating positions was on the 40 and 15 Novice bands. KH6AX continues to handle teletype traffic from out near XV5-Land. Congratulations to KH6IJ on winning the ARRL DX Contest from Oceania. He was signing KA2IJ from near Fuchu AS this past summer. Let's hear from all of you. My address is on page 6 of any *QST*. Traffic: (June) KH6BZF 26, KH6IWO 5, W5-VZO/KH6 1, KH6ETG 1, KH6RS 1. (Apr.) KG6IC 39.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU, WA7BJA, NCS of the Nevada Emergency Net on 3996.5 kc., is doing an FB job Mon. and Thus. at 1900 local time. The NARA held its Annual Installation of Club Officer's Dinner with W7THH as MC; *HH2PRR, pres.*; WA7EGW, *vice-pres.*; K7NKF, secy.; W7CP, treas.; WN7GHQ, sgt. at arms. WA7ESM, K7RKH and K7ZOK report successful contacts on v.h.f./u.h.f. operating from Utah and Arizona. NARS members were out in force on Field Day operating from Mt. Ophir. W7YRY is off the air temporarily updating his gear and ham shack. W7YKX, WA7ISA and WA7OJF report increasing activity on 6 meters. The Sierra Hamfest will be held at Bowers Mansion (near Reno) Aug. 24, with W7OYQ, chairman; HH2PR, W7THH, W7SKP, K7NKF and K7ZAU *committee members.* Lots of f.m. repeater activity is reported on K7UGT (Reno) and W7DDB (Las Vegas). W7PBV gave an FB report on his trip to the ARRL National Convention in San Antonio. For the SNARC Achievement Award certificate for working 25 Nevada amateurs, the mailing address P.O. Box 73, Boulder City, Nev. 89005. Traffic: K7NTU 414, WA7BEU 9, W7PBV 2, W7YDX 2.



The Distinguished Family of World Travelers

The experts know that matchless performance can only be achieved through matched components.

That's a sound principle to follow whether your interest is racing engines, golf, fishing or doing a better home laundry. It's an even more important criteria when you travel the world as an Amateur Radio Operator.

You travel the first class ticket when you go on the Galaxy line. Matched components, balanced and precision produced to perform as a perfect team. A team that will take you anywhere in the world...and bring the world to you.

We're Hams ourselves, so we know that's what you want from your equipment investment.

See the Galaxy line at your dealer's. If he doesn't have it, write us for one near you who does.

GALAXY ELECTRONICS

"Pacesetter in Amateur/Commercial Equipment Design"

10 South 34th Street • Dept. QST-m33 • Council Bluffs, Iowa 51501

3RD CALIFORNIA QSO PARTY

October 5-7
sponsored by
The North Hills Radio Club, K6IS

The contest starts at 2000 GMT Sat. Oct. 5 and ends at 0200 GMT Mon. Oct. 7, 1968. Use all bands, c.w. and phone. The same station may be worked only once per band, per mode. California stations send QSO number, RS(T) and county. Non-California stations send QSO number, RS(T) and ARRL section or DX country. W6 stations may work other W6 stations, but for QSO credit only. Non-W6 stations may work only California stations.

California stations multiply total QSOs by total ARRL sections and DX countries worked. Non-California stations multiply total QSOs by total California counties, a maximum of 58. Call CQ CF on c.w., and CQ California QSO Party on phone.

Suggested frequencies: 1910 3550 3725 3900 7075 7175 7220 14,075 14,270 21,075 21,125 21,370 28,075 and 28,700.

All logs must show date, time, band mode, stations worked, exchanged. All logs become the property of the NHRC and cannot be returned.

First place certificate to the winner in each ARRL section and DX country. In California, the top three winners will receive certificates. Additional awards may be made upon decision of the contest committee.

All entries must be postmarked no later than November 8, 1968, and mailed to John F. Minke III, WA6JDT, 6230 Rio Bonito Drive, Carmichael, California 95608. If results are desired, please include a large s.a.s.e. or s.a.e. and IRC.

Note the change from the 1967 rules. Your comments and suggestions are welcomed.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—ECs: WB6MXD, K6RHW, WB6RSY, W6SMU, WA6TQJ. RM: W6LNZ.

Net	*Freq.*	*Time*	*Days*	*Mgr. or NCS*
NCN	3630	0200Z	Daily	WB6HVA
NCN/2 (Slow-speed)	3630	0330Z	Daily	WB6YTX
Nevada Co. Slow	3749	0300Z	Fri.	K6RHW
SCEN	146.25	0500Z	Wed.	———
Yolo Co. CD	146.94	0200Z	Tue.	WA6TQJ

Please note that the above net information is GMT for both time and days. Field Day messages were received from the following: W6AF, W6AK, WB6OXD, WA6QGT, WA6TQJ and WB6VKK. W6WLI is now K6FO and W6ZJW is now K6GG. The Bay Area Hamfest will be held Oct. 19-20 at the Thunderbolt, south of the San Francisco airport. The California QSO Party, sponsored by the North Hills Radio Club, Fair Oaks, will be held Oct. 5-7. New officers of the North Hills Club are W6ZOH, pres.; WA6JDT, vice-pres. and secy.; and WA6PAB, treas. WB6MAE has gone s.s.b.! W6AF was on the air during the dedication of the Oroville Dam and will issue attractive QSLs to commemorate the event. Summer months are a bit slow as usual for amateur radio. Let's start this fall with a bang with the California QSO Party. Send your logs to WA6JDT. Traffic: W6LNZ 150, WB6YTX 60, WB6QZZ 29, WB6MAE 10, W6NKR 5, W6VUZ 1.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD—SEC: W6WLV. WB6UJO has stacked mono-bander 15-and 20-meter antennas looking for those rare ones. W6HST is home from the hospital and on the air again. The Field Day activities of the San Francisco Radio Club got plenty of publicity on Channel 5 TV. W6GGC, W6KVQ and W6JWF were at the Mission Trail Round-Up this year. W6KVQ was awarded the Moran Award for general excellence in activity on the Mission Trail Net during the last year. W6WLV still is pounding the brush for ECs and emergency activity. The Humboldt Radio Club made over 700 contacts from its Field Day activity. The Petaluma Radio Club hosted an Explorer Scout group at its Field Day activity. The Marin Club on San Pedro Ridge had its tents blown down during Sat. afternoon but kept right on going. WB6JQP is home for awhile and has his SB-101 going fine. W6UDL again is active on the Mission Trail Net. WA6AUD was elected secy-treas. of the Northern Calif. DX Club. The Petaluma Club meets Tue. at 8 P.M. at 28.6 Mc. A

The Latest Advance in Long Range Radio Communications

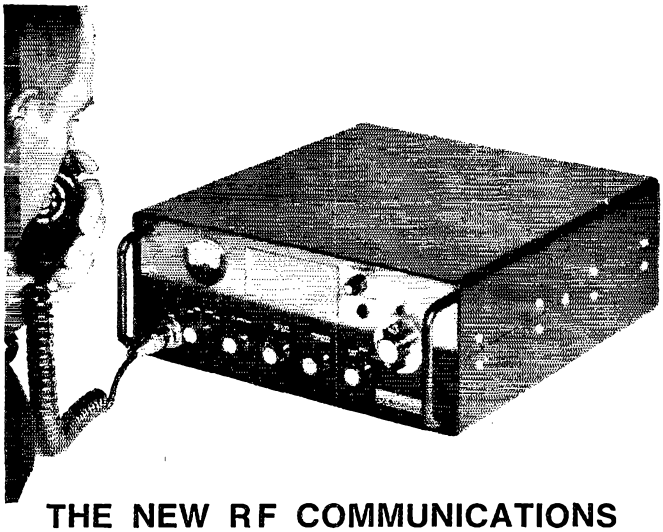
The Controller and Courier SSB Transceivers have been under development at R F Communications for almost three years. These are the first of an entirely new line of transistorized transceivers with many unique and advanced features.

The Controller and Courier are in the middle price range for Commercial Grade Equipment. Within the next few months, we will announce:

- The RF-201 Series Transceivers with higher CCS Power Rating, half duplex capability and greater accessory flexibility.
- A new line of specially designed MARINE SSB Transceivers with Full F.C.C. Type Acceptance.
- A line of equipment with D.O.T. Approval for use in Canada.
- A new line of Full Remote Control equipment with supervisory capability, for operation over standard telephone circuits.
- A universal Modular Line where the user specifies only the features needed.

R F Communications is a leader in the design and manufacture of advanced communications equipment. Shown below are some of our accomplishments during the past five years:

- We have supplied a greater number of military grade SSB Transceivers to military users than any other company.
- We have supplied a larger number of FCC Type Accepted SSB Transceivers to Commercial Marine Operators than any other company.
- And, we have introduced a larger number of new and unique SSB communications products than any other company.



THE NEW R F COMMUNICATIONS

Controller & Courier Series

BASE STATION AND VEHICULAR STATION

Single Sideband Transceivers

For Commercial, Government and Semi-Military Applications

The *Controller* Base Station and *Courier* Vehicular Station SSB Transceivers are the latest advance in equipment for Long Distance Radio Communications. These units from R F Communications offer features never before available in fixed channel SSB transceivers.

- Operation on up to TEN Preset Channels.
- Frequency Range of 2 to 30 Mc.
- Simple to Operate—Only Five Front Panel Controls.
- Fully Transistorized except for P.A.
- Smaller Size and Weight, 5 3/8 x 14 1/4 x 16 1/4 inches (13.6 x 36.2 x 41.2 CM) and 16 1/2 pounds (7.5 Kg), plus power supply.
- Full line of Built-in Accessories, including Remote Control, VOX, CW, Squelch, Noise Limiter, Phone Patch, etc.
- 100 Watts Power Output.
- Choice of Power Supplies, 115/230 Volts AC, 12 Volts or 24 Volt DC.
- Reliable and Dependable Operation under extremes of Temperature, Humidity, Shock and Vibration.
- Flexible Mounting Arrangements, Desk Top, Bulkhead, Shockmount, Mobile Cradle, Rack, etc.

Please write for details.

R F COMMUNICATIONS, INC.
1680 UNIVERSITY AVENUE—ROCHESTER, NEW YORK 14610

For employment opportunities, send your resume to the Personnel Director. An equal opportunity employer.

non-club group in Mendocino County, consisting of WA6QXV, W6IOI, W6CBR, K6RIN and WA6YRQ, operated Field Day from Mt. Sanhedrin deep in the Mendocino National Forest. Another non-club group operated on the Tiburon Peninsula with the call W6OZC/6. W6ZC has just returned from a trip to Europe. Lloyd and Iris Colvin attended the July meeting of the Marin Club, where a prolonged critique of Field Day activities highlighted the meeting. Old-timers W6GPB, W6ZC, W6KNZ, W6HVX and W6ADV meet monthly for luncheons. WA6BYZ made the BPL. W6KVQ's out-of-town travels kept his traffic count down. WA6JUV finished a night school course in calculus and tried to get back on the air only to find his beam had toppled. W6RQ sweated through a pile-up to work 8X8AA only to find he's a pirate. K6TWJ continues to represent the section on the Golden Bear Net. The check-ins on the San Francisco Section Net Mon. and Fri. at 1830 local time on 3900 kc. have picked up. VK3AVE/W6 put up a quad to work back to VK-Land but cannot get around the hill behind his QTH. Traffic: WA6BYZ 349, W6KVQ 129, W6WLV 115, WB6LFT 75, W6BWV 37, K6TZN 14, WA6AUD 13, WB6JQP 6, WA6QXV 3, W6UDL 3, W6CYO 1.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—The Bakersfield Radio Club held its FD at Round Mountain. The Fresno Radio Club, W6TO, was near Shaver Lake with 25 operators. The Turlock Radio Club had its FD near Sonora with 7 operators. The Tuolumne County Radio Club held its annual FD at Lake Alpine. The Delta Amateur Radio Club held FD at Manzanita Point with 7 operators. The Bakersfield Amateur Radio Club is working on a 2-meter f.m. repeater and is in the process of getting equipment. The repeater is to be at the site of Channel 17 in Bakersfield. K6APE is the one to contact on this project. WB6UYG won the Pacific Division V.H.F. SS. WA6NZI is heard on 15-meter s.s.b. The North Hills Radio Club, K6IS, is holding its 3rd Annual QSO Party starting at 2000 GMT Oct. 5 through 0200 GMT Oct. 7. All are urged to participate. Rules can be had from WA6JDT, 6230 Rio Bonito Dr., Carmichael, Calif. WN6FYH is a new ham in Bakersfield. The new officers of the Turlock Amateur Radio Club are K6SMZ, pres.; K6ZDE, vice-pres.; K6IXA, secy.; and WB6-MDN sgt. at arms. K6URK has a new kw. final on s.s.b. WB6ETQ is looking for a new QTH. WB6PEL is heard on 75-meter s.s.b. W6NKZ is vacationing at Shaver Lake with an SB-33. Traffic: W6ADB 371, WB6-HVA 299, WA6SCE 207, K6KOL 163, W6LRU 14, WN6-FYH 7.

SANTA CLARA VALLEY—SCM, Edward T. Turner, W6NVO—SEC: W6VZE. RM: W6LFA. ECs and AREC members should try to check into the Bay Area AREC Net on 3900 kc. at 1830. League appointees also can check in to pass information to other ECs. Join a local club. Write your SCM for a list of your clubs in your locality. Note that W6NVO is your new SCM. I would like to be put on the mailing list of club papers, including those of the many "company clubs" in this section. And, too, I would like to thank the many League appointees who have offered their congrats and/or condolences. And last, but not least, thanks to WB6IZF for carrying on as Acting SCM for nearly six months. W6BPT is moving back to the c.w. nets. K6DYX reports a new net on 10 meters at 7:30 P.M. local time on 28.650 with K6LY as NC. W6RSY continues his FB job on RN6 and PAN. W6DEF is QRL traffic nets, the Wx Net, e.d., MARS and others. W6-YHM is off to Alaska. W6RFF, now in his 29th year as ORS, works DX and traffic. K2AFQ is now W6IKW and still waiting for his equipment from N.J. W6YBV had a good traffic score. W6AUC is QRL on the nets and skeds 20 and 75. Congrats to W6EMIS, who was married June 8. W6CBX is QRL most modes and frequencies, ditto for MARS. W6VK is another retired work horse who does more than his share on the ham bands. WA6LFA is devoted to ham radio and golf. W6WX is on 2 meters and DX but is going to try to find time for traffic. The Westcars Svc. Net is holding up late into the evening despite QRM from the Mid-west and East Coast. New check-ins in this section are WB6NIN and WB6WVC. The 3rd Annual Calif. QSO Party is upcoming. Contact WA6JOT for details. The date is Oct. 5 through 7. Traffic: (June) W6RSY 1464, W6YBV 503, K6DYX 186, W6DEF 116, W6EMS 107, WA6LFA 97, W6VK 40, W6ZRJ 40, W6AUC 32, W6ACW 20, W6OII 14, W6RFF 10. (May) W6EMS 144. (Apr.) W6EMS 146.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4-BNU—Asst. SCM: James O. Pullman, W4VTR. SEC: WA4LWE. RM: K4CWZ. PAM: W4AJT. W.H.F. PAM: W4HJZ. The following clubs are known to have participated in Field Day exercises: Brightleaf ARC, Bun-

TOMORROW'S TRANSCEIVER TODAY BY YAESU

FTDX-400

Latest arrival on the American scene, Spectronics presents the FT dx 400. Yaesu engineers have looked into the future to provide the present day amateur with a complete station in one package.

The usual "accessories" are standard equipment in the FT dx 400. Features built-in power supply, dual calibrators — 100KC and 25KC, break in CW with sidetone, fully adjustable VOX system, four switch selected crystal controlled transmit channels in addition to VFO positions, and varactor controlled clarifier offers receiver offset tuning capability.

Remember, all these extras are included in this new imported transceiver. Check the specs and ask your local dealer for a demonstration dx trip with the FT dx 400.

$599.95 including power supply and all accessories except speaker.

SP-400 matching speaker **$14.95**

DEALER INQUIRIES INVITED

SPECIFICATIONS

FREQUENCY RANGE: 3.5-4Mc, 7-7.5Mc, 14-14.5Mc, 21-21.5Mc, 28-30Mc (3 more 500KC receiver bands can be added).
FREQUENCY STABILITY: Less than 100 c/s drift in any 30 minute period after warm up.
ANTENNA IMPEDANCE: 50 to 120 ohm unbalanced.
MAXIMUM INPUT: 500W P.E.P. SSB, 440W CW, 125W A.M.
CARRIER SUPPRESSION: —40db
SIDE BAND SUPPRESSION: —50db (at 1,000 c/s)
DISTORTION PRODUCT: Down at least 25db
AUDIO BANDWIDTH: 300-2,700 c/s
RECEIVING SENSITIVITY: 0.5uV,. S/N 20db (14Mc SSB)
SELECTIVITY: 2.3Kc (—6db), 3.7Kc (—55db)
IF AND IMAGE RATIO: More than 50db
AUDIO OUTPUT: 1 watt @ 5% distortion
OUTPUT IMPEDANCE: 8 ohm, 600 ohm
TUBES AND SEMICONDUCTORS: 18 tubes, 9 transistors and 33 diodes
POWER SOURCE: AC 117 volts, 50/60 c/s
DIMENSIONS: 15¾" wide x 6¼" high x 13¾" deep
WEIGHT: 50 Pounds

SPECTRONICS

BOX 356 • LOS ALAMITOS, CALIFORNIA 90720

combe County ARC, Rowan County ARS and Yadkin Valley ARC, plus WA4UXU and WB4DOO operating a one-transmitter portable station. There might have been others who didn't send reports. WA4FJM is now W4VTR. KØJFJ/4 says he will be in Elizabeth City for the next two and one-half years as Coast Guard Aviation electronics instructor and plans to stay active on c.w. nets NCN and 4RN. WA4VTV says he has finally sent in a DXCC application. New officers of the Buncombe County ARC are WA4VNV, pres.; WN4JMQ, vice-pres.; WB4ENP, secy.; W4DPF, treas. K5TTN is back on the air after having rig troubles for a while.

Net	*Freq.*	*Time*	*Days*	*QTC*	*Mgr.*
THEN	3923 kc.	0030Z	Daily	150	W4ZZC
NCN(E)	3573 kc.	2230Z	Daily	123	W4IRE
NCN(L)	3573 kc.	0200Z	Daily	82	WA4CFN

Traffic: W4EVN 218, W4FDV 107, K4YCL 77, W4VTR 53, WA4UQC 46, K4EO 44, WA4VNV 31, WA4GMC 29, WA4ZLK 28, W4ZZC 27, WA4AKX 23, WA4HCW 18, KØJFJ/4 16, W4BNU 15, WA4VTV 13, WA4RVI 5, WB4EFJ 4, WA4KWC 2.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: WA4ECJ. RM: K4LND. PAM: WB4BZA.

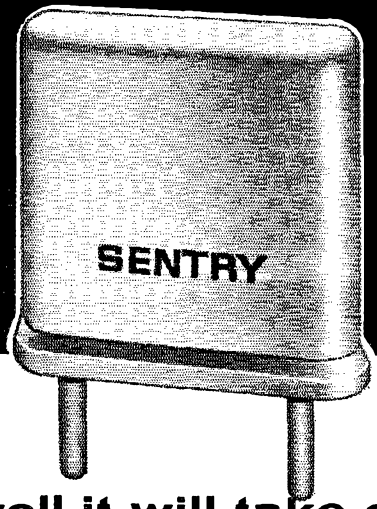
SCN	3795 kc.	2300Z/0200Z	June Tfc.: 74
SCSSBN	3915 kc.	2300Z	June Tfc.: 153

WA4EWX and W4KWH are new Extra Class holders in Spartanburg. W8PT/K4GL is back in Pickens and is a new OVS appointee. W4FVV reports that both local nets were activated in Anderson on May 12 when tornadoes were reported in two nearby communities. Thirteen stations were on the air in 20 minutes. WB4DXX, with a whopping 512 traffic count, makes BPL for the third time, winning the BPL medallion. Congratulations, Butch! Not many reports were received because of the shortness of time after the SCM election. Keep the news coming in and we'll fill our space each month! Traffic: (June) WB4DXX 512, W4PED 26, W4FVV 24, K4OCU 21, W4NTO 18, WA4HFA 11. (May) W4NTO 16.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. PAM: W4OKN. RMs: WA4EUL and K4MLC. WB4GTG made the BPL the hard way. WB4FDT got the HW-100 at the VFN Picnic. W4OKN has issued VSBN certificates to W4OUK, W4THV, WA4SJT and WB4GTG. New appointees are W4HU as OO and WB4FLT as ORS. Director W4KFC has been traveling the division visiting clubs, conventions and hamfests. TARC (Norfolk area) has been assigned the call W4NV in memory of the late holder of the same. WB4GTS now has mobile including 80-meter c.w. for netting. Virginia net frequencies: 3680, 3935, 3835 seven evenings per week. Traffic: (June) WB4GTG 529, W4UQ 214, WB4FDT 202, W4RHA 154, K4KNP 110, K4CG 101, WB4DRB 85, K4TSJ 80, K4MLC 76, WA4WJJ 64, WA4EUL 63, WA4SJT 62, W4OKN 53, WB4CVY 52, K4NDH 52, K4FSS 49, W4HE 47, WB4GAN/4 44, W4BZE 30, WA4FIJ 21, WA4PBG 21, WB4FLT 20, WA4JJF 20, W4ZM 15, W4IA 14, W4JXD 10, W4KFC 9, K4LMB 8, W4KX 7, W4HFH 6, W4MK 6, W4ZAU 5, W4HUW 4, WB4GTS 4, WN4HUE 3, W4TE 3. (May) K4MLC 27.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8EV. RMs: K8MYU, K8TPF. PAMs: W8IYD, K8CHW. Congratulations to WA8RQB on receiving the Amateur of the Year Award at the State Radio Convention, and to the Kanawha Radio Club on winning the Field Day Trophy. I regret to report the passing of W. Lee Williams, W8MIP, of Clarksburg. Elected at the WVN C.W. Net meeting at Jackson's Mill were K8MYU, net mgr., and WA8YOF, phone net mgr. W8WVM, WA8NDY and WA8WCK attended WA8QND's wedding in Columbus and, along with WA8YHJ, WA8YHL and K3ZPY/8, operated a station at the State Convention. W8DUV and W8DUW have new NCX-5s. Morgantown, Huntington, Charleston, Martinsburg, Bluefield, Oak Hill and Fairmont ARCs reported FD activity to the SCM. New stations in Fairmont are WN8BMY, WN8BMZ, WN8YWK, WN8AJJ, WN8BMX, WN8BMW, WN8AAT and WN8BMV. The WVN Phone Net reports 30 sessions, 704 stations and 133 messages. The C.W. Net reports 30 sessions and 75 messages. W1HKE, W4KFC and W4BPD attended the State Convention. Those taking top honors in the Code Contest were WA8CFJ, WA8KUW and W8HZA. The Roanoke Division Convention will be held in Greensboro, N.C., Sept. 28 and 29. Traffic: WA8POS 118, W8SQO 45, K8BIT 43, WA8RQB 43, WA8LFW 36, WA8CKN 31, WA8NDY 30, WA8YSB 23, W8JM 22, WA8WCK 17, WA8WIX 16, W8GUL 11, K8MQB 10, WA8WTR 10, W8EV 6, K8MYU 6, WA8YOF 6, W8AFN 5, W8DUV 4, W8IYD 4, W8WEJ 4, WA8KMZ 1, K8KZF 1, WA8MRI 1, K8NCV 1, WA8OND/8 1, WA8TLT 1, WA8UCB 1, WA8UNP 1, K8ZDY 1.

SO YOU WANT CRYSTALS FASTER!



24

HOUR DELIVERY ON ALL ORDERS OF TEN CRYSTALS OR LESS

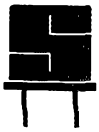
...well it will take someone with manufacturing *"know how"* to do it

But of more importance the crystal must be manufactured to Strict Specifications, have good activity and operate *"on frequency"* in the circuit for which it was ordered.

SENTRY can manufacture crystals for all two-way radio equipment: Commercial, Amateur, Aircraft, Military and Citizen Band. You need only to specify the model of set and channel frequency.

You don't believe it, when we say - *"Buy the Best"*?
You are satisfied with your present supplier?
You are satisfied with high prices?
You are satisfied with *"second best"*?
Until you try **SENTRY** you will never know!
Try Us! Make Us Prove It! *"Buy the Best"*

SEND FOR OUR CATALOG OF PRECISION QUARTZ CRYSTALS AND ELECTRONICS FOR THE COMMUNICATIONS INDUSTRY.
IT WILL COST YOU NOTHING!



SENTRY MANUFACTURING COMPANY

1634 Linwood Boulevard - Oklahoma City, Oklahoma 73106

PHONE: 405-232-1431

ROCKY MOUNTAIN DIVISION

NEW MEXICO—SCM, Kenneth D. Mills, W5WZK—Asst. SCM: Martin A. Petsonk, WA5MCX. SEC: W5PNY. PAMs: W5DMG, WA5FFL. RM: WA5FJK. Congratulations to K5CQH on receiving this year's section PICON award. Received FD messages from the following clubs: Albuquerque ARC-W5DRU, Manzano High School ARC-WA5RAA. W5YGR has a new crank-up tower. WA5FPS and K5PGI are mobile with TR-108s on 6 meters. WA5FPS has built a new mobile turnstile antenna and mount. Welcome to K5GSH on 50 Mc. with a new HA-460 transceiver. K5FXN has gone back to work after an extended illness. The Caravan Club ran communications for the B'nai B'rith Convention in Albuquerque during FD week end. W5ALR was appointed new EC for Bernalillo Co. New Mexicans seen during the Rocky Mtn. Convention were W5CK, W5NON, W5PQA and their XYLs. W5BWV visited Headquarters during his vacation in W1- and W2-Land. W4WNH works K5TQP regularly on 2 meters. Traffic: WA5MIY 26, W5MYM 25, W5DMG 24, WA5JNC 20, W5NON 5, WA5BLI 3, W5NUI 3, W5PNY 2.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF. RM: W7OCX. Traffic Nets:

BUN	Daily	7272 kc.	1830Z
UARN	Sat.-Sun.	3987.5 kc.	1400Z

Congratulations to Tom Miller, W7QWH, your new SCM. Tom certainly isn't a newcomer to ARRL agairs as he was SCM of Utah a few years back. The address of W7QWH is 3148 South 3360 East, Salt Lake City, Utah, 84109. As your SCM for the past two years, I would like to thank the appointees, club officers and others who helped the ARRL organization in Utah. I'm sure our new SCM would appreciate your help and comments in the coming months. OVS WA7IAW reports 6-meter openings almost daily, and needed states being worked. ORS W7EM has a new telegraphic keyboard mill for traffic-handling. Utah again was represented during Field Day. Most active clubs in the state reported FD activity. UCARC competition for first place in the 1A class will be very close this year. Traffic: W7EM 84, W7OCX 3.

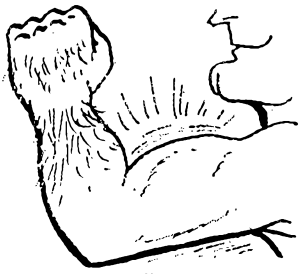
WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: K7NQX. RM: WA7CLF. PAMs: W7TZK, K7SLM. ORSs: K7SLM, K7NQX. Nets: Pony Express, Sun. at 0800 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 7260; WX Net, 0630 Mon. through Sat. on 3920. W7AEC is now out of the hospital. W7HEB has been experimenting with slow-scan TV. WA7BDI and OM vacationed in California. WA7BFV has been working portable from Jackson Hole. If you are interested in joining the Wyoming Mobile Club, write K7ITH. Osa is doing a fine job in organizing the first mobile club. By now the state hamfest is over and another fine job was handled by K7NKR. I want to thank you all for the vote of confidence in the recent election. If you have any suggestions, ideas, complaints or just plain news, please drop me a note. Traffic: K7NQX 234, WA8HDM/7 101, K7ITH 86, K7KSA 58, W7TZK 50, K7VWA 31, K7QJW 7, K7WRS 6, K7BTE 3.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: W5FPI. PAM: WA4EEC. RM: K4BSK. The North Alabama Hamfest, Huntsville, Ala. will be held Aug. 17 and 18 in The Mall. W4GRG advises that he finally received his QSL from JT1, got his WAZ certificate and worked his 95th Hungarian station. W4OXU has assumed duties as manager of the AENP. Walt reminds us that the morning net meets every day except Sun. at 0630 CDST on 3955 kc. and provides a good outlet for that late traffic from the night before. WA4GNG/4 is now located in Hartselle and is on with a complete new station working 75 through 6 meters, a.m. and s.s.s.b. Band conditions were good for the June VHF QSO Party but operators were scarce within the section. V.h.f.ers, get ready for the Sept. contest, Sept. 7 and 8. Let's see some activity. It should be a fine chance to get that rare state or country. WB4DQW (KL7EBB) is now in Illinois where he will be active on 6 and 2 along with his duties for Uncle. Traffic: (June) WA4AVM 338, WA4FYO 149, WA4GGD 59, WA4VEK 45, K4AOZ 44, WB4EKJ 42, K4BSK 34, K4WHW 34, W4MKU 29, WA4AZC 27, WA4ROP 24, K4WOP 22, WA4JSM 20, WB4BLX 15, WA4EEC 14, W4DGH 8, WA4WIE 6, K4UUC 4. (May) W4SVM 49.

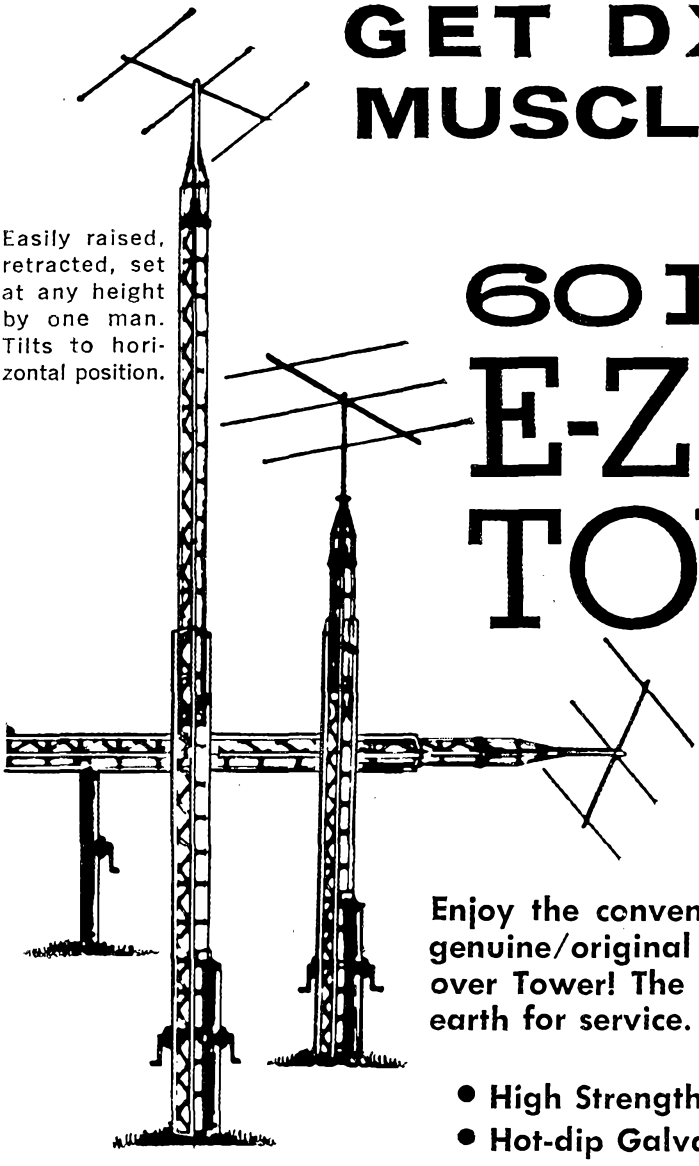
CANAL ZONE—SCM, Russell E. Oberholtzer, KZ5OR—MARS Station (KZ5AA/KZ5), CZARA (KZ5CZ/-KZ5) and CARC (KZ5PA/KZ5), all operated Field Day using emergency power. Band conditions in KZ5-Land were better this year than they have been in

GET DX MUSCLE



Easily raised, retracted, set at any height by one man. Tilts to horizontal position.

60 FOOT E-Z WAY TOWER



Get there "fustest with the mostest" . . . with DX "muscle" that punches out from atop a 60-foot E-Z Way Crankup, Tiltover Tower!

Enjoy the convenience and safety of the genuine/original E-Z Way Crankup Tiltover Tower! The antenna comes down to earth for service. Construction features:

- **High Strength Steel**
- **Hot-dip Galvanized after Construction**
- **No Concrete Required with Wonder Ground Post**
- **No Guy Wires**
- **Safety Rests**
- **E-Z Installation**
- **Hardware Others Call "Accessories" are Standard with E-Z Way**

Towers are shipped partially assembled freight pre-paid. Write for free literature on all models or contact your favorite dealer.

E-Z WAY Products, Inc.
P. O. Box 17196
TAMPA, FLORIDA 33612

ONE OF THE WESTERN HEMISPHERE'S QUALITY TOWER SYSTEM SUPPLIERS

More E-Z Way Towers Are In Use Than Any Other Kind

years. W5CJH/MM, off the *Wesleyan Victory*, had an eyeball with several KZ5s. KZ5NH will QSY to Puerto Rico. Ralph is very active and a PAM and will be missed by KZ5s. KZ5TW is leaving for the land of the big PX and another KZ5 who will be missed. 73. Ralph and Larry. Traffic: KZ5SA 120, KZ5OA 111, KZ5OB 52, KZ5JC 49, KZ5AD 38, KZ5CT 33.

EASTERN FLORIDA—SCM, Jesse H. Morris, W4MVB—Asst. SCM: William G. Blasingame, Jr., WA4NEV. SEC: W4IYT. Asst. SEC: W4FP. RM C.W.: W4ILE. RM RTTY: W4RWM. PAM 75M: W4OGX. PAM 40M: W4SDR. V.H.F. PAM: WA4BMC. Field Day for 1968 has come and gone. It seemed to be very successful even with all of the new rule changes. It was much more challenging. W4ZVX reports a good opening on 2 meters June 21. He was able to work W2CNS in Rochester, N.Y., from Orlando, followed by seven VE3s and then W8IYX, in Muskegon, Mich. W4GUJ, in Jacksonville reported working Topeka, Kans., on 2-meter f.m. the same date. I understand W4UQZ has tuned feeders 156 feet long and WA4SCK uses a cage antenna. WB4AJV was in Tampa on vacation and passed the Extra Class amateur and 1st-class telegraph exams. Among the regular traffic-handlers who have been on vacation are K4DAX, WA4IJH, WB4AIW and WB4AJV. WB4FSF recently was appointed Asst. EC of Seminole County. W4EHW reports that he is working over his antenna system. W4LEP spent part of Field Day with the Platinum Coast Club. He has a four-element 2-meter beam up for AREC work and has applied to the FCC to become RO for Indian River County. I believe that W4MVB will be returning home in a few more weeks. He has been missed by many. WA4GDS is a patient in MacDill Air Force Base Hospital, recovering from a heart attack, and K4FQH is a patient in Sarasota Memorial hospital with the same thing. We certainly hope that both these fine men recover and return to the air waves. Traffic: WA4SCK 509, K4EHY 279, WA4NEV 219, W4FPC 191, W4SDR 112, W4FP 98, WB4EPD 95, W4UQZ 89, WB4FLW 79, K4SJH 78, W4SMK 70, WA4HED 64, K4LEC 63, WB4DSP 59, W8BZY/4 58, W4OGX 54, K4QCG 51, WA4OHO 47, WA4HDH 43, W4DVO 39, WA4CIQ 36, W4AKB 35, K4COO 35, W4ZAK 35, K4DAX 32, WB4AIW 30, WB4FSF 29, W4NGR 29, W4YPX 28, WA4UFO 26, W4FHZ 25, W4EHW 24, K4LPS 24, WB4DDO 22, WB4HJW 20, W4IAD 16, WA4IJH 12, W4SOM 12, W4VPQ 11, K4BLM 10, W4LEP 8, W4TJM 8, K4DSN 7, K4EBE 4, W4KRC 4, W4VDC 4, WA4YRU 3.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: W4DDY. Asst. SEC: WA4WQU. RM: W4CZN. PAMs: WA4WQU, K4HQI. WB4HUO is doing an outstanding job as net mgr. for GTN and GTAN while Tim is on vacation. GTN reports QNI 97, QTC 23 with 28 sessions. GTAN reports 12 sessions, QNI 69, QTC 28. WN4HLX is DXing while recovering from a back injury. WB4FMJ and K4HQI report v.h.f. activity as follows: Conditions were excellent on 6 with all U.S. call areas plus VE2, 3, 4, GO, FG7XT, T12NA, XE1PY and KP4 heard. The 2-meter band was open to W2- and 3-Land. W4NXD was called to the service. He will be missed in the Gainesville area. WB4FMJ worked his 47th state and K4HUI worked his 46th. W4ISS worked K2CBA on 6. With K4BAI and K4BVD both gone for the next year, K4VGI and W4HWY will work with me to try to put on an outstanding QSO Party. A fine report as usual came from W4LRR. K4HQI has a new HQ-170A, K4VJJ a Clegg 22er. WA4ARS made it 46 on 50 Mc. Traffic: W4CZN 192, WA4RAV 144, WA4UQQ 133, W4PIM 40, W4DDY 20, K4TXK 16, W4RZL 11, W4SVH 9, W4REI 6, WA4LLI 4, WN4IES 3.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4IKB. PAM H.F.: W7BNR/4. V.H.F.: W4UUF. RM: K4UBR. Nets:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3957 kc.	2200Z	Daily	30	418	17
QFN	3651 kc.	2230/0200Z	Daily	60	...	..

Pensacola: New officers of the FFARA are K4FKV, K4LAN and K4NMZ. The club took part in FD from Santa Rosa Field near Milton. WB4DVM was hospitalized for a week; likewise your SCM. WA4EPH stays active on 15-20-meter s.s.b. W4UUF picked up seven new states on 2 meters during the great June 20 opening! Milton: K4HOX is building a five-element 2-meter vertical collinear. Fort Walton/Eglin AFB: K4UBR is our new RM, while W4BVE takes a much-needed rest. W4ROM is the RO aboard USNS *Mission San Rafael*. The EARS set up for FD at Camp Robbins; WB4GMG, W4FDJ and WB4EQU were the mainstays. WB4GYX was top QNI in the section for QFN. Panama City: The PCARC got some fine publicity on TV for its Field Day efforts. Chipley: W4IKB now has 5 kw. of emergency power available. He re-

We say:

the 2K-3

is the best $1000 linear amplifier ever made for the amateur service

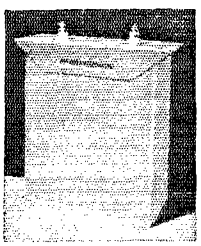
(and we sell it for only $745)

Other manufacturers look at the 2K-3 and shake their heads in disbelief. They say it can't be sold for $745. But we do it! We do it by working a little harder, by being a little more efficient and by selling DIRECT from factory to user.

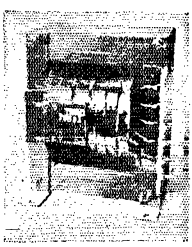
Compare the quality of the components used in the 2K-3 and its true value becomes more apparent.

1. Look at the superb 20 mfd 5000 volt test oil filter condenser...exceptional dynamic voltage regulation.
2. Heft the heavy duty, high efficiency transformer. . . 38 pounds of brute power with exceptional voltage regulation and peak current capability.
3. Observe the rugged, high-cost, double section bandswitch.
4. Note the commercial duty 25 ampere mercury power relay.
5. Experience the reliability of special design solid state bridge rectification.
6. Relax with a host of other conservatively rated deluxe components no other competitive amplifier can equal. . . high efficiency, silver-plated tank coil, silver-plated L-section coil, unique toroid type filament choke, resonant input filter choke, high reliability bronze gear drive assembly, modern design illuminated push-button start-stop switch, all DC relay systems. And there is more, but let us send you a descriptive brochure on the 2K-3. Let us help you own this outstanding linear amplifier.

The 2K-3, Floor Console or Desk Model $745.00



1.



2.

3.

4.

5.

ATTENTION! Military, commercial, industrial and scientific users. . . please write for information on our custom line of high power communication linear amplifiers and RF power generators.

EASY FINANCING • 10% DOWN OR TRADE-IN DOWN • NO FINANCE CHARGE IF PAID IN 90 DAYS • GOOD RECONDITIONED APPARATUS • Nearly all makes & models.

Henry Radio Stores

CALL DIRECT . . . USE AREA CODE

Butler, Missouri, 64730	816 679-3127
11240 W. Olympic, Los Angeles, Calif., 90064	213 477-6701
931 N. Euclid, Anaheim, Calif., 92801	714 772-9200

East Coast Rep.: Howard Laughrey, 2 Elizabeth St., Chappaqua, N.Y. 10514, (914) CE 8-3683

"World's Largest Distributor of Amateur Radio Equipment"

recently was elected vice-pres. of the Fla. Chapter of APCO. Marianna: W4KCA was appointed EC of Jackson County. Traffic: W4RKH 16, W4BVE 12, W4IKB 4.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—PAM: W7CAF. RM: K7NHL. OBS: WA7GOG is presently running low power because of trouble in the PA. Look for him on 444.1-Mc. ATV 24 hours a day. K7MLE is on 6 meters with a 10-watt all-transister rig. WA7HRE reports working 60 countries using 65 watts. OBS K7-MTZ resumes normal Bulletin schedules after completing station modifications. New Novice calls in the Valley of the Sun are WN7JTP and WN7JQG. All amateurs are invited to report to their SCM via Form 1 report cards, available for the asking from ARRL. All appointees are reminded that regular reporting is a requisite for reappointment, which is done on a yearly basis. Look at the date on your certificate (and your license); you may be surprised. Traffic: K7MTZ 60, WA7IRE 28, WA7IFD 25, WA7ISP 16, W7FKK 11.

LOS ANGELES—SCM, Donald R. Etheredge, K6-UMV—SEC: K6QPH. Asst. SEC: K6AVQ. New appointees for the section include W6CRQ as OO, W6GEN as OVS, WB6VZD as OPS, WB6WDS as ORS, K6YCX, past SEC in L.A., is now VE7AFJ. Regrettully we record the passing of K6IOV. WB6KET is a new TRW ARC member. New officers of the SGVRC include W6CLQ, prexy; WA6CBJ, secy.; K6BEM, treas.; WA6IDV, programs. Recent W6LS members include WN6s AJU, CWF, EGV, ZHR, K6CSO and WA6FZT. Ex-WA6AYF is now W6ISZ. W6MLF is the proud holder of 1st-class phone, 1st-class telegraph and Extra Class amateur licenses. The new secy. of the WCARS Net is WA6VIB. WCARS meets daily at noon and monitors 0730-1700 local time daily on 7255 kc. Guest check-ins are invited to this excellent net. The Third Annual California QSO Party is scheduled for the week end of Oct. 5. Write WA6JDT (address page 6 *QST*) for information. The WVARC has added WB6SLU to its crew. W6CRQ now has 5 dipoles aloft. K6NA reports serving K6BAG 100 lbs. of ice in FD. WB6GHB/6 has a new QTH near UCLA. W6GEN has his 6-meter FET converter operating and a five-element beam up. WB6OUD hopes to be able to go mobile s.s.b. soon. The Los Angeles City Amateur Radio Organization is in its second year of operation. Contact W6TXJ for information. K6EA reports operating Field Day 900 miles west of San Francisco. WB6VZD has an all-band trap dipole up now. W6DQX added a SB-200 to his equipment collection. WB6KGK now has 6-meter t.m. gear on the air. A 51J2 receiver found a new home at WB6PKA's location. WA6KZI operated /7 in Nevada during the past CD Party, e.w. naturally. W6s HWM, QAE, WOU, K6IOR, WA6VPJ and WB6QMF attended the annual Mission Trail Net meet in Paso Robles. Their on-the-air net meets at 1900 local time on 3854 kc. daily at MTN. Brass-pounding certificates were sent out to W6GYH, W6MLF and W6DSC for June traffic-handling work. The W6SD club recently held its 11th Annual Ham-fest-Picnic. Traffic: (June) W6GYH 1403, W6MLF 629, W6QAE 327, WB6GGL 271, WB6BBO 241, W6DSC 205, K6CDW 201, WA6KZI 199, W6OEO 109, WB6PKA/6 106, WB6SCK 94, W6FD 86, WB6TMC 50, WB6WDS 50, WB6TQS 34, WB6KGK 33, K6KA 30, K6CI, 29, WB6-SLG 28, WB6YHD 25, W6BHG 23, W6DQX 21, WB6-VZD 18, K6ASK 16, W6DGH 14, W6USY 10, WB6SXY 8, WB6AEL 7, W6HUJ 7, K6EA 6, W6TN 4, W6TXJ 4, WB6OUD 3, W6RCV 3, K6UMV 3. (May) WB6TQS 29, WB6KGK 22. (Apr.) WB6TQS 129.

ORANGE—SCM, Roy E. Maxson, W6DEY—Riverside ARC, Desert RATS, Fullerton RC, Anaheim ARA, Newport ARS, Orange County ARC and others went full out for FD. Excellent reports have been received. SEC WA6ROF was appointed mgr. of SCN by WINJM effective June 10. Many OS hams are members of the Mission Trail Net and attended the Roundup at Paso Robles June 15/16. OBS W6WRJ was appointed traffic mgr. for '68/'69. W6FB's June visitors were W6ATC and W6QL (ex-Philippine KA1QL). K6MCA is rebuilding the station and in addition to his traffic report had 189 p.p.s. on amateur frequencies per WB6PRP. OO W6BUK notes he has held the same call for 46 years. How about you? WA1JHZ/6 says his transmitter was struck on FD and put out of commission temporarily. He will depart for WO-Land shortly. Don't forget that the San Bernardino Microwave Society meets the 1st Thurs. of each month at Corona City Hall at 1930 in the RACES room. A beautiful plaque of appreciation was awarded WB6CQR and OS AREC members at the recent banquet of the Orange County Heart Association. K6IBI is working toward better understanding between the amateur service and MARS. Traffic: (June) K6MCA 331, K6QEH 320, WB6TYZ 295, WA6ROF 179, WB6RJX 76, WB6RVM 70, WA1JHZ/6 64, W6WRJ 53, K6IME 33,

W6BUK 3, W6GB 2. (May) WB6UCK 66, WB6ULE 5, WB6RYX 3.

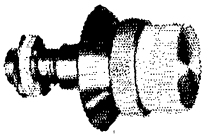
SAN DIEGO—SCM, James E. Emerson, Jr., WB6GMM—The signal of WA6TAD will be showing a marked improvement as soon as he gets his antenna up in his new QTH. Doug also has been appointed chairman of the '69 Division Convention, to be held here in San Diego, and is looking for assistants. Also in '69, San Diego will be celebrating its 200th anniversary. All area amateurs soon will be receiving a commemorative QSL card, with instructions on how to order a *free* supply, from the 200th Anniversary Committee. From all reports Field Day this year was the biggest and best ever for all section clubs. Advance reports indicate record scores for many. The El Cajon ARC reports a noticeable increase in membership since it has been reporting its activities in these pages. Do all local hams know of your club? The Palomar Club held its Annual Picnic at Live Oak Park in Aug. with a good turnout. WB6SQZ just completed a 2-week cruise aboard a coast cutter as a radioman, while WA6DEI spent the same period in W7-Land with the Navy. Beside his duty as RN6 manager, W6VNQ kept very busy as TCC director for the second half of June. Traffic: K6BPI 10,684, W6NVQ 571, K6CAG 400, W6EOT 397, W6BGF 370, WB6SQZ 258, WB6UMT 232, W6SE 124, W6LRU 81, WA6QAY 63, WA6DEI 40, K6HAV 34, WB6PFO 31, W6YKF 12, WB6GMM 11, WA6KHN 11, WA6TAD 6.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—SEC: K6GV. The Estero Amateur Radio Club held an installation service for new officers for the new year at the Baywood Park Lodge on June 13. W6JTA was master of ceremonies. The new officers are W6BNF, pres.; WB6FOG, vice-pres.; K6TOE, secy.-treas. Field Day at the Estero ARC was led by WA6QDA. K6PHT (father) and WB6WFP (son) have spent time and effort with a u.h.f. model of the quad that they are now installing. Recent license recipients in the Morro Bay area are WA6GOR, General, and K6TOE, Advanced. The Mike and Key Club of Camarillo meets the 1st Wed. of each month. Contact K6VBX for details. WB6YTJ is active on 2-meter s.s.b. with a large cross-fire Yagi on 145.025 Mc. The Simi ARC Field Day was interesting in that the group assisted in the search for a downed aircraft and provided liaison with the CAP. A Field Day report was received from W6AB, operating from Orcutt Hill. As in previous years, the club operated from the same location with about 10 operators. W6UJ, in Lompoc, reports that the CD activity is now on 75-meter s.s.b. The section has two active hams with the name Jim Price. One in Thousand Oaks (WB6WFP) and the other (WB6DPV) in Santa Maria. The latter just passed the Extra Class exam. Traffic: WB6DPV 3, W6UJ 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. After many years of talking we have finally come up with my idea of the proper way a Field Day should be run. I have suggested many times that a Field Day should be operated as if it were an actual emergency. In the past we have been able to go to the site of FD operation, put up antennas and other needed facilities and wait for the time to start operation. This time we were allowed three hours to get set. I think it should be cut down to a smaller margin—that is to have a 24-hour-period to go to the location, set up and start operating. In case of a real emergency we would have to pick out a favorable spot and get set as soon as possible. Some clubs have complained about this new procedure but I think they have lost sight of the real purpose of FD. I was disappointed in the number of FD messages received but was well pleased with the message format used. They were almost perfect. FD messages were received from the following: W5ABF/5, W5AXA/5, WA5CKF/5, W5HPI/5, W5NGL/5, W5OYC/5, W5US/5 and K5ZSB/5 for the Irvin ARC. Several other clubs reported participation but failed to file FD messages. W5MVC and W5VOH presented a fine talk and demonstration of audio filters for s.s.b. and c.w. at the July meeting of the Midland ARC. The 7290 Tfc. Net had 40 sessions, 1728 stations and 1699 QTC. Traffic: K5BNH 1309, WA5TYH 629, W5JSM 17, W5PBN 17, W5BNG 14, W5MSG 2.

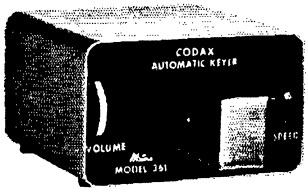
OKLAHOMA—SCM, Cecil C. Cash, W5PML—SEC: WA5AOB. RM: W5QMJ. PAMs: W5MFX—75, K5TEY—40, WA5JGU—6, K5ZCJ—2. June was a busy month for traffic with over 6000 messages, and I am sure K5TEY must not have taken a vacation for she had a traffic count of over 5500 of those, plus some 200 on Navy MARS. Field Day was a great success with some records set. K5OCX claims the Oklahoma Central V.H.F. Club took all honors. The Enid Club has re-



2 SPEED DRIVE UNIT

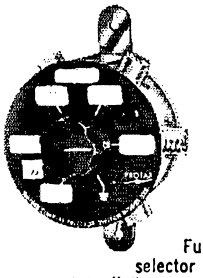
For professional, sophisticated gear. Slow motion 4.5:1 drive shaft controlled from 1" dia. satin anodized aluminum knob. Direct drive operated by 1½" dia. dial. Mounts on outside of any thickness panel.

Model 4832/2K **$4.95**



Waters Mod. 361
CODAX AUTOMATIC KEYER

Dot-dash ratio 3:1 • Space-character ratio 1:1 • Controls: Audio output level, on/off switch, speed control • Double paddle key, self-monitoring • Interconnects with any transmitter, transceiver or receiver • Self-powered • Solid state circuitry. **Net $92.50**



Waters Mod. 376
PROTAX ANTENNA SWITCH

Functions as a regular selector switch with 5 side mounted (radial) connectors. Has the additional feature of automatically grounding the entire antenna system when the rig is not in use. Complete with knob, mounting hardware and escutcheon plate. Power handling 1000 w. VSWR less than 1.2:1 up to 150 MHz.

$12.50

$12.95 W2AU FOUR PURPOSE BALUN $12.95

BALANCE YOUR ANTENNA • STOP YOUR COAX FROM RADIATING • HELP ELIMINATE TVI • IMPROVE YOUR RADIATION PATTERN PLUS F/B RATIO

• Broad-banded 3-32 mc. • Center hang-up hook for inverted Vees • Handles full legal power, 2KW PEP • Built-in lightning arrester • SO239 RF connector for coax transmission feed line eliminates center insulator • Withstands up to 600 lb antenna pull • For use with all type antennas fed with unbalanced coax line • Weighs only 6½ oz. 1½ diam. 6" long • 2 Models: 1:1 matches 50 or 75 ohm unbalanced coax to 50 or 75 antenna load. 4:1 matches 50 or 75 ohm unbalanced coax to 200 or 300 ohm.

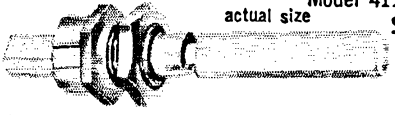
● W2AU Super Vinyl jacketed 2 element 10-15-20 meter quad. Complete quad $64.95

● W2AU Super-Fiberglas 2 element 10-15-20 meter quad. Complete quad $99.95

DIRECT/5:1 REVERSE VERNIER DRIVE

The newest in the line of fine tuning aids from Jackson Bros. Direct/Slow Reverse (5:1 ratio) Vernier Drive. Easy fixing — requires only one ⅜" hole. High torque, low back lash, smooth and permanent movement, coaxial spindles, ¼" shaft dia. Model 4111/RV

actual size



$1.95

VERSATILE MINIATURE TRANSFORMER

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

$1.49 ea. 3 for $3.95 10 for $12.50

PRECISION PLANETARY-VERNIER for exceptionally fine tuning

Shown approximately actual size.

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive. ¼" dia. Shaft 1⅛" long; 6:1 ratio. Vy FB for fine tuning. Easily adaptable to any shaft. Comparable value $5.95 Model 4511 DAF.

$1.50 ea. 10 for $13.50

REPRESENTANTE EN VENEZUELA
CHUCHO ESAA R. YV3HR
P.O. BOX 480 TELEFONO N. 23913
BARQUISIMETO—LARA, VENEZUELA, S.A.

ARROW ELECTRONICS INC

• 900 Rte. 110, Farmingdale, N. Y. 516 — MYrtle 4-6822

• 97 Chambers St., N. Y., N. Y. 212 — DIgby 9-4411
• 525 Jericho Tpke., Mineola, N. Y. 516 — Pioneer 2-2290
• 18 Isaac St., Norwalk, Conn. 203 — 838-4877
• 225 Rte. 46, Totowa, N. J. 201 — 256-8555

ceived the call W5HTK. K5CAY also reports that the Enid 2-meter relay is about ready to swing into full-time action. The Oklahoma Post Office Net probably will soon be looking for a new manager as wedding bells are soon to ring for WA5KZA. Vacation time took W5FW and W5PWN to Mexico City. Yours truly enjoyed a short vacation in San Antonio at the Hemisfair in conjunction with the ARRL National Convention. WN5SZK finished OSU and is off to W4-Land. WA5RBD is moving to Houston. W5EHC reports W5-PAA is in a new location; also his son, W5TKC, was in for a short visit then back to Scott AFB. Congratulations to W5HFN, who finally made WAC after 35 years. Congratulations to new Extra Class W5UYQ, Advanced WA5KGV, General WA5VNF, the XYL of WA5GHK. Christmas came early this year. Old Santa *missed me but he left a new* SB-100 with W5HIM and also W5IGY. Traffic: K5TEY 5579, W5QMJ 184, WA5-KFT 97, WA5AOB 80, WA5IMO 36, W5PML 34, W5-FKL 32, W5FW 26, WA5KZA 25, W5MFX 24, K5CAY 21, K5SWL 19, WA5FSN 18, WA5DZP 11, K5OCX 10, K5WPP 6.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5-AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. Congratulations to two new ORS appointees, WA5INZ and WA5PUQ, both heard on the traffic nets. Field Day in Southern Texas came near being the *real thing* again this year. Hurricane Candy, the "instant hurricane" as EC W5KR put it in his *Off Reasonance* Bulletin, had quite a number of the South Texas gang on the alert. "Candy" was crossing the coast line before most of us realized we were in for possible trouble. She gave Corpus Christi and Brownsville a good shaking before going inland. WA5GZX is building a new solid state exciter unit. PAM W5KLV is back with a movie unit. K5JKV, NCS for the South Texas emergency nets, is recovering from surgery in Houston. W5ABQ advises that W5SC, San Antonio ARC station on the Hemisfair grounds, does not solicit outgoing Hemisfair traffic but will handle it if requested. W5AC's linear is out of business until a new part is received. EC W5TFW reports Field Day was rained out by "Candy." K2EIU/5 reports an amateur radio club has been organized at Randolph AFB. Officers are K2EIU/5, pres.; WA9IAT, vice-pres.; and WA4JAB, secy. K5HZR reports the San Antonio ARC was prepared for "Candy" even if it was FD. The South Texas Emergency Net S.S.B. 75-Meter Section has moved frequency from 3810 kc. to 3915 kc. RM W5EZY reports that W5QJA conducts a beginners' session Thurs. nights on the TEX Traffic Net at 10 w.p.m. with a Q & E session after the net. K5EJL reports the new Novice class at the Deep Eddy Natural Science Center, Austin, is off to a good start with 19 enrolled. Instructors are W5OMV and W5PPQ. The new state civil defense radio officer for Texas is J. R. Messenger, former Navy c.w. operator and in the Department of Public Safety communications. Traffic: WA5QKE 132, W5EZY 113, WA5PUQ 104, K5HZR 80, W5BGE 68, W5QJA 68, K2EIU/5 66, W5TFW 43, W5AC 40, W5ABQ 20, W5KLV 18, K5WYN 14, W5AIR 6, K5HMF 4, K5EJL 2.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6PL, VE6AFQ, VE6AFR. ORSs: VE6BR, VE6ATH, VE6FK. PAM APSN: VE6ADS. ECs: VE6SS, VE6XC, VE6ATG. OPSs: VE6HM, VE6SS, VE6ATH, VE6AFQ. OOs: VE6HM, VE6TY. OBSs: VE6HM, VE6AIF. VE6FK reports that activities are very good for the summer. The B.E.B.A. was very successful, according to AMA officials, and high praise is due the ham operators for their hard work during the long week end. The next B.E.B.A. long week end will be the Labor Day week end and that will be it for this year. All clubs are quiet for the months of July and Aug. It would be very much appreciated if clubs would send in their winter activities so that we may keep the members informed. Reports are slow this time of year as most of the boys are holidaying. Traffic: VE6HM 64, VE6FK 27, VE6SS 7, VE6TG 7, VE6HF 5, VE6UJ 5, VE6AFQ 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —VE7BBL working from a "Girrafe" for B.C. Hydro took 60,000 volts. He is recovering in the hospital. Also recovering but still in the hospital is VE7PO. VE7OT is home but must take it easy. WA6IQP/VE7 returned home to San Francisco after eight years in B.C. Bob was pres. of the Vancouver ARC and a big prime mover in activities for amateur radio. North and West ARC held a week-end demonstration of amateur radio in the parking lot of a large shopping centre. The Ladner AREC group, with a back-up from others, supplied communications for the Walk for Millions. The Chilliwack ARC has nice test equipment and VE7ASC is well equipped. The Beaver Valley is running a series of

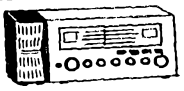
No, we're not lazy! It's just that "Popular Electronics" (Dec. 1967) tells the DX-150 story so well.

Reprinted Without Editing

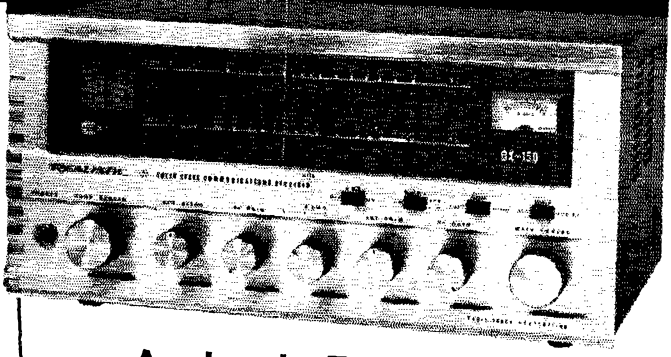
"What may be the first really noteworthy advancement in communications receivers is wrapped up in the new Radio Shack imported DX-150. Featuring continuous coverage from the top of the AM broadcast band (535 kHz) to the bottom of the 10-meter band (30 MHz), the DX-150 is a single-conversion superhet with a tuned r.f. stage, two i.f. stages, full-wave product detector for SSB/CW reception — and it's 100% solid state. Selling at $119.95, the DX-150 has the flexibility of a communications receiver that a ham or SWL is used to buying for $175-plus. To rattle off a few more "features": there is a front panel antenna trimmer, fast or slow a.v.c. attack, a cleverly concealed built-in monitor speaker, plenty of calibrated bandspread, and noise limiting in both the i.f. and audio stages. Because of the solid state circuitry, the usual warm-up drift expected with a tube-type receiver is virtually absent here. And, although the DX-150 is primarily a base station receiver with a 117-volt a.c. power connection, it can be operated from an outboard d.c. power supply consisting of only 8 D-cells. Radio Shack claims that the receiver will operate for 100 hours — continuously — using only the d.c. supply. Ideal for Field Day and emergency work! The proof of the pudding so far as any communications receiver is concerned is how well it works "on the air" At POPULAR ELECTRONICS, the DX-150 was hooked up to a 125-foot long-wire antenna and tuned across the AM broadcast band. Needless to say, the S-meter was pinned on just about every single channel, and the audio quality with Radio Shack's voice-selective speaker (extra, $7.95) was crystal-clear. Tuning the band between 1.55 and 4.5 MHz, your reviewer got a chance to appreciate the comfortable handling on SSB reception. Going a little higher (4.5-13.0 MHz), the 25- and 31-meter bands were "alive" and signals appeared to leap out of the air — possibly due to the very quiet background of the DX-150. While quietness is usually regarded as a lack of sensitivity, that wasn't the case with the DX-150. On the top band (13-30 MHz), the sensitivity still seemed high; and on the CB frequencies, the DX-150 could hold its own against a dual-conversion receiver built just for CB work. **Summary:** Radio Shack has the Model DX-150 in most of its 160 retail outlets. Take a look at it, and get the "feel" of this unusual receiver."

CUSTOM ACCESSORIES

12 VDC Power Set



Matching Speaker



And only Radio Shack has this 119.95 receiver!

Thousands of hams and swl's have discovered that Radio Shack's Realistic DX-150 is truly the "breakthrough" full coverage receiver of 1968. It's the 100% solid state receiver that *banishes forever* tube failure, tube heat, tube drift, and — thanks to its built-in 117V/12V supply — your dependence upon AC current when power fails or on field day. The brilliant DX-150 is NOW IN STOCK in every one of Radio Shack's over 300 stores.

CAVEAT EMPTOR

Since DX-150 is certain to be the world's most imitated communications product, we advise our readers that "solid state" on a receiver is not necessarily indicative of selectivity, sensitivity and "feel." The DX-150 is built to $200-$300 performance specifications; its modest $119.95 price tag simply designates the extent to which we have sacrificed traditional markup to establish REALISTIC as a quality line! P.S. — DX-150 is a hefty 14 lbs., with a 12¼" dial, extruded 11-control front panel, and 14¼x8¼x6½" in size. It's just the picture that's little! Our no money down policy makes the pain little, too!

FILL IN AND MAIL ORDER TODAY!

RADIO SHACK { **EAST:** 730 Commonwealth Ave., Boston, Mass. 02215 / **WEST:** 2615 West 7th St., Fort Worth, Texas 76107

Please rush me the item I've checked below. Dept. YI
I enclose $_____, plus 50¢ for postage and handling:

- ☐ FREE 1968 Catalog
- ☐ Receiver, 20-150, $119.95
- ☐ Matching Speaker, 20-1500, $7.95
- ☐ 12 VDC Power Set, 20-1501, $7.95

Name (print) _____

Street _____

City _____ State _____ Zip _____

pictures of its members in its paper. VE7CM is holidaying in Hong Kong. The Canadian Pacific ARS has been awarded for its hard work at Pearson Hospital by four paraplegics obtaining their amateur license and station call VE7PAR. VE7GG (who was VE3TT) is our newest OO and ORS. VE7BQF is building a large quad to outshine the beams. VE7BLO, who is handicapped, wishes to thank the Burnaby ARC, which installed his 50-ft. tower, TH3 beam and inverted "V." Traffic: (June) VE7ZK 372, VE7GG 9, VE7BLO 6: (May) VE7BHH 61, VE7AC 35, VE7AXH 16, VE7-BLS 6.

MANITOBA—SCM, John Thomas Stacey, VE4JT—Reports for this column must reach me by the fifth of the month following the month covered in your report. VE4HK reports that the "Miles for Millions" walk in Winnipeg was covered by the AREC using three s.s.b. units on 75 and nine 2-meter t.m. mobiles. Herb also reports that there are thirty 2-meter stations in the Winnipeg area, twenty of them operating mobile. Plans are underway to establish a repeater at Birds Hill which is intended to provide consistent communication into the Winnipeg area and into Piniwa where VE4FV is active. VE4CZ has been elected vice-pres. of the Manitoba Teachers Society for '68-'69. VE4YC was successful in his all-band examination. VE4EX has gone QRT and as such has resigned as the PAM. Congratulations are in order to VE4DQ, who has made the 300 mark in DXCC, the first VE4 to hit this total. VE4EL is getting ready to hang up a TA-32 beam to his Galaxy. VE4RW has added an SB-401 to the shack. Net reports for May: Phone Net, sessions 30, QNI 434, QTC 10; C.W. Net, sessions 31, QNI 134, QTC 25. For June: Phone Net sessions 30, QNI 308, QTC 13: C. W. Net, sessions 28. QNI 128, QTC 34. Traffic: (June) VE4NE 25, VE4SR 13, VE4FQ 9, VE4-EF 7, VE4GN 6, VE4XN 5, VE4QJ 4, VE4RO 4, (May) VE4NE 27, VE4GN 11.

ONTARIO—SCM, Roy A. White, VE3BUX—This section is allowed 32 lines per month for Ontario news and this includes traffic counts. Which would you rather have, items of interest or traffic counts? Let me know, it's *your* column. Thanks to VE3EBH for a good job as controller on the Ontario-Quebec Net. Congrats to VE3GI, who has been elected to carry on. Thanks also to VE3DV for his able assistance in organizing the election, etc. The Scarboro ARC is busy making plans for participation at the CNE Aug. 16 to Sept. 2. The station will be on the ground floor of the Queen Elizabeth Building. Everybody is looking forward to the RSO Convention Nov. 1, 2 and 3 in Brantford. ARRL will be conducting a forum. VE3CTY has a new linear going and VE3CMO is running a new HW-100. The Nortown ARC has plans to run slow-speed code classes three times a week starting Oct. 1. Field Day has come and gone and the QRM seemed worse than ever. We need more liaison between the phone and the c.w. nets, particularly between the OFN and Laurentian Nets and the Grey-Bruce and Ontario-Quebec c.w. setups. Any volunteers? If so, just let VE3ETM, VE3BLZ, VE3DPO, VE3GI or your SCM know. We regret the passing of VE3DOO in Windsor on June 8 and the passing of VE3CYV of Ottawa on June 17. VE3EGO, in Ottawa, had what is believed to be the first slow-scan TV contact with Sweden. Welcome to VE3CWR, VE3GKH and VE3APL, new EC appointees. VE3DJK has bought a plane and is busy taking lessons. Traffic: (June) VE3GI 128, VE3ATI 75, VE3DPO 55, VE3GCE 51, VE3BUR 44, VE3BZB 42, VE3DU 21, VE3FGV 21, VE3BEB 17, VE3AUU 14, VE3NO 12, VE3VD 12, VE3ETM 6, VE3BQL 2, (May) VE3DV 131, VE3DPO 88, VE3GI 86, VE3EBH 61, VE3GCE 49, VE3ATI 43, VE3WW 33, VE3DU 29, VE3FGV 25, VE3-EHL 18, VE3GMQ 18, VE3NO 17, VE3AWE 16, VE3-AFA 14, VE3BUR 10, VE3EBC 10, VE3DVE 8, VE3-EWD 6, VE3VD 4, (Apr.) VE3DV 114, VE3DPO 92, VE3GI 77, VE3WW 73, VE3GCE 68, VE3BZB 64, VE3EAM 62, VE3BLZ 46, VE3DBG 46, VE3ATI 33, VE3BEB 28, VE3AWE 26, VE3EBC 25, VE3EHL 24, VE3GMQ 24, VE3NO 23, VE3AWO 22, VE3AFA 10, VE3EIG 8, VE3EWD 7, VE3VD 4, VE3DH 1, (Mar.) VE3EIG 7.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. RM: VE2DR. PAM (v.h.f.): VE2AGQ. PAM (h.f.): VE2BWL. We received seven FD messages. PAM VE2-AGQ and SEC VE2ALE attended the convention in Plessisville. VE2DR finds it hard to shake off the ghost of being named QSL Mgr. for a phony DX station. Your SCM from away back, VE2GL, still is active on c.w. VE2ADX, the South Shore Club station, was not heard on Field Day mainly because so many originals have departed to other locations. The Ontario-Quebec Net, which meets nightly on 3540 kc., goes well with new Net Mgr. VE3GI. RTQ, which covers our section on c.w. on 3603 kc. nightly, and RPQ, on 3780 for phone

Large SWAN Stock = Fast Delivery

RAY SEZ: "Why so much new SWAN in stock?" Simple! SWAN makes GREAT transceivers and AMATEUR ELECTRONIC SUPPLY is a GOOD place to do business with. The demand created by the SWAN and AES Combination requires a huge inventory of Factory-Fresh equipment to insure prompt delivery.

GOOD REASONS for buying your new SWAN from AES

TOP TRADES for your good clean equipment

STAY-ON-THE-AIR PLAN – Enables you to keep your trade-ins until your new gear arrives – Lose no operating time!

36 MONTH TIME-PAYMENT PLAN offers free 105-day pay-off option

PERSONAL SERVICE from fellow hams who understand your problems

SAME DAY SERVICE on most Orders and Inquiries from our Centrally Located Modern Facilities

Top Notch Service Department

LOOK at your low Monthly Payment AFTER JUST $5.00 DOWN

SWAN 350C 80-10m Transceiver	(14.98)	$420.00
SWAN 500C 80-10m – Deluxe.....	(18.59)	520.00
SWAN 250 6m Transceiver.....	(11.55)	325.00
Mark II 80-10m Linear – w/tubes ...	(14.08)	395.00
Mark 6B 6m Linear – w/tubes.....	(14.08)	395.00
Power Supply for Mark II & 6B.....	(8.30)	235.00
TV-2 2m Transverter – specify if ...	(9.38)	265.00
117XC AC Supply w/spkr. in cabinet.	(3.61)	105.00
14-117 12v DC Supply w/cable.....	(4.51)	130.00
405X MARS Oscillator - less crystals		45.00
406B Small Phone Band VFO.....		75.00
410C Full-Coverage VFO.....		115.00
210 6 Meter VFO.....		120.00
VX-II Plug-in VOX.....		35.00
22 Dual VFO Adaptor		32.00
100kc Calibrator kit for 350C.....		19.50
500kc Calibrator kit for 250		19.50
RC-2 Mobile Remote Control kit		40.00
45 Swantenna – manual.....		65.00
55 Swantenna – remote control		95.00
Custom Contour Bumper Mount.....		24.95
Kwik-on Antenna Connector		3.25
14C 12v DC Module/cable		65.00
14CP As above, but Positive Ground.....		75.00
117X Basic 117v AC supply ONLY.....		65.00
230X Basic 230v AC supply ONLY.....		75.00
117 or 230vac Line Cord (specify).....		8.00
8' Cable w/plug (Supply to Transceiver)		6.00
230XC 230v AC Supply, speaker & cabinet..		115.00
14-230 12v DC supply w/230v Basic.....		140.00

AMATEUR ELECTRONIC SUPPLY

4828 W. Fond du Lac Ave.; Milwaukee, Wis. 53216
Phone (414) 442-4200

STORE HOURS: Mon & Fri - 9 am to 9 pm; Tues, Wed & Thurs - 9 am to 5:30 pm; Sat - 9 am to 3 pm

SAVE $50

Purchase any new Swan transceiver or linear at the regular price with no trade-in and you may take a $50.00 Credit toward the purchase of any other merchandise.

To: AMATEUR ELECTRONIC SUPPLY
4828 West Fond du Lac Avenue
Milwaukee, Wisconsin 53216 Q-9

I am interested in the following new equipment:

_____

I have the following to trade: (what's your deal?)

_____

Ship me the following New Equipment.

_____

I enclose $_____; I will pay balance (if any)

☐ COD ☐ 1 year ☐ 2 years ☐ 3 years

Name _____

Address _____

City _____

State _____ Zip _____

☐ SEND 1968 AMATEUR CATALOG

coverage nightly, will welcome your participation. VE2DBN is 146.6-Mc. mobile on a motorcycle. VE2AGP has now made WAC. VE2EC reports that 2-meter activity is great in the St. Maurice Valley. After depending so much on repeater operation on 2 meters one finds an awesome hush when lightning strikes and puts the repeaters out of commission. This points strongly to the need for emergency power at home and on mountain-top located repeaters. Traffic: VE2DR 129, VE2OJ 87, VE2BRD 57, VE2BVY 50, VE2DCW 42, VE2AJD 29, VE2EC 23, VE2RM 8, VE2CP 6, VE2ALE 5, VE2BTZ 3.

SASKATCHEWAN—SCM, Gordon C. Pearce, VE5HP—High on a hilltop, near Claybank, 50 miles west and south of Regina, a group of spirited hams planted a flag called VE5NN/5 and set up a tent to win the 1968 ARRL Field Day—and win it they did. The boys at Moose Jaw using the call VE5MA/5 and at Saskatoon under the call VE5AA/5 ran up excellent scores, too. The Saskatchewan Hamfest was held at the Beesborough Hotel in Saskatoon June 29, 30 and July 1. Noel Eaton, ARRL Candian Director was on hand to enjoy the festivities and to conduct the ARRL Forum. This was one of the finest meetings we have had the pleasure of attending at a hamfest and Noel is to be thanked and commended on his presentation. The Saskatchewan Amateur Radio League Annual Meting was held on Sun. afternoon and considered much important business concerning the Saskatchewan ham. The officers elected were VE5HP, pres.; VE5QK, vice-pres. VE5FH, the hard-working secy. is being roped in for another term. For theory proficiency the CKBI Trophy was won by VE4ZX; the C.W. Trophy by VE5PC; the Efficiency Trophy by VE5YY; the transmitter hunt by VE5VT; commercial mobile by VE5LG; homebrew mobile by VE5VD and the Liar's Contest by VE5TS. The book printed by the Saskatoon Club titled *From Spark to Space* is an excellent history of Canadian amateur radio and may be obtained by writing the secretary of the Saskatoon Club. QST

A Tester For Crystals And Transistors

(Continued from page 37)

is built on a small aluminum angle bracket and details of its construction are visible in the photographs.

Using the Tester

For crystal testing, insert the 2N706A in the transistor socket, plug the questionable "rock" into the crystal socket, set S_3 to the desired frequency range, and turn S_2 to ON. Tune C_1 for a rise in meter reading. S_1 should be switched to the appropriate position for the type of crystal being tested. An active crystal will cause the meter reading to rise to a peak when C_1 is tuned; the more active the crystal, the higher the peak. No change in meter reading will be a sure sign that the crystal is not oscillating. Output from the oscillator can be monitored on a receiver during crystal tests, if desired.

For checking unknown transistors, first determine whether they're n-p-n or p-n-p types by using a checker of the type mentioned earlier. If an n-p-n unit is to be tested, the battery polarity shown in Fig. 1 will be used (positive voltage on the collector). If the transistor is the opposite type, p-n-p, the battery polarity will have to be reversed so that the collector has a negative voltage connected to it. The meter connections also will have to be reversed. (The builder may wish to add a polarity-reversing switch in the battery leads for greater convenience. As shown, reversing the polarity requires unhooking the battery wires and reconnecting them.) Rough checks on the frequency range of an unknown transistor can be made while using the circuit as a crystal-controlled oscillator.

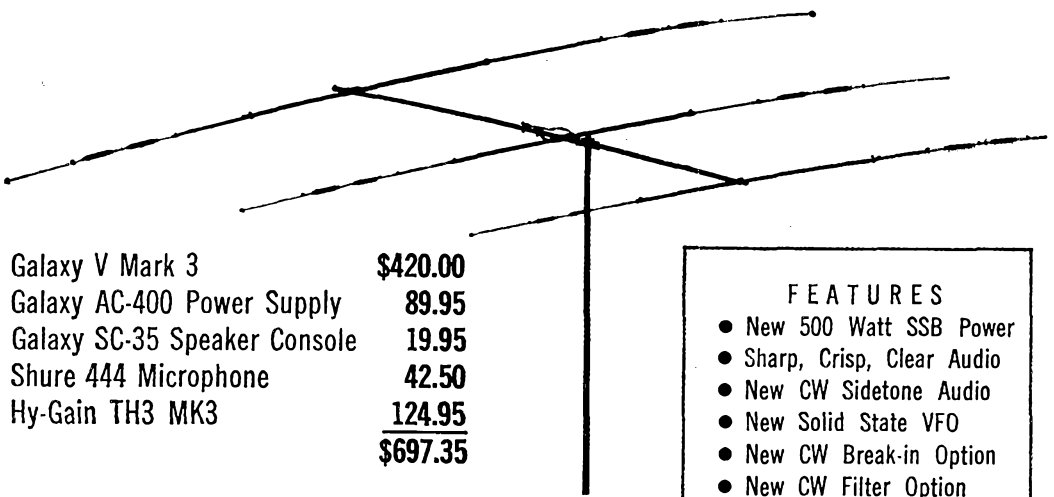
Exciting, NEW

GALAXY V MARK 3

hy-gain

TH3 MK3

Mobile or Fixed Station
5 BAND TRANSCEIVER



Galaxy V Mark 3	$420.00
Galaxy AC-400 Power Supply	89.95
Galaxy SC-35 Speaker Console	19.95
Shure 444 Microphone	42.50
Hy-Gain TH3 MK3	124.95
	$697.35

FEATURES

- New 500 Watt SSB Power
- Sharp, Crisp, Clear Audio
- New CW Sidetone Audio
- New Solid State VFO
- New CW Break-in Option
- New CW Filter Option
- New ALC Circuit
- New Precise Vernier Logging Scale

SPECIAL PACKAGE PRICE

$619.00 - $21. Month

No Down Payment — Immediate Delivery

Check with
BRYAN W5KFT
for all types
of amateur equipment

EDWARDS
ELECTRONICS

PHONE 806 POrter 2-8759 / 1316 19th Street / Lubbock, Texas 79401

With no crystal at Y_1 and the external tuned circuit plugged into J_1, Q_1 operates as a self-excited oscillator. By checking the unknown transistor in such an oscillator circuit one can get an idea of its upper-frequency limit. (It is usually more difficult to make the transistor oscillate near its upper frequency limits in a v.f.o. circuit than it is in a crystal-controlled hookup.) S_3 and S_4 are switched to the desired frequency range during v.f.o. operation and C_1 and C_2 are peaked for the operating frequency. The meter reading will rise when the stage is oscillating. The more vigorous the oscillation, the higher the meter reading will be. This will be a pretty good indication (high meter reading) that the transistor has a fairly high f_T rating with respect to the frequency at which it is oscillating. A 22-pf. plug-in feedback capacitor should be plugged into the crystal socket (in place of Y_1) for operation between 1.8 and 2 Mc. and S_1 set at the FUND position. A smaller capacitor, 10 pf., should be used for frequencies above 2 Mc. and S_1 set at the OVERTONE position. QST

World Above 50 Mc.

(Continued from page 97)

Heavy rainfall and the resulting thick foliage hampered 1296 propagation in southern New York and northern New Jersey this summer. WA2VTR says paths which had previously produced solid signals become nearly inaudible, so the summer was spent improving antennas. W2CCY, W2CQH and K2PPZ developed a method of mass producing seven-foot dishes using fibreglass and a mold. WA2VTR is now using a 7289 final with 23 watts output and a modified commercial television dish.

Two reports were received from Virginia. W4API and W3NG report what they believe to be the first 1296 contact between the third and fourth call areas, and K4QIF continues his quest of 1296 moonbounce. Rusty has 300 watts into a 10-foot polar-mounted dish, equipped with automatic tracking.

The Talcott Mountain U.h.f. Society, WA1IOX, Avon, Connecticut, operated on all bands, 50 through 10,000 MHz., during the June V.h.f. Party. The society wants schedules on those bands for the September contest. Write W1HDQ or W1QVF.

QST

Beware The Scrap Box

(Continued from page 47)

more than 10,000 ohms. If it reads much less, the transistor is probably shorted. With either an open or a short, the transistor will not work.

Fig. 7 shows similar connections for n-p-n transistors. The same resistance values should be obtained as with p-n-p types.

Although this transistor check is simple, it is a reliable way to determine if a transistor has a serious fault.

Use the Scrap-Box Component

The proverb, "An ounce of prevention is worth a pound of cure," certainly applies to the use of electronic components. In industry, incoming inspection departments are set up to check *new* components as they arrive from the

"FLAT PAK" INTEGRATED CIRCUITS!!

Solid State KING

BRAND NEW! $1.49 ☐ DUAL 914*

We include 30 Basic IC Projects RADIO-ELECTRONICS January & JULY 68

RTL Logic

*First time anywhere two identical IC's in one package.

-55° C to +125° C Electronics World:

EPOXY SILICON TRANSISTORS

- ☐ 3-FK-4046, 1W, 0.5A, npn, 250MC $1.00
- ☐ 3-2N3568, 350MW, 200MC, 200BVC, NPN $1.00
- ☐ 4-2N3563, NPN, 600MC, 200MW $1.00
- ☐ 3-2N3683, NPN, 1000MC, 5MA, 200MW .. $1.00
- ☐ 3-14 WATT, B-5000, npn, 3A $1.00
- ☐ 4-2N4313, PNP, 600MC, 200MW $1.00
- ☐ 4-2N3565, 500HFE, npn, 200MC $1.00

FAIRCHILD INTEGRATED IN-LINE CIRCUITS

Tested, with data sheets

- ☐ 930 DUAL 4 INPUT GATE & EXPANDER $1.00
- ☐ 933 DUAL INPUT EXPANDER $1.00
- ☐ 944 DUAL POWER GATE $1.00
- ☐ 946 QUAD 2 INPUT NAND/NOR GATE $1.00
- ☐ 952 DUAL 2 INPUT INVERTER GATE $1.00
- ☐ 953 2-2-3 INPUT AND GATE $1.00
- ☐ 954 DUAL 4 INPUT AND GATE $1.00
- ☐ 955 8 INPUT AND GATE W/2 INPUTS $1.00
- ☐ 956 DUAL INPUT BUFFER $1.00

100's of other IC's including: Flip-Flops, Registers, Adders, etc. Write for listing.

FAIRCHILD ** "FLAT PAK" INTEGRATED CIRCUITS

BRAND NEW! RTL

Sale		
☐ 900	Buffer	$1.49
☐ 903-903*	3 Input Gate	$1.69
☐ 904-904*	Half Adder	$1.69
☐ 914-914*	Dual 2 Input Gate	$1.49
☐ 923	JK Flip Flop	$1.69
☐ 923-923*	JK Flip Flop	$1.98
☐ 927	Quad Inverter	$1.69

*First time anywhere two identical IC's in one package, example 923-923 contains two separate JK flip-flops in one package. 914's and 923. We include 50 uses. ** Licensed. ¼" x ¼"

LINEAR AMPLIFIERS *with circuits & data*

- ☐ 702C WIDE BAND DC $3.98
- ☐ 703H RF-IF-FM $1.49
- ☐ 709C HI-GAIN OPERATIONAL $3.98
- ☐ 710C HI-SPEED DIFF. COMP. $3.98
- ☐ 711C DUAL COMPARATOR $4.98

400 mc 5 for $1 NPN 2N706 ☐ SILICON

Watts	V_{cb}	H_{fe}	ma
.5	30	TO-300	150

$10 ORDERS CHOOSE ANY $1 ITEM Free

100 MICROAMP PANEL METER

CLOSEOUT! 2.88

SILICON POWER STUD RECTIFIERS

PIV	3A	6A	12A	55A
50	☐ .06	☐ .16	☐ .20	☐ .50
100	☐ .07	☐ .22	☐ .25	☐ .75
200	☐ .09	☐ .30	☐ .39	☐ 1.25
400	☐ .16	☐ .40	☐ .50	☐ 1.50
600	☐ .20	☐ .55	☐ .75	☐ 1.80
800	☐ .30	☐ .75	☐ .90	☐ 2.30
1000	☐ .40	☐ .90	☐ 1.15	☐ 2.70

1 AMP TOP HAT AND EPOXIES

PIV	SALE	PIV	SALE	PIV	SALE
50 ☐	.05	800 ☐	.19	1800 ☐	.87
100 ☐	.07	1000 ☐	.31	2000 ☐	1.05
200 ☐	.08	1200 ☐	.44	3000 ☐	1.60
400 ☐	.11	1400 ☐	.62	4000 ☐	1.90
600 ☐	.16	1600 ☐	.72	10000 ☐	4.80

★ Handles 2 Amps 2 AMP 800 PIV TOP HAT RECTIFIERS 6 for $1 ☐

TUNNEL DIODE ☐ 1N3716/TD3 Actual Size

Used in many oscillator and amplifier circuits $1

1. AMP MICROMINIATURE SILICON RECTIFIERS

Actual Size →

PIV	Sale	PIV	Sale
50 ☐	5¢	600 ☐	20¢
100 ☐	7¢	800 ☐	25¢
200 ☐	9¢	1000 ☐	31¢
400 ☐	12¢		

10¢ for bargain catalog on ☐ 100's of $1 Poly Pak assortments, ☐ transistors, rectifiers, zeners, ICs, Triacs, SCRs, etc., ☐ parts & equipment. "It's the hottest bargain parts catalog in the industry."

Terms: add postage. **Rated:** net 30, cod's 25%
Phone Orders: Wakefield, Mass. (617) 245-3829
Retail: 211 Albion, St., Wakefield, Mass.

POLY PAKS

P.O. BOX 942 M
Lynnfield, Mass. 01940

manufacturer. Industrial assemblers know how time-consuming and expensive it is to trouble-shoot electronic equipment *after* the components are wired in. The scrap box is a wonderful source of electronic "goodies," but until these components are checked . . . beware! QST

Results, June QSO Party

(Continued from page 69)

Virginia

K4SUM 5094-144-41-ABDE
K4QIF 1955- 75-23-BD
W4UIB 1380- 60-23-AB
WB4GFG 1242- 69-18-AB

West Virginia

WRAEC 864- 48-18-B
WA8KJX 432- 27-16-A
WN8YHC 21- 7- 3-B

ROCKY MOUNTAIN DIVISION

Colorado

WAØSLM/Ø (WAØS LVM SLM) 7358-283-26-AB
WAØPHZ/Ø (6 oprs.) 7279-251-29-AB
WAØSKH (8 oprs.) 3984-165-24-ABD

New Mexico

W5FO/5 (8 oprs.) 2970-110-27-AB
W5IXR/5 (W5s IXR IXS, WA5OOR) 960- 80-12-A

Wyoming

W7VDZ 550- 50-11-A

SOUTHEASTERN DIVISION

Alabama

WB4DQW 7849-167-47-AB
K4WHW 1430- 65-22-A
WB4GZW 242- 22-11-A

Eastern Florida

WA4STJ 9870-235-42-A
W4GDS 8016-167-48-A
W4OJU 4805-155-31-A
WB4HIP* 1404- 52-27-A
K1FFE/4 15- 5- 3-B

Georgia

WB4FMJ 2472-103-24-AB
K4HAV 1840- 80-23-A
WA4ZEN 18- 6- 3-A

West Indies

W1HOY/KP4 7998-186-43-A

SOUTHWESTERN DIVISION

Arizona

WA7CJO 4995-135-37-A
K7IPZ 704- 88- 8-AB
K7NHK/7 665- 35-19-AB
WA7BBM (K7SPE, WA7BBM) 680- 40-17-A

Los Angeles

WB6PKA/6 678-113- 6-B
WA6FJJ 272- 68- 4-B
K6UMV 2- 2- 1-B
K6BPC (9 oprs.) 6690-427-15-ABC
W6IAK/6 (W6IAK, W9DHK) 424- 53- 8-AB

Orange

K6IBY 1260- 56-20-ABC
WA6OUE 912- 76-12-AB
W6HPH 300- 21-10-BDE
K6YNB/6 (K6s DLY YNB) 4928-301-16-ABC

San Diego

WA6ZQU/6 3528-126-28-AB
WB6JLC 150- 24- 6-ABC

Santa Barbara

W1LXE/6 338- 26-13-A
WB6ZPS (WA6s BPU ZPS) 1524-121-12-ABD

WEST GULF DIVISION

Northern Texas

K5IPV 9495-211-45-A
W5BDF 4800-160-30-A
K5IVB 4234-146-29-A
WA5CAX 2760-120-23-A
WA5DOH 1156- 68-17-A
WA5RUP 630- 45-14-A

Oklahoma

W5WAX 13,149-247-53-ABD
WA5TVY 2375- 95-25-A
K5CBA 1725- 75-23-AB
WA5DWK 1564- 68-23-AB
WA5OUU 1380- 69-20-AB
W5VCJ 960- 40-24-A
WA5LXT 264- 22-12-A
W5FMX 242- 22-11-A
W5LOW 230- 23-10-AB

Southern Texas

WA5TXI 7548-204-37-A
WA5IYX 880- 44-20-A
W5FSC 180- 15-12-A
W1HDQ/5* 91- 13- 7-A
K2OJD/5 45- 9- 5-A
K5BDQ 30- 15- 2-B
WA5KPU (W5ZNM, WA5KPU) 6970-205-34-A

CANADIAN DIVISION

Quebec

VE2SH (VE3RM, opr.) 5472-145-36-ABD
VE2HW 1501- 67-19-BDE
VE2RM (14 oprs.) 7956-204-39-AB

Ontario

VE3BPR 7084-135-46-ABD
VE3EZC 3216-116-24-BD
VE3DSQ 1456- 91-16-AB
VE3ZZZ (VE3ABG, opr.) 1122- 66-17-A
VE3GDD 741- 57-13-AB
VE3DSE 480- 34-10-BD
VE3AIB 357- 45- 7-BD
VE3EVW 319- 23-11-BD
VE3ERQ 207- 69- 3-B
VE3FIB (VE3s ASO DJT FIB) 13,392-275-48-ABD
VE3SAU (9 oprs.) 8008-182-44-AB
VE3BGA (VE3s BDX BGA GAF) 6460-160-38-ABD

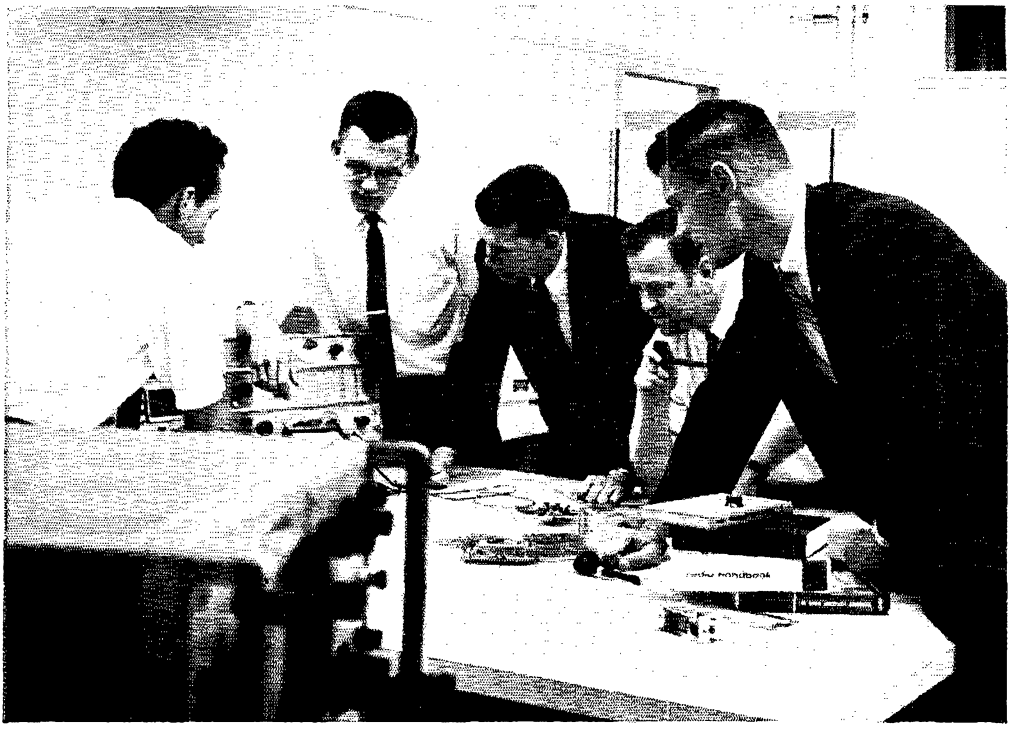
Manitoba

VE4MA 1098- 61-18-A

British Columbia

VE7XF 1890- 90-21-AB
VE7ASM/7 (VE7ASI, opr.) 1224- 68-18-AB
VE7BQH 60- 11- 5-BD
VE7BBG 44- 10- 4-BD

Check logs: WA2CJU, K4MHS. QST



What's the BIG Idea?

When it's tough to separate last year's science fiction from today's state of the electronic art . . . when even the "new" transistor has been superseded in many cases by more versatile and efficient devices . . . and most of the electronics industry has been turned upside down . . . WHY DOES AMATEUR RADIO STICK TO THE TECHNOLOGY OF THE FIFTIES?

The manager of advanced development for a big communications company—an active ham since his early teens — asked the same question of another long-time enthusiast and nationally-known authority on solid state devices. They observed that effective **application** of the new technology — largely a product of the aerospace industry — demanded a high degree of engineering sophistication and a variety of technical capabilities not generally found outside of that industry . . . Their idea . . . why not organize a group of outstanding professional engineer/hams . . . to do the job . . . and develop their own new generation of no-compromise ham gear?

The idea grew . . .

Word got around . . . and it became obvious from the interest it aroused that a lot of serious amateurs were eager for really modern equipment . . .

. . . and grew . . . with the creation of a unique engineering team . . . young and enthusiastic . . . encompassing several advanced EE degrees . . . more than half-century of up-to-the-minute communications engineering experience . . . plus some seventy years' post-war hamming . . . DX, contests, VHF, RTTY . . . the whole spectrum of amateur radio . . .

. . . and became really big . . . when the backing of a major corporation turned it into an intensive, full-time professional operation.

The "BIG IDEA" became SIGNAL/ONE.

SIGNAL/ONE is a new criterion for judging amateur radio equipment . . . sophisticated engineering combined with classic ham ingenuity to offer you unprecedented performance . . . and operating pleasure. Unique new marketing and warranty policies reflect SIGNAL/ONE's pride and confidence in this superb new line . . . and the determination to keep SIGNAL/ONE . . . NUMBER/ONE . . . In investment value.

WHAT'S THE BIG IDEA?

It's all the performance . . . the versatility and convenience . . . the quality . . . that a few demanding engineers knew was possible . . . and wanted to put into their own ham gear . . . They did . . . and the result is . . . SIGNAL/ONE.

The remarkable SIGNAL/ONE line will soon be available for you to put through its paces . . . when you use it you'll agree . . . the idea was great . . . and the result well worth waiting for . . .

signal/one

Indian Rocks Beach, Florida

Silent Keys

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

WA1ANK, John B. Guild, Andover, Mass.
W1ISJ, Warren A. Hamilton, Raymond, Maine
K1MRT, Kirk C. Fourcher, Ridgefield, Conn.
ex-1RM, ex-W1RM, Royal E. Mayo, Lynn, Mass.
K1TMV, Vincent A. Jablon, Newtown, Conn.
W2CYW, William F. Heffner, Albany, N. Y.
WA2DQL, Dr. John A. Jackson, Waterport, N. Y.
ex-W2FSP, Saul J. White, New Rochelle, N. Y.
W2KO, Edgar L. Sypher, Hicksville, N. Y.
WA2KOC, John J. Kic, Delevan, New York
K2RZR, Winchester R. Wood, Schenectady, N. Y.
W2TM, Kenneth A. Durst, Bridgeton, New Jersey
W2ZTX, Walter P. Kruger, Long Island City, N. Y.
W3HT, Frank Caulfield, Stewartstown, Pa.
K3MCO, Thomas J. Bradley, Ardmore, Pa.
W3TOJ, Henry O. Walker, Warren, Pennsylvania
WB4AJG, Corbin Breeding, Redfox, Kentucky
W4CKX, David E. Hollinger, Sarasota, Florida
WA4FJV, John A. Klingensmith, Ormond Beach, Florida
W4MH, Lyle H. Beebe, Virginia Beach, Va.
K4PSH, S. Wilkes Dearing, Memphis, Tenn.
W4QCB, William Leslie Porter, Lynn Haven, Florida
K4UCZ, Walter G. Alford, Youngsville, N. C.
K4UJW, Adam F. Moranty, Ormond Beach, Florida
W5DGB, George Hidalgo, Plaquemine, Louisiana
K6GOK, Melvin Thomas, Cucamonga, California
WA6JVR, Glen J. Messick, Granada Hills, Calif.
W6MEG, Charles M. Gutheil, Arcadia, Calif.
WB6SIL, W. E. Butterfield, Oakdale, Calif.
W6WFR, Victor H. Ortegren, Pleasant Hill, California
K6ZIP, Herbert B. Buxton, Jr., Hollywood, Calif.
W7RPH, Floyd L. French, Portland, Oregon
W7VT, Robert O. Brown, Portland, Oregon
W8GQA, Henry L. Otos, Lambertville, Mich.
W8NF, Charles W. Thomas, Alden, Michigan
W8WFA, Joseph Gardella, East Detroit, Michigan
W9BBN, Robert A. Fink, Evansville, Indiana
K9KBQ, Leonard D. Sylvan, Chicago, Ill.
K9QEQ, Murray A. Cohee, Mooresville, Indiana
K9VQO, Guy Hustead, Creve Coeur, Illinois
WØBBJ, Bernard J. Bucher, Topeka, Kansas
WAØKZT, Robert C. Campbell, Independence, Missouri
G3ZC, Hugh E. Cockrem, Newton Abbot, Devon, England
KH6ALM, Murray Befeler, Honolulu, Hawaii
TG5HC, Bro. Jeronimo, J.S.C. Patricio, Huehuetenango, Guatemala, Central America
VE3AAW, Gabriel F. Sellwood, Scarborough, Ontario, Canada
VE3AXV, C.O.F. Mogk, Hamilton, Ontario, Canada
VE3BLD, Fred J. Dagg, Renfrew, Ontario, Canada
VE3CYV, Hugh Borbridge, Ottawa, Ontario, Canada
VE4DB, G. V. Lawrence, Anola, Manitoba, Canada
ZL2SM, Dave A. Jenkins, Wainuiomata, New Zealand

1967 VE/W Contest Results

(Continued from page 62)

Manitoba

3C4ST	8560-107-40-	-B
VE4GB	5760- 24- 8- 1	-A

Alberta

VE6GN	37,455-227-55-13	-A
VE6UV	22,256-214-52-	-B
3C6JW	630- 15-14-	-A

British Columbia

3C7AHD	103,872-541-64-16½	-A
VE7AXJ	10,947- 89-41-18½	-A
VE7QC	10,374- 91-38- 7	-A

Northwest Territories

VE8RCS	18,894-201-47-20	-B

U. S. DIVISIONS

Arizona

K7ZRC	8280- 46- 9-18½	-B

Connecticut

W1HPD	3600- 15- 8- 9	-A

Eastern Florida

WA4WIP	18,810- 57-11-17	-A
WB4ERZ	5940- 22- 9- 8	-B

Georgia

K4BAI	900- 6- 5- 1	-A
WB4EMF	240- 4- 2- 1½	-A

Illinois

W9QQG	11,180- 36-11- 4½	-A
WA9CIO/9	5700- 19-10- 2	-A
WA9FBC	1620- 9- 6- 1½	-A
K9UCR	80- 2- 2- ½	-B

Indiana

WA9UGI	8100- 27-10-11½	-A
K9GEL	2940- 14- 7- 3	-A

Los Angeles

K6YFZ	4410- 21- 7- 4	-A

Maryland-D.C.

WA3DNH	2310- 11- 7- 4	-A

Michigan

W3TBF/8	7700- 38- 11- 7	-B
W8RQG	7260- 33-11- 8	-B
W8MFU	1600- 16- 5-10	-B

Missouri

WAØEMS	600- 5- 4- 1½	-A

Mississippi

K5SVC	23,760- 72-11-12½	-A

Nebraska

WAØOPQ	4400- 22-10-11	-B

Northern Texas

WA5CBE	4950- 15-11- 1	-A
WA5ALB	3780- 27- 7- 5	-B
K5JEF	1800- 15- 6- 2½	-B
W5QGZ	270- 3- 3-	-A

Ohio

WA8UPI	11,550- 35-11-	-A

Orange

WB6YPX (W6DLE, opr.)		
	1020- 9- 6-	-A

San Diego

WB6VFL	800- 10- 4- 1	-B

Sacramento Valley

WB6UNP	4560- 19- 8- 4	-A
WB6SVC	1800- 12- 5- 2	-A

Santa Clara Valley

W6ISQ	800- 10- 4- 1	-B
WB6ITM	60- 2- 1- ½	-A

Southern Texas

WA5SFO	1440- 12- 4- 4	-A

South Carolina

WA4JDG	3060- 17- 9- 5	-B

Tennessee

K4HQD	2880- 16- 6- 7½	-A
WB4FFW	180- 3- 2- 1	-A

Utah

WA7EVO	6820- 31-11- 3	-B

Wisconsin

W9PQA	4560- 19- 8-	-A

Check logs; VE3AWE, 3C3DU W2GUZ, W6CLM, VE3ZF/W6.

QST

A General Purpose V.F.O.

(Continued from page 41)

With the v.f.o. in its case, and with the bottom enclosed by the main chassis or an aluminum plate, again apply voltage and listen for the signal in the receiver. Set C_6 for approximately mid-range. C_5 should be fully meshed and C_7 should be approximately half meshed. Adjust the slug in L_1 until the v.f.o. signal is heard at the lowest desired frequency. Next, tune C_5 to minimum capacitance (unmeshed) and tune the receiver until the signal is heard. If the signal falls near the desired *upper* range, no additional adjustments will be necessary. If it falls too high, or too low to give the necessary v.f.o. tuning range, juggle the settings of C_7 and L_1 until the desired bandspread is obtained. If the v.f.o. is to be used on the higher frequencies listed in Table I, the builder may wish to remove plates from C_5 and increase the capacitance of C_7 to limit the tuning range of the v.f.o. — *W1CER*

Notes on the "Vacation Special"

(*Continued from page 35*)

slow transmit-receive operation of antenna relay K_{45} caused by the voltage buildup across C_9.

Results

As evidenced by the receiver's ability to pull in weak c.w. signals through the heavy QRM that existed on Field Day, and by the transmitter's increased range on a.m. phone, both modifications are well worthwhile. If nothing else, 50 watts of inexpensive, clean, Class B transistor power from a modulator whose collector current swings up to several amperes in a circuit that uses an 866 filament transformer as a modulation transformer will stimulate several minutes of technical conversation! QST

Beat McCoy

(*Continued from page 58*)

"You run a kw. to a single 811? That tube is only good for about 250-300 watts."

"Then you agree I beat McCoy in the technicals too!"

"What kind of power supply you got?"

"Oh, I swapped a fella my real old beat-up 4-element beam for his pretty new exciter supply."

"An exciter supply would give you about 200 watts max. How do you make a kw. supply out of that?"

"Who needs a kw. supply for a kw. final? I told ya this was grounded grid."

"Grounded grid . . . grounded plate . . . what's the difference? A 200-watt supply don't get ya a kw."

QRS a bit now, Charlie, QRS. It all depends how ya drive a grounded-grid final. If ya just happen to have a left over emergency exciter around the shack . . . say one that's good for a kw. all by itself . . ."

"You drive your 811 final with your regular moderately-powered kw. rig? You're crazy!"

"Ohhhhhh yeeeaaahhhh? Well, just how do ya calculate power in a grounded-grid final? The book says you *add* the drive power to the final power. Right?"

"You mean your kw. driver plus your "Real McCoy" 811 final with grounded griii . . . grrrrrr. . . ."

"Sure. Ya run the 811 final at 200 watts, but you drive it with 800 watts. That adds up to a nice crisp kilowatt. Of course, ya want to key it kinda fast, else the plate will blind ya. But what's the difference, Charlie, I beat McCoy by $.93163." QST

HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**
(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.
(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is **no charge for zipcode, which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**
(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**
(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

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

PEORIA Hamfest, September 15, Peoria, Illinois. Same place as last year, for details, see September 1967 issue of QST. Hamfest Calendar. Advance registration: $1.50. Write: Ferrel Lytle, W9DHE, 419 Stonegate Road, Peoria, Illinois 61614.

A.W.A. Historical Radio Meet for old time amateur and commercial operators, historians and collectors. Smithsonian, Washington, D.C. Oct. 5th. Write W2QY for details.

"SAROC" Fourth Annual Fun Convention scheduled January 8-12, 1969, in Hotel Sahara's new space convention center, Las Vegas, Nevada. Advance registration closes January 1, 1969. Ladies Program in Don the Beachcomber. Technical seminars, FM, MARS, RTTY, OCWA, WCARS-7255. Registration $12.00 per person entitles "Saroc" participant to special room rate, $10.00 plus room tax per night single or double occupancy, admittance to cocktail parties, technical seminars, exhibit area, Hotel Sahara's late show, Sunday breakfast equal to any banquet dinner. Ask any "Saroc" veteran. Brochure planned November mailing for details QSP QSL card with zip Southern Nevada ARC, Box 73, Boulder City, Nevada 89005.

INVITATION: New York Radio Club invites New York Area hams and SWLS to its regular monthly meetings, the second Monday of each month at the Hotel George Washington, Lexington Ave. and 23rd St. at 8 PM. W2ATT, New York Radio Club.

QCWA—Quarter Century Wireless Association is a nonprofit organization founded 1947. Any amateur radio operator licensed 25 or more years is eligible for membership. Write for information, A. J. Gironda, W2IE, 1417 Stonybrook Ave., Mamaroneck, N.Y. 10543.

PRE WORLD WAR I operators will find many of their old buddies are members of the Old Old Timers Club. We welcome all applicants whose first wireless contact was more than 40 years ago but give special consideration to those pre-World War I Pioneers, including Charter Membership. Write to W5-VA. Secretary of the Old Old Timers Club, P.O. Box 840, Corpus Christi, Texas 78403.

THE Ham-Dinger: Warren (Ohio) A.R.A. 11th Annual Hamfest, Sunday, August 25th, Newton Falls, rain or shine. Follow arrows from Rte. 534 or turnpike Exit 14. Talk-in stations, 10-6-2. Swapshop homebrew-code contests, XYL-YL program, raschews galore. Food sold, or bring picnic. For Hamfest Bulletin, write W.A.R.A., Box 809, Warren, Ohio 4481.

BEAUTIFUL Gold bordered certificate that no ham station should be without. Answers questions that a visitor may ask. Yours for a donation of fifty cents in coin to: The Rockaway Amateur Radio Club, P.O. Box 205, Rockaway Park, N.Y. 11694.

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 48104. Tel. NOrmandy 8-8262.

RTTY Channel filters, octal mounted, 2125/2975, $5.95 pair. Special filters for TT/L-2, SASE for information. 88 Mh. toroids, uncased, 5 for $2.50. Herman Zachry, WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

TR-4, $480.00; AC-4, $83.00; DC-3, $123.00; R4-B, $360.00; T4XB, $360.00; MS-4, $17.50; RV-4, $83.00; L-4B, $580.00; W-4 $43.00; factory-sealed boxes, fully guaranteed. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404. Tel: 919-299-8767.

QSLS? ? QSLS? ? America's finest! ! Personalized made-to-order! Samples 25¢. DeLuxe 35¢. Religious 25¢ (refunded). Sakkers, W8DED, Box 218, Holland, Michigan 49423.

QSLS "Brownie" W3CJI, 3111 Lehigh, Allentown, Penna., 18103. Samples 10¢. Catalog 25¢.

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

C. FRITZ WSLs. samples 25¢. Stamps (deductible). Box 1684, Scottsdale, Arizona 85252.

QSLS—SMS. Samples 25¢. Malgo Press, Box 373, M.O., Toledo, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

10¢ Brings free samples. Harry R. Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSL, SWL, cards that are different. Quality Card stock, Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio 45015.

CREATIVE QSL Cards. Personal attention, Imaginative new designs. Send 25¢, Receive catalog, samples, and 50¢ refund coupon. Wilkins Printing, Box 787-I, Atascadero, Calif. 93422.

RUBBER Stamps $1.15 includes tax and postage. Clints' Radio, W2UDO, 32 Cumberland Ave., Verona, N.J. 07044.

QSLS, finest YLRL's, OMs samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

3-D QSL cards, recognized leader among raised designs. Compliments aplenty! Prized collector's item. Samples 25¢ (refundable). 3-D QSL Co., Monson, Mass. 01057.

QSLS, SWLS, WPE. Samples 15¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix, Ariz. 85017.

QSLS, samples, 10¢. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere, Massachusetts 02151.

QSLS 300 for $4.35, samples 10¢. W9SKR, George Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples. Thomas St., Riegel Ridge, Milford, N.J. 08848.

QSLS-100 3-color glossy $3.50; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

SHARP QSLs, 10¢. Filmcrafters, Box 304, Martins Ferry, Ohio 43935.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to Dealers or Clubs. Tepabco, John, K4NMT, Box 198T, Gallatin, Tenn. 37066.

PICTURE QSL cards of your shack, etc. from your photograph. 500, $12.00. 1000 $15.25. Also unusual non-picture designs. Generous sample pack, 20¢. Half pound of samples 50¢. Raum's, 4154 Fifth St., Philadelphia 19140.

QUALITY QSLS: Samples 25¢ (refundable). R. A. Larson Press, Box 2387, Eugene, Ore.97402.

QSLS by K1FF, $2.00 for 100. Others at reasonable prices. Samples 25¢ deductible. K1FF QSLS, Box 33, Melrose Highlands, Mass. 02177.

QSLS. Gorgeous rainbows, cartoons, etc. Top quality! Low prices! Samples 10¢ refundable. Joe Harms, WA4FJE/W3COP, 905 Fernald, Edgewater, Fla. 32032.

QSLS. Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors 100-$3.00 up. Samples 15¢. Agent for Call-D-Cals. K2VOB Press, 240 West Kinney St., Newark, New Jersey 07103.

QSLS, WA6QAY Press, 15008 Orchid Ave., Poway, Calif. 92064.

RAISED Lettering QSLs. Ace Printing, 6801 Clark Ave., Cleveland, Ohio 44102.

QSL cards. Finest quality. Economical prices. Fast service. Free samples. Little Print Shop, Drawer 9848, Austin, Texas 78757.

RUBBER Stamps. Return mail delivery, postpaid. Basic price, $1.00 first line, 50¢ each additional line. Request type style chart. Fulton Rubber Stamps, Route 216-A, Fulton, Maryland 20759.

QSLS. By Jansen, K2HVN. Samples, 25¢. 860 Atlantic St., Lindenhurst, N.Y. 11757.

RUBBER Stamps. Four lines with call letters, $1.50 postpaid. Finest quality, fastest service. Sherman's Stamps, Box 234, Natrona Hts, Penna. 15065.

BADGES. Engraved laminated plastic 1" x 3". Call and your first name, also for "XYL" and "Jr. Op" $1.25 each, prepaid. Club badges designed. K6PBE, Box 1307, Alhambra, Calif. 91802.

NAMEPLATES. Call Letters, wall pressure-sensitive, $2.00; desk type, $2.50. Kronenberg, 1492 High Ridge Road, Stamford, Conn. 06903.

ENVELOPES! Amateurized wid ur call, adr! $12.00 per 1000. K3ZWA Press, R. 1, Elizabethtown, Penna. 17022.

MANY Extras!! Free samples!! K.L.L. Press, Box 258, Martinsville, New Jersey 08836.

RUBBER Stamps. 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

JOHNSON Kilowatt AM and SSB amplifier with pedestal, audio driver transformer and low-pass filter, $400. Collins 32V3 with low pass filter and spare 4D32, $150.00. Both in gud condx and not used many hours. W8NIZ, 1851 Hunt Club Drive, Grosse Pointe Woods, Michigan 48236. Tel: 881-0044.

TOWER Sale: Tri-Ex extra large deluxe crank-up tower HZ-471N extended 71 ft. collapsed 21 ft. Weight 1050 lbs. Unit available for rotating entire tower from bottom. Self-supporting. 3 yrs. old. Gud condx for large beams. Ham net $1220. Other details and photo on request. Only $750.00. W9CKF, Porter Barnes, 2922 Muesterman, Evansville, Indiana 47712. Phone 812-425-9857.

DRAKE R4-B receiver with MS-4 spkr, $360.00; Drake T4-XE transmitter with AC-4 p/s, $420.00, Hallicrafters HA-1 keyer with Vibroplex key, $65.00; Ham-M rotor, $80.00; Mosley TA-33 Jr, $50.00; all used less than seven hours and are in original cartons. Jeff Poll, WA3BZO, 155 East Godfrey Ave., Apt. #G304, Phila., Penna. 19120.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 813B No. Federal Hiway, Fort Lauderdale, Florida.

WELCOME To Maritime Mobile service net. 14317 Khz, daily 2130Z. Amateur Radio's service to the Fleet. Vic Barry, RDC USS Corry, DD817 FPO, N.Y., N.Y. 0950.

SELL swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

DUMMY Loads, 1 KW, all-band, $7.95; wired, $12.95. Ham Kits, P.O. Box 175, Cranford, N.J. 07016.

WANTED: Military, commercial, surplus, airborne, ground, transmitters, receivers, test-sets, especially Collins Airborne. We *pay cash, and freight. Ritco* Electronics, *Box 156*-Q567, Annandale, Va. Phone: 703-560-5480 collect.

WANTED: 2 to 12 304TL tubes, Callanan, W9AU, 625 West Jackson Blvd., Chicago, Ill. 60606.

HT-44 and A.C. Supply $250.00; SX-117, $225.00; SR-42 and VFO $150.00. All like new. W4MVC, 10 Carlen Ave., Asheville, N.C. 28804.

MANUALS for surplus electronics. List 15¢ S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

HAM'S Spanish-English manual $3.00 Ppd., Gabriel, K4BZY, 1329 N.E. 4th Ave., Fort Lauderdale, Florida 33304.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear. Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

1916 OSTS needed for personal collection. Price secondary. Ted Dames, W2KUW, 308 Hickory Street, Arlington, New Jersey.

FOR Sale: SB-101 and SB-200. Wanted, kits to wire. Heath preferred. 12% of cost, some in stock. Professionally wired. Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

WE buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

JOYSTOCK Variable frequency antenna systems, solve space problems. Available immediately, SWL Guide, 218-S Gifford, Syracuse, N.Y. 13202.

CASH Paid for your unused Tubes and good Ham and Commercial equipment. Send list to Barry, W2LNI. Barry Electronics, 512 Broadway, N.Y., N.Y. 10012. Tel. (212) WAlker 5-7003.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S. R388, R390, GRC. Any 51 series Collins unit. Test equipment, everything. URM, ARM, GRM, etc. Best offer paid. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

INTERESTING Sample copy free. Write: "The Ham Trader," Sycamore, Illinois 60178.

WANTED: For personal collection: Learning the Radiotelegraph Code, Edition 4; How to Become a Radio Amateur, Edition 9; The Radio Amateur's License Manual, Edition 2, 11, 12. W1CUT, 18 Mohawk Dr., Unionville, Conn. 06085.

RTTY gear for sale. List issued monthly. 88 or 44 Mhv toroids, five for $1.50 postpaid, Elliott Buchanan & Assoc., Inc. Buck, W6PVC, 1057 Mandana Blvd., Oakland, Calif. 94610.

SELL: Exclnt CE100V, $495. Kent Merkel, WØPHM/TF2WLD, Box 144A, RR#1, Lexington Park, Md. 20653. Tel: 301-863-5967.

WE'RE Trying to complete our collection of Callbooks at Headquarters. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington, Conn. 06111.

TUBES, test equipment, transmitters or receivers. Any and all types bought for cash or trade on new or used ham gear Air Ground Electronics, 64 Grand Place, Kearny, New Jersey 07032.

WANTED: Model #28 Teletype equipment, R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

NOVICE Crystals; 40-15M, $1.33, 80M, $1.83. Free list. Nat Stinnette, Umatilla, Fla. 32784.

TOROIDS. 88 mh uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

SAVE. On all makes of new and used equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts, 617-598-2530 for the gear u want at the prices u want to pay.

ESTATE Liquidation. SSAE brings list *quality* equipment. Paradd Engineering, 284 Route 10, Dover, N.J. 07801.

TOOORES—Tranzeesters: New, unused. 6146B, $4.00; 6CW4, $1.60; 811-A, $4.25; 417-A, $4.50; 6146-A, $2.95. Free catalog. Vanbar Distributors, P.O. Box 91z, Paramus, N.J. 0765.

1000 PIV 1.5 amp. epoxy diodes, includes by-pass capacitors and resistor. 10 for $3.75 ppd U.S.A. Fully guaranteed. East Coast Electronics, 123 St. Bonifice Road, Cheektowaga, N.Y. 14225.

3000 V 60 3MfF brand new GE Pyronal oil capacitors, $3.00 each. Can mail, 3-lbs. each shipping weight. FOB P. Wandelt, RD #1, Unadilla, New York 13849.

TELETYPE Gears, shifts, keytops, typebars, motors, forks, typeboxes, typewheels, punchlocks, nonoverliners, CR-LFs TRs, TDs, KSRs, ASRs, FSCs, toroids, fresh paper, testsets, SRT subchasses. Buy, too! Typetronics, Box 8873, Ft. Lauderdale, Fla. 33312.

NEW MEXICO: Like new SX-117, recently serviced and realigned, $225; HT-30-31, 750W, excellent, low cost SSB, $225.00; SBE-33, mint $175.00. Martin Goodwin, Drawer 1628, Clovis, N.M. 88101.

WANTED Lampkin mod. 105B frequency meter and modulation meter model 205-A. XE2Q, J. R. Agraz, P.O. Box 544, Hermosillo, Sonora, Mexico, Tel: 3-54-46.

SELL Or trade: *QST, CQ, Electrical Experimenter*, Radio, Modern Electronics Wireless Age and Callbooks, any quantity. Wanted; Old radio gear, books and magazines. Erv Rasmussen, 164 Lowell, Redwood City, Cal. 94062.

COLLINS 75A-4, #3495 three tilters, exclnt condx. $385.00; BC-221 $45.00; LM-14, $35.00; Hickok OS8U 'scope, $40.00; Simpson VTVM, RF probe $35.00; Eico dipper, $20.00. OSTs from 1930's to present. Large assortment of parts, tubes, meters. ARC-5 revrs. KW xmtr. SSR xmtr. At "give away" prices. W2ETM, tel: 212-375-6151/338-4241.

WANTED: Tubes, Diodes, Transistors and integrated circuits. Astral Electronics Corp., 150 Miller Street, Elizabeth, N.J. 07207. Tel: (201)-354-2420.

OFFER $10 for May 1913 Elec. Experimenter, $3, Oct. 1914; $2 May 1919; $5 1919 issues Radio Amtr. News; $10 any 1908 Modern Electrics; $10 gov't. amtr. Callbooks 1922-26. Less for later dates, or poor condition. For historical library, none sold. Wayne Nelson, W4AA, Concord, North Carolina 28025.

YAESU FT-DX-400 transceiver for sale, W8AO, 2942 Riverview Blvd., Silver Lakes Village, Ohio 44224.

SALE: Heathkit DX-60, $50.00 Heathkit HG-10 VFO, $25.00. Both in excellent condition. Hal Kusner, WB2PHW, 21 Charles Court, Fair Haven, New Jersey 07701.

HALLICRAFTERS HT-37, perfect electrical condx. All new tubes, $200. No trades, please. L. E. Herring, Jr., WB4ARK, 2805 Glendale Rd., Charlotte, N.C. 28209.

WRL's used gear has trial-terms-guarantee! SR-46, $94.50; SR-500, $199.95; HW-12, $89.95; HW-22, $89.95; Galaxy V, $289.95; Galaxy 300, $159.95; TX-62, $99.95; 75A3, $229.00; 51J3, $395.00; NC300, $149.95; RME-6900, $149.95. Hundreds more, low prices, free Blue-Book list. Write WRL, Box 919, Council Bluffs, Iowa, 51501.

SELL: Mint HT-37, good RME-4300, 4301 Slicer, $310.00. LaVern Smith, 3104 Catherwood, Indianapolis, Ind. 46226.

SELL: In A-1 condition: Collins KWM1 transceiver 516 F1 AC supply 516 F1-DC supply 312B-2 speaker console with wattmeter; *351D-1 mobile mount with all cables*. All for $500. Also like new 75A4 serial 3959 with speaker, $425.00. Will pack and ship collect. W2FNF, Mike Rosenberg, 35 Strawberry Lane, Roslyn Heights, N.Y. 516-MA 1-4798.

CATV Design Engineers. Leading CATV manufacturer has openings for R.F. circuit designers skilled in designing broadband, solid-state amplifiers and other CATV active devices. Kaiser CATV, P.O. Box 9728, Phoenix, Arizona 85020.

SELL Viking II. Viking II VFO, Viking 6N2, Viking 6N2 VFO, NC-300 with 100 KC calibrator, NC-300 converter cabinet, with 2 and 6 meter converters and Ameco pre-amplifier, D-104 mike, automatic keyer, other extras. $400.00. G. M. Anderson, 520 Pasadena Ave., Metairie, LA. 70001 K5GFB.

A.W. A. Historical Radio Meet for old time amateur and commercial operators, historians and collectors. Smithsonian, Washington, D.C. Oct. 5th. See Hamfest Column for details.

COLLEGE! Must sell! Heath HP-13 mobile power supply, $40.00; Waters auto-match mobile antenna, body mount w/80-40M coils, $55.00. Turner 454C SSB microphone, $10.00. New-Tronics Cliff-Dwellers, 80-40M rotating, tunable dipole, $65.00. You pay postage. Herbert Novitsky, WB2NZA, 41 Grant Avenue, Glens Falls, N.Y. 12801.

ANTIQUES. Radiola 26 w/o batts ($35.00); Radiola 18, with R-100A speaker/tubes ($35.00); RC-454, 3-6 Mc, Dyna $5.00; R-27/ARC-5, 6-9.1 Mc., unused, $10.00; BX-49, w/16 coils 21 crystals, 4035-5500, $3.00; also S-38, excellent for Novice, $25.00; vacuum cap, Jennings "JCS" fixed and "UCS" variable, best reasonable bid; two 0-50 dc milliammeters, unused, $5.00 each. First $125.00 takes the lot. Will answer all inquiries. Waite, W2ZK, 46 Monmouth, Oceanport, N.J. 07757. Pick up deal or ship collect.

HEATH Shawnee HW-10 six meter transceiver expertly wired, in xclnt condx, $200.00; Saturn 6 mobile ant, complete, $8.00. Hammarlund HQ-170AC with matching speaker. Like new, in original cartons, $260.00. Wes Blanchard, WIFP, RFD #1, Northwood, N. H. 03261.

SACRIFICE: Drake R4A, two months old, with warranty, cartons, etc. $295.00. Invader 2000, mint condx, all new tubes, manual, $395. Greenbaum, 2568 Laconia, Bronx, N.Y. 10469. Tel: (212)-881-3054 evenings.

COMPLETE Station: HT-44, SX-117, HA-6 transverter for 6 meters, pwr supplies, xtals, etc. $499.00. Also unused 6-meter Telrex beam, $25.00; antenna tuning unit from BC-610, $50.00. Entire package, you to pick up, $549.00. L. Harvey, 7604 Lanham Lane, Camp Springs, Md. 20022. Tel (301) 248-3057.

RECEIVER 80-6. National NC-155, $75. Also Ameco 6 M Nuvistor converter, CN-50, IF 14-18 Mc., $25.00. Midn. E. G. Davis, 23rd Co USNA, Annapolis, Md. 21412.

A BUSINESS *of* your own. An industry leader shows you how to get into the Sound and Intercommunications business on your own. Send today for a free brochure to: Action! Systems Company, 34 Cambridge Street, Meriden, Conn. 06450.

CHRISTIAN Ham Fellowship being organized for Christian fellowship and gospel tract work among licensed amateurs. Christian Ham Callbook for $1 donation. For details write Christian Ham Fellowship, 5857 Lakeshore Drive, Holland, Mich. 49423.

ZEUS 6-2 meter transmitter, $250.00 or best offer. Heathkit Seneca, $100 and Collins 32V-1, $100.00. John Colicci, K1AJC, 84 Summer St., Providence, R.I. 02903.

HEATHKIT Mohawk receiver Model RX-1, Eico 720 transmitter. Both in perfect condx, many extras including deluxe key and clock. Must sell immediately, $190.00 complete. Marc Linden, 55 Wellington Rd., East Brunswick, N.J. 08816. Tel: (201)-257-2154.

TMC GPR-90-R receiver, $200.00; Hallicrafters HA-5 VFO *with 6 & 2 meter xtals*, $45.00. Carl Burlock, WB4AIA, 60 Brown's Neck Road, Poquoson, Va. 23362.

SELL: NCX-5, NCX-A power supply and speaker, in mint condition. Factory realigned, Dec 1967. Manual, service bulletin. Shipping carton; $450.00. Aubrey Arnett, WB4BNM, Rte. 1, Box 66, Siluria, Ala. 35144.

EICO 460 FW 'scope, new condx, with manual, $75.00; Eico 145A signal tracer with manual, $15.00; Johnson "Signal Sentry" RF actuated c.w. monitor with instructions, $15.00; Superex COM-S headphones, new, $8.50; Dumont 280 oscillograph, best offer over $100. You pay shipping charges. John Catron, W5DZA, 826 Ranchitos, Santa Fe, N. Mex. 87501. Tel: (505)-982-0894 evenings.

FOR Sale: Heath SB-200 w/extra pwr trans, $200.00; Swan 350 w/117XC and Ameco PT preamp, $330.00; Drake W-4 wattmeter, new, $35.00. Will ship. K2RUD, Dave Shineman, 502 Thurber St., Syracuse, N.Y. 13210.

WANTED: Tuneable capacitively loaded coaxial cavity for 6M, 1 kw. rating. WA8VOS, 1792 East 32nd St., Cleveland, Ohio 44114.

FOR Sale: Model T-350X surplus transmitter. A brute—weighs 700 lbs. Pair of 813s in final, runs a cool 800 watts. Also has a.m. speech and modulators, but best on c.w. 220-volt primary, husky power supply. Tunes 2-20 Mc. continuous. In a shielded rack, on castors, stands nearly 6 ft. high. Built-in antenna tuner. Will match anything, from coax to a 6-foot length of wet string. $100. Pick-up only, no shipping. W1IKE, 26 Ridge Road, Simsbury, Conn. Phone (203)-658-7307.

HAMMARLUND HQ-110 in excellent condition. $175.00. WA2TLK, 15 Knoll Lane, Roslyn Heights, N.Y. 11577. Tel: (516)-621-6666.

SELL: DX-40 with VF-1, $40.00; NC-109, $80.00. K1VOJ, 128 Eastern Drive, Wethersfield, Conn. 06109.

WIRED Heath Shawnee, 6 meter transceiver, excellent condition, fixed mobile operation. Ed Zarebski, K1YDH, 113 Nonotuck St., Holyoke, Mass. 01040. Tel: (413)-536-3092.

NCX-5 and NCX-4, in exclnt condx, in warranty, $460.00; DX-60, excellent, and VF-1, VFO, good, both for $65.00; NC-270, good, $120.00; Heath Warrior, HA-10 KW, exclnt, $150.00; 80-10 meter Transmatch for 2 KW PEP homebrew plug-in coils, $80.00 with built-in Heath SWR meter, wide spaced 3-element 20-meter beam and AR-22R rotator and indicator, both $50.00. ARC-5, $5.00. Will Nicholl, 246 Riveredge Road, New Shrewsbury, N.J. 07724.

FOR Sale: Thunderbolt. Complete with spare tubes. Will ship. $225.00. K6HLO, 511 Oak St., Roseville, Calif. 95678.

MUST Sell: SX-115, $350.00; HT-37, $300 (or both $610.00). Autronic Keyer with W8FYO paddle, $75.00; RME DB-23 preselector, $25.00; T-R switch, $15.00. All in perfect condx. C. Lachterman, 3 Archer Lane, Scarsdale, N.Y. 10583.

SELL: Johnson KW Matchbox, Model 250-30-3, mint condition, $100.00. W2AU Balun, 1:1, never used, $7.50. W2CMD.

HT-37, Drake 2-B mint, original owner. R. W. Downes, K3ROW, Sunset Dr., Denton, Maryland 21629. Tel: 479-0935.

WRITE, Phone or visit us for new or reconditioned Collins, Drake, Swan, National, Galaxy, Gonset, Hallicrafters, Hammarlund, Hy-Gain, Mosley, Waters, SBE, Henry linear, BTI linear, towers, rotators, other equipment. We meet any advertised cash price on most equipment. We try to give you the best service, best price, best terms, best trade-on. Write for price lists. Henry Radio, Butler, Mo. 64730.

NO Time for hamming. For sale: Galaxy V with crystal calibrator, remote VFO, deluxe accessory console, AC power supply, Heath SB-610, Mosley two element TA-32 beam with TR-44 and 30 foot tower. $450.00. R. E. Bowles, 544 Lillie Lane, Toppenish, Washington 98948.

MODEL 19 teletype set in excellent condition, with many accessories, including deluxe receiving converter with plug-in toroids and scope tuning. No shipping, sry. All for $160.00. Ed Sauer, K5YYD, 1538 15th Ave. North, Texas City, Texas. 77590.

HW-22 and 110 power. In exclnt condx. So seldom used, for $120.00. I'll sell. K8GHY, Apt. 336, 301 "G" S.W., Washington, D.C. 20024.

1000 PIV @ 1.5 amp, epoxy diodes includes disc bypass, caps and bridging resistors, 10 for $3.75. Postpaid USA. With diode purchase, 125 Mf. at 350 volt electrolytic capacitors, 50¢ each. Postpaid USA, no limit. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga, N.Y. 14225.

NOVICES: Hammarlund HQ-110-C w/speaker; Hallicrafters HT-40 xmtr w/relay. All very good condition. WN2DGH, Michael Tantleff, 161-28 90 St., Howard Beach, Queens, N.Y. 11414. Tel: 835-4617.

FOR Sale: Drake R4A, T4X, AC3, and MS4, $600. Firm, Cash and carry only. Ben Hellman, W2FMM, 59 Midland Road, Roslyn Heights, N.Y. 11577. Tel: (516)-MA1-3056.

NOVICES: NC-300 Receiver, $150.00. DX-40 transmitter, $35.00. WA8UHB, 738 N. Walnut St., Wilmington, Ohio 45177.

CLOSE Out: Brand new Hammarlund HQ-170AC, $282.95; HQ-110AC, $205.95; HQ-145A, $219.95; HQ-145AC, $229.95; HXL-One, $285.00; HQ-110AC—VHF, $269.95. Demonstration Models: Brand new, A Drake L4, $510.00; Eico 753, $200.00; Johnson Adventurer kit, $39.95; Eico 720, $69.95; 730, $69.95; 723, $49.00. Used gear: Drake R4, $250.00; Swan 350/AC-DC-USB/LSB xtal-calibr., $375.00; Ranger, $99.99; SX-111, $125.00; HQ-170AC, $229.00; DX-40, $34.95; DX-35, $29.95; Sr-46, $129.00; Eico 723, $34.95. Airex Radio Corporation, 132 Nassau St., New York City. Tel: 964-1820.

HAMMARLUND Model SP-600, SPC-10 single sideband converter and Super Pro, in matching cabinet. In excellent condition. Only $450.00. C. M. Phillips, 444 Hammond Ave., San Antonio, Texas 78210.

VHF, Near new, Parks 144-1, $45.00; Parks 432-3, $40.00. Both 10 meter I.F. Johnson 6N2 and VFO, $70.00. WØEUQ, 1822 S. 17th St., Grand Forks, N.D. 58201.

SELL: Johnson Viking Kilowatt amplifier, less modulation section. Has been converted to pair 4-400A grounded grid. Original cost over $15.00; asking $350 or best offer. Collins KWS-1. Needs some work: $200.00. HT-37, in excellent condx, $200.00. Joe Johnson, 300 North Walnut, Clinton, Illinois 61727.

FOR Sale: 75A-4 #5362, 0.5, 3.1 Kcs., $425.00; KWM-2 #12,161, PM-2, $725; SBE-34, mike, $250; Invader 2000, $250; Henry 2KD-2, $550; noise-blankers for 75A4, 75S1s, new, $50; Cush Craft 4-element 15m, $35.00; SM-1, $25.00; 351D-2, new, $75.00; 351D-1, used, $30.00; Eldico SSB-100-F, $225.00; SSB-1000F, $175.00; HT-33A, $275.00; Simpson #303, VTVM, reconditioned, $50.00; 75A-3, $250.00; Used 4-1000-As, $35.00; C.E. 20-A, $75.00; Model "B" Slicer, $35.00; HW-32, $70.00. Wanted: KWM-1, above #1000, F455J-21 (75A-4). James Craig, 29 Sherburne Ave., Portsmouth, N.H. 03801.

MORE DX with a new QSO Phrase Book—Spanish, German, French, Russian, $3.00. M. Holubov, VE2BAG, 22 Vaudreuil, Baie Comeau, P.Q., Canada.

HALLICRAFTERS SX-117. In mint condx, $250.00. First check or money-order or call a.e. 504-366-6375. John Sunkel, WA5URC, 2764 Ramsey, New Orleans, La. 70114.

VIBROPLEX Original Deluxe, nice chrome, $15.00. Wanted: McCoy Golden Guardian (48B1) SSB filter. Peter Laing, VE7-BYG, RR #1, Nelson, B.C., Canada.

GONSET GC-105 2-meter transceiver, with manual and mike. 110 volt or 12 volt. $80. John Stiles, K7DGV, Box 114, Sweetgrass, Montana 59484.

IMMACULATE NCX-3 and AC/PS. $250.00. Dean, 1321 N. Wilbur, Spokane, Wash. 99206.

FREE Copy to hams (limited supply) National zipcode directory flyer. Send for your copy. E. McIvor, Box 8151, Rochester, N.Y. 14617.

BC342-N with manuals, $75.00; Mackey $4.00. R. H. Bush, W4KQK, 4007 Alton Road, Louisville, Ky. 40207.

SELL: Astatic D-104 w/ptt stand, $18.00; Telrex beams 10 mtr, 3-el., $35.00; 2-mtr, Supermini, 2-el., $30.00; Moto/gen., PE-103, $10.00; Advance antenna relay, $3.00, Vibroplex Champion bug, $10.00. All are in excellent condition. F.o.b. Jackson, N.H. Mack Beal, W1PNR, Box 101, Jackson, N.H. 03846.

TOROIDS, 44 & 88 mhy., center-tapped, unused, 5/$1.50 ppd. 11/16" paper tape, $3/box. Page printer paper, $5.50/case. Tecraft 2-meter transmitter with p/s, $30.00. Globe Chief 90A transmitter, $25.00; D-104 with G stand, $20; HQ-100AC receiver, $90.00. Wanted: Rotator, tower, Matchbox, RTTY gear, FM gear. Stamp for list. Van, W2DLT, 302Z Passaich, Stirling, N.J. 07980.

SWAN 410 VFO and 22 Adaptor, $80.00; Swan 240 TCU, never used, $30; Drake converter console with 6 and 2 meter converter, plus power supply and calibrator, $120.00; Amplidine 6 and 2 transmitter and Ameco VFO, $135.00; Eico keyer and Autronic paddle, $45.00; Philip Schwebler, W9GCG, 4536 N 50th St., Milwaukee, Wis. 53218.

SELL: HT-37, like new, $200; NCX-3, needs alignment, $150.00. Leon Balch, W4AJC, 120 Tuxedo Circle, Chattanooga, Tenn. 37411.

COLLINS 75S3, 32S3, 516F, 312B4, SM2, all in exc. Condx, $1000; Linear homebrew 2 Kw, 4-1000A GG with solid-state power supply, both in custom floor cabinet with two spare 4-1000As: 500. Tower Tri-Ex LM-354 54 ft. free-standing crank-up, Ham-M rotator, TH-4 beam, $400; Hy-Gain 18HT Hy-Tower vertical, $75.00; LM freq. meter, $75.00; HA-1 T-O keyer and key, $50. $1850 takes entire package. All packing and shipping charges collect. James Denneny, W3ELW, P.O. Box 217, Blue Ridge Summit, Penna. 17214.

COLLINS MM-2 mobile mike, $25.00; Argonne dual crystal, stand $12.00. Triplett Model 3413-B tube-tester, $40. W2TG.

FOR Sale: 1924 radio, in glass case. Mr. Carmine De Marco, 51-2 Colonial Avenue, Paterson, N.J. 07502. Real radio collector's item.

SELL: HW-100, $250.00. Willie Ustaszeski, WB2HLH, Indian Trail, Budd Lake, N.J. 07828.

COLLECTORS! QSTs 1923-1962, complete run. Best offer. Hardy, W1BCT, Prospect, Lunenburg, Mass. 01462.

MINT Late Model, SBE-33 with VOX, $195.00; HW-32A, $80.00 or your best offers. WA1FFO, 53 Oak Street, East Hartford, Conn. 06118.

TEKTRONIX Type "L" plug-in, .005 v/cm, 30 MHz, $50. Type "P", $25.00. K4GYO, 430 Island Beach Blvd., Merritt Island, Florida 32952.

SELL: Heath VTVM, $20.00; Sixer, $35.00; Twoer, $35.00; Vibroplex Lightning Bug, $15.00. Send for list of other equipment. Graening, W9KHS, RR 1, Tremont, Ill. 61568.

COLLINS 75S-1, Waters rejection, $265.00; KWM-1/516F1, $285.00; 312B-1 speaker, $10.00. 312B-2 console, $49.50. All in exclnt condx. E. D. Flynn, 3118 N. Francisco Ave., Chicago, Ill. 60618.

CRYSTALS Airmailed: Nets, SSB, Marine, MARS etc. Novice .05% crystals $1.50. Custom finished etch stabilized FT-243 .01% any kilocycle or fraction 35000 to 8600 $1.90, (five or more this range $1.75 each), (nets ten or more same frequency $1.45). 1700 to 5499 and 8601 to 20.000 $2.75, with overtones supplied above 10.000. 10.001 to 13.500 fundamentals $2.95. Add 50¢ each for .005%. Add 75¢ each for HC-6/u metal miniatures above 2000. Summer's over—get those Tall building projects going. Crystals for ARRL construction from QST, Handbook, SSB, etc. Write-be specific. Free order-bulletin. Crystals since 1933. Airmailing 10¢/crystal, surface 6¢. C-W Crystals, Marshfield, Missouri 65706.

FOR Sale: 1967 Model Heathkit SB-301 receiver capable of handling RTTY, LSB, USB, CW, and AM. Speaker included (SB-600). Best offer takes this fine assembled rig selling at $428.00, in kit form. Tim Wilson, Gore Bay, Ont., Canada.

HALLICRAFTERS SR-2000 Hurricane with PS-2000 supply, first $950.00. SBE-34 factory modified aligned June 1968. First $290.00. Both are in exclnt condx. Quitting radio. Package deal: $1150.00. T. Downing, WA6EBB, 661 Gilman, Palo Alto, Calif. 94301.

GOOD Drake Receiver LA. $110.00. Write KØGRP, Richard Giesen, Estelline, S.D. 57234.

FOR SAle: Ameco R5 receiver, new, $65.00; Heathkit TC-2 tubetester, $10.00; Heathkit TS-4 alignment tv generator $15.00; Heathkit T-3 Signal Tracer, $15.00. Dumont 164E scope, $10.00. Delmer Carfin, RFD 2, Bryan, Ohio 43506.

COLLINS 32V-2 with spare 4D32 and operating manual, $160.00; Hallicrafters Sp-44 Panadaptor, $30.00. W2BZF, RFD 180, Roslyn, L.I., N.Y. 11576. Tel: a.c. (516)-MA1-0549.

KWM-2 with MP-2 supply and CC-2 carrying case. In exclnt condx, $750.00; Hunter Bandit 2000C, like new condx, $395.00; new PTO for 75A4; 70E-24, $49.00. Richard E. Mann, 1415 North 14th St., Fort Dodge, Iowa. 50501.

FOR Sale: SB-301, c.w. crystal, $265.00: HD-10 keyer $25.00; 14 AVQ antenna, $15.00; Knight SWR meter, $7.50; Grid dip meter, $10.00; z 'scope, $35.00. Elco VTVM, $20.00. C. D. Mascrang, 3408-29th, Lubbock, Texas 79410. Tel: a.c. (806)-795-6788.

SELL: HA-2 with pwr supply, mint condx. All mods. Prefer drive-in pick-up deal. W2IXB, 26 Manila St., Clifton, N.J. 07011. Tel: a.c. (201)-772-5385.

LINEAR, 2KW PEP, 4-400As, G.G. B&W bandswitching tank, vacuum variable plate cap,p P.S. 3.6 Kv, 700 ma., castored cabinet, best over $100. 1 Kw linear, 7094's, P.S. finished, $75.00. Slopefront cabinet, 17 1/2 rack height, $25.00. Pair oiled walnut enclosures, $13.50. W1WEX.

LAFAYETTE HA-230 shortwave receiver, $50.00. Eico 145A signal tracer, $10.00; BC-459 transmitter $10.00. All are in gud condx. Michael St.Angelo, 248 Bay Avenue, Patchhogue, N.Y. 11772.

HEATH DX-20 w/built-in ant. relay, $25.00; homebrew 10-15-20 meter mobile 2-tube converter, $35.00. Mike Kaufman, K6VCI, 3733 Meadville Dr., Sherman Oaks, Calif. 91403.

FOR Sale: DX-100, $65.00: NC-270, $125.00. Both $175.00. MP-33 beam, $70.00. W8GYO, 237 Golden Gate Drive, Dayton, Ohio 45459.

SELL: Viking TX, factory wired, $145.00; Drake 2B with 2AQ and xtal calibrator, $190.00. Both for $315.00. Sry, no shipping! WB6NUO, 12 Farm Road, San Rafael, Calif. 94903. Tel: a.c. (415)-479-9456.

SR-150 AC/PS, $350.00. WA8NXL. Tel: a.c. (616)-962-4845 R-5, Battle Creek, Michigan 49017.

FOR Sale: Collins 75S-3 with manual, in exclnt condx, $395. P.P.; need 32S-3 with 516F2 power supply. Also need F455-FA05 filter (500 cycle) W3EZN, W. W. Brantley, 6204 MacArthur Boulevard, Washington, D.C. 20016. Tel: a.c. (301)-652-3355.

HT-37 SSB transmitter, in perfect shape, $185.00, or your best offer. L. Tamblyn, WA9KRF, 4582 S. Ahmedi Ave., Milwaukee, Wis. 53207.

HAMMARLUND, SP-600 JX, $175.00 and Joystick variable freq. ant. used, $15.00. F.o.b. Hack Treadwell, K4DKJ, 3289 Hallwood Circle, Macon, Ga. 31204.

DRAKE 2B, $165.00; HT-37, $195.00; R4A, $305.00; T4X, $305.00; 100 ft. RG-17/U, $25.00; 100 ft. RG-219/U, $35.00. K4YYL, Art Balz, Box 1294, Jupiter, Florida 33458.

ATTENTION Hams! The newest ham store on the West Coast. August 15, 1968. L.A. AMATEUR RADIO SUPPLY, 2302B ARTESIA BLVD, REDONDO BEACH, CALIFORNIA. Best trades & cash deals in the West. Loads of new & used equipment. Drake, Galaxy, Swan, Hallicrafter, Hy-Gain, Mosley, etc. *SEPTEMBER SPECIAL! Ham-M's for only $89.00!* (No shipments at this price) Stop by for an "eye-ball QSO". William Ogg WA9RMO/6

PREPARE For new FCC exams! You need Posi-Check. Multiple choice questions, diagrams, explained answers. IBM sheets for self-testing. Same form as FCC exams. General Class, $3.25; Advanced Class, $3.50; Extra Class, $3.75. 295 to 300 questions or diagrams in each. Each complete for a specific exam. Basic questions duplicated if they apply. Third class postage prepaid. Add 26¢ per copy, for first class mail; 54¢ for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

RANGER I, PTT with manual, in gud condx, $60.00. W8VVE, 4500 9th Ave., Vienna, W. Va. 26101.

SWAN-250, mint condx, all factory improvements including calibrator. Three hours airtime. Guaranteed. Price: $275.00, including seven element Finco 6-meter beam. W6NFW, 51 Washington, San Juan Bautista, Calif. 95045.

WANTED: KWM-2 S/Line or SB-101-100 accessories, etc. In gud condx and reasonable. F. E. Coble, 251 Collier Ave., Nashville, Tenn. 37211.

DRAKE R-4, T-4X, AC-3, MS-4, all in excellent condition. $675.00 postpaid or will deliver 75 mile radius. W3UIO/4. 7203 Harrison Lane, Alexander, Va. 22306.

SX101A, $199.00. HT-37, $225.00; Knight T150A transmitter, $60.00; Knight receiver R100, S-meter, calibrator, speaker, $60.00; Pierson KE-93 receiver, homebrew a.c. supply, speaker, $60.00; BC-457 converted 80 meter Novice, TVI suppressed, 75 watts, crystal, regulated supply, $19.00; HW-12, $85.00. All exclnt condx. Express c.o.d. W9PTJ, 10316 N. Greenview, Mequon, Wisconsin 53092. Tel: 241-4317.

CLEGG Zeus, $295.00; HRO-60T a.b.c.d. $175.00; 432 Mc. receiver, $35.00; Millen VHF transmitter, $50.00; Central Electronics MM-2, $40.00; BC-221, $45.00; TS-323 20-480 Mc, $85.00; TS-186 100-10.000 Mc., $150.00; Bird wattmeter, $75.00; P & H VFOmatic, $45.00; WE transmitter, VHF through 4000 Mc., $50.00; Apeco copy machine, $40.00. Few Bird #43 elements, panel meters, list. W4API, Box 4095, Arlington, Virginia 22404.

SELL: Galaxy 300, $130.00; Hallicrafters HT-6, HT-17, S-102; National NC-100XA, best offer. J. Yagelowich, 2-B Crescent Rd., Greenbelt, Md. 20770.

25KHz markers from your 100 KHz calibrator, $6.00 wired, with instructions. Postpaid. Navigator, $55.00. APS-13 complete, $15.00. Heathkit Balun $4.00. Send SASE for good electronics list. WØKPZ, Box 1038, Boulder, Colorado 80302.

WANTED: Comanche tuning scale. WA6QAY.

BC-342, $35; BC453, $15.00; R24/ARC5, 550-1500, $15.00. Xclnt. Ellis, 303 N 13, Richmond, Ind. 47374.

SELL: DX-60A, $60.00; HG-10B VFO, $30.00; Dow-Key DK-60-G2K 115 v. coaxial relay, $15.00; extra tubes for above (inc. 6146s) and all manuals. All mint condx, ready to go. WB6VYU, 39670 Grand Ave., Beaumont, Calif. 92223.

SELL: Complete station. New value around $400. Includes Elmac AF-68, PMR-8, M-1070 power supply, Mosley Antenna, relay, cables, etc. Will sell all or part. Steve Diehl, 2434 Paradise Dr., Hagerstown, Md. 21740.

SELL: S-85, $40.00; DX-35, $30.00; Johnson Matchbox, $35.00. All for $95.00. Joel Levy, K2VNS, 73 Princeton Arms, Cranbury, N.J. 08512.

LINEAR, Heath Warrior (HA-10), 1000 w. PEP, gud condx, $50.00. W3CQ, 7116 Longwood Dr., Bethesda, Md. 20034.

HEATH DX-100, exclnt condx with Heath antenna load mod. and silicon HV rectifier, $80.00. WITF, Elmer Turner, Box 87, Melvin Village, N.H. 03850.

KWM-2 and PM-2 power supply. Recent complete factory check-out! Like-new condx, $725.00. Dan Hingtgen, WØWIG, 272 Crandall Dr., N.E., Cedar Rapids, Iowa 52402.

TEKTRONIX 535 also C and D preamps. Personal oscilloscope used non-commercially, original carton. Best offers received by Sept. 20th. Cavett, 8570 Herbert, Pennsauken, N.J. 08109.

HEATH DX-60, $60.00; HG-10, $20.00; HR-10, $50.00; Turner 454C mike, $15.00; Vibroplex bug, $15.00. Complete station. Guaranteed. $125.00. Tom Ellett, WAØIAK, 1809 Meadowlane, Ames, Iowa 50010.

HENRY 2K, excellent, $465.00. Ham-M, $65.00. TA-33 $65.00. Hap Davis, WA1CTN, 37 Frost St., Framingham, Mass. 01701.

COLLINS 30S-1, $895; 30L1, $365.00; 51S1, $985; 75S1, $275; 32S1, $335; 312B4, $125.00; 516F2, $90; 75A4, SN4600, $420.00. All very clean. Tom Nash, M.D. W5-NWA, 1100 Canterbury, Dallas, Texas 75208.

SELL: Drake TR-3 transceiver with AC-4 PS, recently realigned and in mint condx, $240. Also Heathkit HM-15 SWR meter, $12.00; Philip Bernstein, 72 Morewood Oaks, Port Washington, N.Y. 11050.

NATIONAL Incentive Licensing poll results: 639 against and 178 for incentive licensing. Thank you. WB2NOD, SCCARC, Box 685, Moravia, N.Y. 13118.

TELREX Largest single band beams. Dismantling Big Bertha installation, installed 1965, excellent condition. Cannot ship, sry. 20M546, $375.00; 40M346, $400.00; 15M532, $225.00; 10M636, $225.00. Rotator-indicator system BB6-95CD,-RIS, $300. Interested in a DX Paradise? Includes superb winterized 5 room cabin, 2 outbuildings, Big Bertha 70 ft. tower, 2 lovely hilltop acres, 30 minutes downtown Buffalo. Appraised $12,500 1965 prior to Big Bertha. K2GXI.

SELL: 4-1000 linear 3.5 KV 900 Ma. solid state PWS. B&W 850/B&W FC-30A. SWR bridge, 40 mfd, 5 kv/$350. For more info write Dave Smith, WB6SFA, 3139 Ronald St., Riverside, Calif. 92506.

"DON And Bob's" new and used gear. Galaxy V, Mk 3, AC supply, calibrator, VOX, speaker, your cost $499.95. Full-line Waters distributor. Used specials HT-32B, $249.95; SB-300, 2M converter; three filters, $250.00; HRO-60, all coils, slicer, $250.00; new guaranteed surplus Telex HMY-2000 headset, $3.95; 1000 kc. xtal; HC6/U $3.95; new G-E boxed tubes, 811A, $6.95; 866A, $2.95; 6146A, $3.50; 6146B, $4.50; 3B28, $3.95; S29 $9.95. Write for list. K5AAD, WA5UUK, Madison Electronics Supply, 1508 McKinney, Houston, Texas 77002. Tel: (713)-CA4-2668.

DISCOUNT Prices. Time payments! New Swan equipment, factory sealed cartons, full warranty at discount prices. Swan SW-500C, $468.00; Swan 350C, $378.00; SW-250, $292.00: immediate delivery. New CDR Ham-M with indicator, $99.95; TR-44, $59.95, Hy-Gain Antenna specials: TH6-DXX, $135.00; TH3-Mk 3, $108.00; tower special Tri-Ex W-51 self supporting crank-up, shipped prepaid $299.95. All equipment listed is new in factory sealed cartons with full warranty. In stock for immediate delivery. No down payment with approved credit. 36 months to pay. Write or call for "Discount Price Quote" on all brands of amateur equipment. Bryan, W5KET, Edwards Electronics, 1316-19th St. Lubbock, Texas 79401. Tel: (806)-762-8759.

SELL new 20-meter 3-element Hy-Gain 203BA beam, $50.00; Heath Ham-Scan, HO-13, $50.00; Vibroplex left-hand bug, $12.00; Vibro-Keyer, $12.00; Brown keyer, $10.00; Ameco 6 thru 160 Nuvistor preamp, with power, $20.00; new Waters coax switch, $10.00; Heath SWR, $5.00. 120 volt AC running time meter, $5.00. F.o.b. W6CZP, 850 Groff, Pomona, Calif. 91766.

FOR Sale: Hammarlund HQ-180 general-coverage triple-conversion receiver, 17 tubes plus rectifier, excellent sensitivity and selectivity. Complete with speaker, $225.00. Bob Hill, W1ARR, c/o ARRL Hq. or 2 Grove Road, Cromwell, Conn. 06416.

SALE: Heath HW-16, clean, $85.00. Firm! WA2SQZ, Teaneck, N.J. 07666.

VARIACS: Panel mount, in new condition, 20A, $32.50; 6A, $12.95; 1 1/4A $6.25. Condenser, computer grade, 74,000 mfd. at 10 VDC. $1.89. Send for catalog listing other condenser bargains. Nicads, solid state material. Test equipment and other desirable items. Advance Electronics, 54-T West 45th St., New York, N.Y. 10036.

TRADE: H.F. linear components: 2-4-400s, new Jennings UCS-300, B&W FC-15, Air Dux #195-1, sockets and filament transformer. Trade for 2M gear, AM, FM, SSB. WA5ONR, R. Chiodo, 125 Hillview, San Antonio, Texas 78209.

ROHN #6 crank-up tower, 72 ft. Winch cable broken but easily repaired. Sorry you must arrange for removal and pick-up. $50.00. G. E. Davis, KILEM, RFD #1, Williston, Vt. 05495.

CENTRAL Electronics 200-V, $350.00; Drake R-4, $260.00. T-O keyer w/Vibro-Keyer, $50.00. Two'er, $30.00. etc. I'm university bound. T. McGuire, 545 Blair, Piedmont, California 94611.

COLLINS 75S3A, 32S3, 516F3 mint and complete $950.00, F.o.b. Atlanta, Georgia. Don Vaughan, W4MTY, 4607 Briarcliff Rd., Atlanta, Ga. 30329.

WANTED: Heath HO-10 'scope, Swan VOX, 410 VFO, Comdell comp. WB6VCM, 959 Clinton Rd., Los Altos, Calif. 94022.

WANTED: Collins 312B-5 speaker console and external PTO. Collins 399C-1 speaker and external PTO. Please quote best price on above. Write Foy L. Alciatore, W5RU, 5700 Canal Blvd., New Orleans, La. 70124.

HEATHKIT SB-301 w/cw filter, $240.00; SB-401, $265.00. Used 6 months. K1IGO, 9 Captain's Walk, Clinton, Conn. 06413.

WANTED: Used HW-32 and power supply. Will pay around $100 but will buy from lowest offer. For sale: DX-60, in exclnt condc. $60 or your best offer. Write: John Erb, 218 Shaddle, Mundelein, Illinois 60060.

"HOSS-TRADER Ed says if you don't buy your ham gear from him you might pay too much. Write us or telephone for best trades anywhere in USA. Used equipment: HT-37, $179.00; Galaxy V transceiver, $249.00; SR-150 and AC supply, $339.00; HA-350 receivers, $59.00; Drake 2-A, $139.00; HRO-500 receiver mint, $1095.00; SB-34, $269.00; Swan 500, $319.00; L-4 Drake linear, $419.00; 20-A, $75.00; Viking 500, $249.00; HO-170C, $159.00; 75S-1, $289.00; 32S-1, $389.00 75A-4, $395.00; Discontinued new gear: Swan 500, $379.00; NCL-2000, $489.00; National VX-501 VFO, $129.00; NC-200, $279.00. New Rohn 50 ft. foldover tower prepaid, $195.00; new Classic 33 Beam and demo Ham-M rotator, $189.50; Display BTI LK-2000, $639.00. Ed Moory Wholesale Radio Co., P.O. Box 506, DeWitt, Arkansas 72042. Phone: a.c. (501)-946-2820.

95 Issues in broken runs of QSTs 1922-1929. Most issues intact, some with covers missing, others fair to gud condx. Make offer singles or entire lot. SASE tnx. W. A. Adams, W6ANN, Star Rte 1, Box 730, Joshua Tree, Calif. 92252.

PANADAPTOR. Panoramic PR-1 3" 455 Kc IF, in exclnt condx. $75.00. Herb Kreckman, W3LLR, Cresco, Penna. 18326.

WANTED: Hallicrafters SX-28, SX-28A, SX-32 or SX-42 receivers. Howard Hoagland, Jr. 639 North Sierra Bonita Avenue, Los Angeles, Calif. 90036.

SELL: Mint SBE-34, SB2-LA, mike, mobile mount, Hustler deck mast w/resonators for 75-40-20 meter bands, Mini-Products 2-element 6 thru 20 meter beam. First certified check for $550.00, or best offer takes it. WA9PTJ, SSGT Laurence E. Rasmussen, Co. C, Box 82, DLIWC, Monterey, Calif. 93940.

DRAKE TR-3, AC-3 and speaker combo. Used less than 10 hours, never mobile, in mint condx. $360.00. Robert Teter, Box 211, Bunker Hill, Ill. 62014.

SIXER Transceiver, Heath, with mobile supply $25.00; Scott LT-10 FM tuner, $30.00; Hickok 215 VTVM, $25.00. Perry, Ric Drive, Florence, Mass. 01060.

WANT: 6 and 2 meter converters and xmtr. Need AC and E coils for HRO-50T. Sam Thompson, 6809 Iris Circle, Hollywood, Calif. 90027.

COLLINS 75A-2/prod. detector, in fine condx, $200.00; HT-40, $60.00. Ameco Nuvistor 6m-conv., $25.00. F. Cantwell, 622 Monroe, River Forest, Ill. 60305. Tel: a.c. (312)-369-6098.

WANTED: RME-84 receiver in good operating condition. Blake, K1CPW, Summer Street, Andover, Mass. 01810.

SELL: Hallicrafters HT-32, $220; SX-101A, $180; Hy-Gain 18AVQ, $35.00; Alliance rotor, $20; Knight-Kit SWR meter, $10. Must sell. Michael Prust, 514 North Washington, St. Peter, Minn. 56082.

WANTED: Microwave gear, waveguide, couplers, mounts, etc., for group starting experimental amateur work. Send list and prices to S. Daskam, K2OPI, RD #2, Box 360, Flemington, New Jersey 08822.

HALLICRAFTERS SX-140 Ham-band receiver, 80-6M, in exclnt condx, $85.00. K4WTK, 224 Virginia, Auburn, Alabama 36830. Tel. (205)-887-9940.

HEATHKIT Marauder, RME-6900. Both need some alignment. Sell as combination for $200. W5GBG/6, 433 E. Hardy, Apt. A, Inglewood, California 90301.

SIX Meters! DX-100 modified for six meters with full 140 watts. Also have SX-140 receiver (covers 6) and coax relay. All for $145.00 or will sell separately. Terry Climer, WB4EHD, RFD #1, Lebanon, Tennessee 37087. Tel: (615)-444-1519.

SELL: Apache TX-1 transmitter, in mint condx, $75.00. John Greeley, WA1DIW, 102 Leonard Road, Hamden, Conn. 06514.

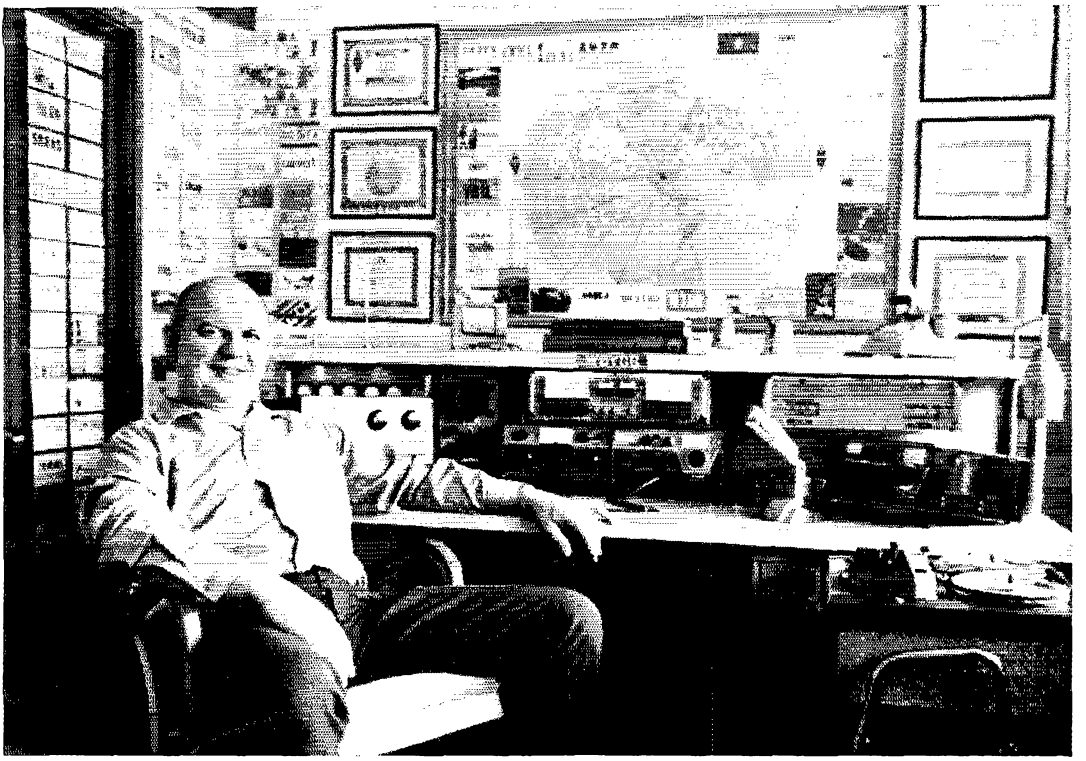
VHFERS: Interceptor, $200. Sidewinder with AC/DC supplies, $250. Gonset power amplifier, $150.00. All in gud condx. W2CRS, Mariaville, N.Y. 12053 Call (518)-864-5273.

FOR Sale: HQ-180C with speaker, in exclnt condx. Make offer. Wells Chapin, 2775 Seminole Road, Ann Arbor, Michigan 48104.

SELL: Heathkit SB-400, $275.00; SB-200 with spare finals, $200.00, or you make offer. SASE pls. Jim, WB6MQE, zip 91754.

SELL: Drake 2B crystal calibrator, mint condx, $150.00. Standing wave bridge Reflectometer CM-52, $12.00. K4FQ, 2804 Broadview, Huntsville, Ala. 35810.

Index of Advertisers



"Drake 4-Line is the most satisfying...totally efficient..."

says WØYDB, Minneapolis...

To quote in part from a letter received from W. C. Higgins, WØYDB, Minneapolis, Minn., dated May 10, 1968...

"...Enclosed are several snapshots of my hamshack and equipment. Since the Drake 4-Line is so predominant, I thought that you might like to add to your photo collection of Drake-equipped stations. Granted, the gear is not the new B series but it is still the most satisfying and totally efficient that this old-timer has used in 32 years of amateur, military and commercial electronic experience. I earn my living as a Production Manager of (aerospace) electronic instrumentation production... and I think I can recognize excellence in electronic engineering design and performance when I see it.

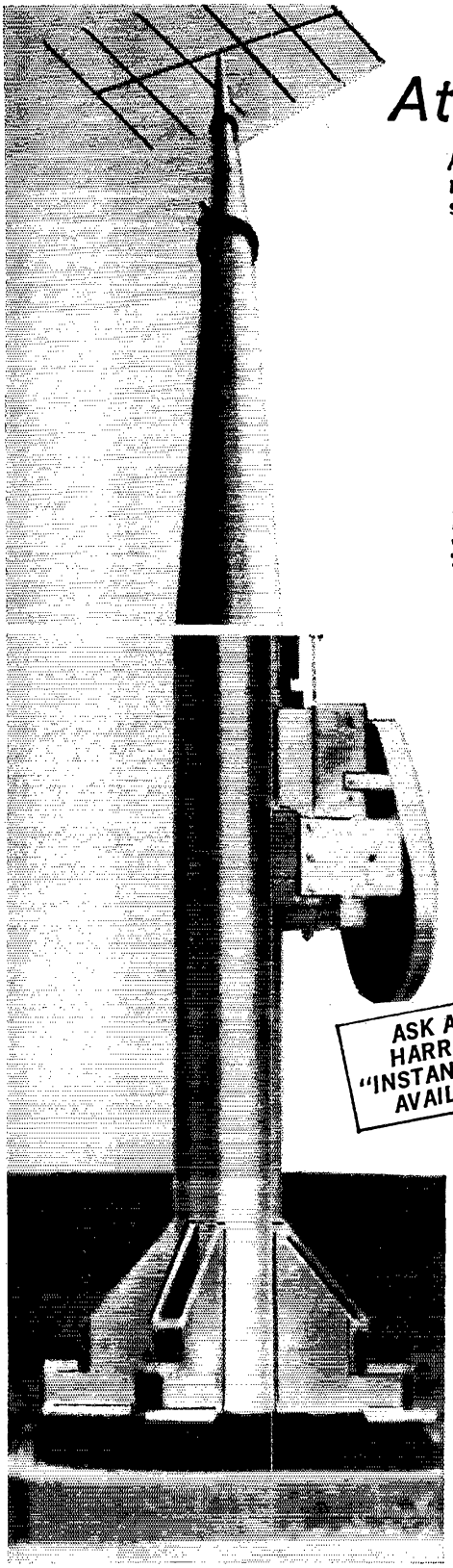
"Again, congratulations for developing the 4-Line. 73..."

(Signed) Bill, W. C. Higgins

Ask any ham who owns a Drake 4-Line Rcvr, Xmtr or Linear...

or write for detailed specifications:

Dept. 198 **R. L. DRAKE COMPANY** 540 Richard St., Miamisburg, Ohio 45342



At last!

A tower your neighbors can't help but admire—it so resembles a stately flag pole! Has the new inconspicuous slender look. It's the all new telescoping tubular

Tri-Ex sky needle

Push the UP button, and it silently extends to thrust your beams up to 70 feet into the sky (or, to the height that gives you *your* best DX!).

No guy wires! But it easily holds a big 30 sq. ft. of antennas way up there in the teeth of 60 MPH winds. Telescoped, it defies the most violent hurricane. Telescoped, it brings your rotator and beams down to safe working level.

Model TM-370

Complete with raising winch motor, and hinged base mount for easy erection and tilting. Hot dip galvanized for long life.—**$1,894**

[***Other sizes start at $447.50*** for the 40 footer with hand winch. The 58 foot job is $789.50.]

ALL TOWERS SHIPPED PREPAID TO 48 USA

ASK ABOUT HARRISON'S "INSTANT TOWER" AVAILABILITY

Literature describing these new "sky needles," or any of the other Tri-Ex complete line of engineer designed towers is available on request.

SPECIAL PACKAGE PRICES? YOU BET!

No one undersells Harrison. Just tell me what you want.

73 *Bil Harrison* W2AVA

Harrison

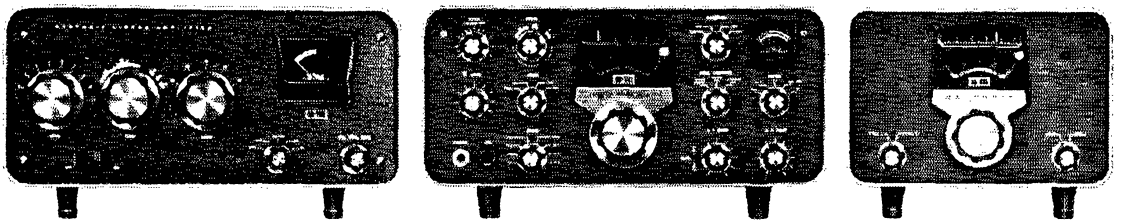
"HAM HEADQUARTERS, USA"®

20 Smith St., Farmingdale, L.I., N.Y. 11735
(516) 293-7990

—VISIT OUR NEW STORES—

FARMINGDALE, L.I. Route 110 at Smith St. (516) 293-7995
NEW YORK CITY—8 Barclay St. (212) BArclay 7-7922
JAMAICA, L.I.—139-20 Hillside Ave. REpublic 9-4101

ver·sa·til·i·ty (vur'se-til'e-ti), n., the quality or state of being versatile; specifically, a) competence in many things. b) ability to move freely in any direction.



the definitive ham rig . . . Heathkit SB-101 Transceiver with SB-640 External LMO and SB-200 KW Linear

Versatility has real meaning when you operate with this Heathkit trio. With the SB-640 & SB-101 combination you have *five* frequency control options . . . external variable control of transmitting frequency . . . internal or external variable control of transceiving frequency . . . or crystal control of *transmitting* or *transceiving* frequency . . . almost enough versatility to put you in two places at the same time. In operation, whether you are a DX hound, net control, contest operator, or just a guy who likes a lot of action, you'll appreciate being able to move freely anywhere. And with the SB-200 KW Linear you'll be heard anywhere.

Order the SB-101 for the best value in SSB transceivers. Front panel selection of upper or lower sideband; SSB or CW filters; PTT or VOX control; plus built-in CW sidetone; built-in 100 kHz calibrator; 1 kHz dial calibration; true linear tuning; fixed or mobile operation.

Order the SB-640 for the most versatile use of your SB-101. It's like adding a second receiver; provides external frequency control by LMO or either one of two crystals; features same calibration and smooth dial mechanism as SB-101; powered by SB-101.

Order the SB-200 for maximum power output at lowest cost. 1200 watts PEP, 1000 watts CW; drives with 100 watts; built-in SWR meter, antenna relay, solid-state power supply; ALC; shielded, fan-cooled amplifier compartment; pre-tuned cathode input; circuit breaker protected; 120/240 VAC.

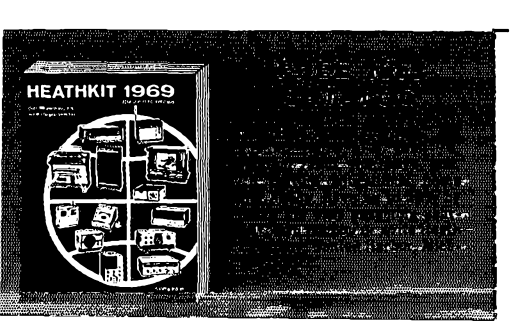
Kit SB-101, transceiver, 23 lbs. **$370.00**
Assembled SBW-101, transceiver, 23 lbs. **$540.00**
SBA-301-2, optional 400 Hz CW filter, 1 lb. **$20.95**
SBA-100-1, mobile mounting bracket, 6 lbs. **$14.95**
Kit HP-13, Mobile power supply, 7 lbs. **$64.95**
Kit HP-23A, Fixed-station power supply, 19 lbs. **$49.95**
Kit SB-640, external LMO, 9 lbs. **$99.00**
Kit SB-200, KW linear amplifier, 41 lbs. **$220.00**

Compare the Specifications

PARTIAL SB-101 SPECIFICATIONS — RECEIVER SECTION: Sensitivity: Less than 1 microvolt for 15 db signal-plus-noise to noise *ratio for SSB operation.* **SSB Selectivity:** 2.1 kHz minimum of 6 db down, 5 kHz maximum of 60 db down — 2:1 nominal shape factor — 6-60 db. **CW Selectivity:** (With optional CW filter SBA-301-2 installed) 400 Hz *minimum* at 6 db down, 2.0 kHz maximum at 60 db down. **Spurious response:** Image and IF rejection better than 50 db. **TRANSMITTER SECTION: DC power input: SSB:** 180 watts P.E.P. continuous voice. **CW:** 170 watts — 50% duty cycle. **Oscillator feedthrough or mixer products:** 55 db below rated output. **Harmonic radiation:** 45 db below rated output. **Transmit-receive operation: SSB:** Push-to-talk or VOX. **CW:** Provided by operating VOX from a keyed tone, using grid-block keying. **CW side-tone:** Internally switched to speaker in CW mode. Approx. 1000 Hz tone. **Carrier suppression:** 50 db down from single-tone output. **Unwanted sideband suppression:** 55 db down from single-tone output at 1000 Hz reference. **Third order distortion:** 30 db down from two-tone output. **Noise level:** At least 40 db below single-tone carrier. **RF compression (TALC):** 10 db or greater at .1 ma final grid current. **GENERAL: Frequency stability:** Less than 100 Hz per hour after 20 minutes warm-up. **Dial accuracy — "resettability":** Within 200 Hz on all bands. **Electrical dial accuracy:** Within 400 Hz after calibration at nearest 100 kHz point. **Cabinet dimensions:** 14⅞" W x 6⅝" H x 13⅜" D.

SB-640 SPECIFICATIONS — Frequency output, LMO: 5 to 5.5 MHz. **Frequency output, crystal:** 4.975 to 5.525 MHz. **Frequency stability:** Less than 100 Hz per hour after 20 minutes warmup from normal ambient conditions. Less than 100 Hz for ±10% line voltage variations. **Visual dial accuracy:** Within 200 Hz on *all* bands. **Electrical dial accuracy:** Within 400 Hz *after calibration* at nearest 100 kHz point. **Dial mechanism backlash:** Less than 50 Hz. **Front panel controls:** Main (LMO) Tuning dial; LMO/XTAL switch; Crystal Selector switch — XTAL 1/XTAL 2. **Panel light:** ON when transmitting or transceiving frequency is controlled by External LMO. **Rear apron facilities:** Connector to SB-101. Frequency Adjust trimmers XTAL 1 and XTAL 2. **Power requirements (from SB-101 Transceiver):** 150 VDC at 5 ma. 12.6 VAC at 450 ma. **Dimensions:** 6⅝" H. (plus feet) x 10" W. x 11⅜" D. (including knobs).

SB-200 SPECIFICATIONS — Band coverage: 80, 40, 20, 15 & 10 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** 30 db or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable *pi-output circuit. SWR not to exceed* 2:1. ***Input impedance:*** *52* ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572B/T-160-L (in parallel). **Power requirements:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). **Cabinet size:** 14⅞" W x 6⅝" H x 13⅜" D. **Net weight:** 35 lbs.



HEATHKIT

HEATH COMPANY, Dept. 9-9
Benton Harbor, Michigan 49022

☐ Enclosed is $_____, plus shipping.

Please send model (s)_____

☐ Please send FREE Catalog.

Name_____
(Please Print)

Address_____

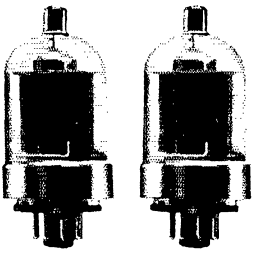
City_____ State_____ Zip_____

Prices & specifications subject to change without notice. AM-202

An independent research company surveyed the top ARRL Sweepstakes scorers in phone and CW...asked them what tubes they used in their transmitters, receivers, and in final stages. And every single one who answered (2 out of 3) said "RCA"

Here's still more proof that whether you run QRP or QRO, on phone or CW, RCA tubes help you put more signal out, and pull in the tough ones even through the SS pile-ups.

Next time you retube *anything* in your shack, see your authorized RCA Industrial Tube Distributor. Then put RCA tubes in every socket–and *go*!



If your rig uses 6146's, increase your power 10% or more! RCA has information for you about increasing your rig's output in Class AB_2, B or C—with the RCA 6146B. Write RCA Electronic Components, Commercial Engineering, Section 137M, Harrison, N. J. 07029 for Engineering Note IEN-3 and product data sheets on the 6146A and 6146B, for details of simple modification.

This year's SS winners were asked "What make tubes do you use?"

–everyone who answered said RCA!

RCA