
40TH ANNIVERSARY
December 1955
50 Cents
55c in Canada
QST
PRICE 10 CENTS
TRANSATLANTIC TESTS SUCCEEDED
AMATEUR RADIO
An All-Wave Receiver
devoted entirely to amateur radio
PUBLISHED BY THE AMERICAN RADIO RELAY LEAGUE

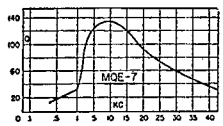
LARGEST PRODUCERS IN THIS FIELD FOR TWO DECADES...

HIGH Q INDUCTORS
FOR EVERY APPLICATION

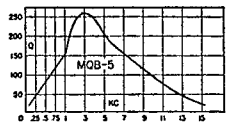
FROM STOCK... ITEMS BELOW AND 650 OTHERS IN OUR CATALOGUE B.

MQ Series
Compact Hermetic
Toroid Inductors

The MQ permalloy dust toroids combine the highest Q in their class with minimum size. Stability is excellent under varying voltage, temperature, frequency and vibration conditions. High permeability case plus uniform winding affords shielding of approximately 80 db.

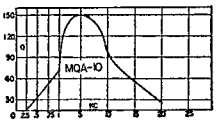


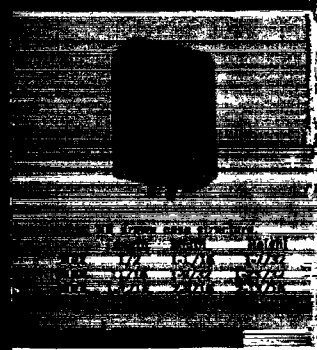
MQE
15 stock values
from 7 Mhy.
to 2.8 Hy.

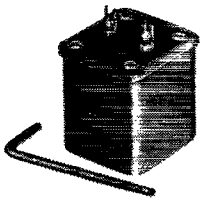


MQB
12 stock values
from 10 Mhy.
to 25 Hy.

MQA
19 stock values
from 7 Mhy.
to 22 Hy.

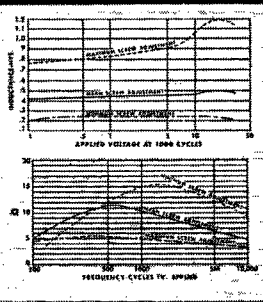






VIC case structure

Length	Width	Height
1-1/4	1-11/32	1-7/16

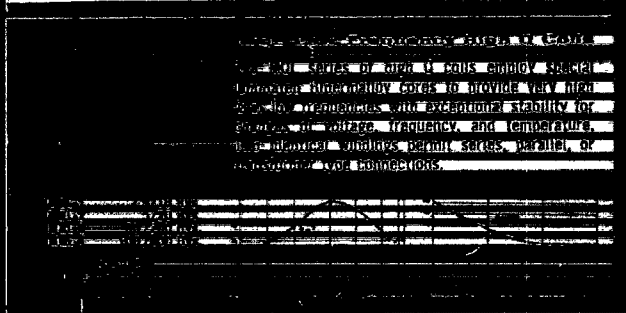


Type	Mean Hys.	Type	Mean Hys.
VIC-1	.0085	VIC-12	1.3
VIC-2	.013	VIC-13	2.2
VIC-3	.021	VIC-14	3.4
VIC-4	.034	VIC-15	5.4
VIC-5	.053	VIC-16	8.5
VIC-6	.084	VIC-17	13.
VIC-7	.13	VIC-18	21.
VIC-8	.21	VIC-19	33.
VIC-9	.34	VIC-20	52.
VIC-10	.54	VIC-21	83.
VIC-11	.85	VIC-22	130.

VIC Variable Inductors

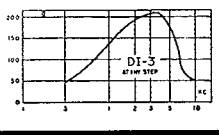
The VIC Inductors have represented an ideal solution to the problem of tuned audio circuits. A set screw in the side of the case permits adjustment of the inductance from +85% to —45% of the mean value. Setting is positive.

Curves shown indicate effective Q and L with varying frequency and applied AC voltage.

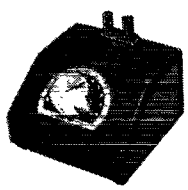


DI Inductance Decades

These decades set new standards of Q, stability, frequency range and convenience. Inductance values laboratory adjusted to better than 1%. Units housed in a compact die cast case with sloping panel ideal for laboratory use.



DI-1 Ten 10 Mhy. steps.
DI-2 Ten 100 Mhy. steps.
DI-3 Ten 1 Hy. steps.
DI-4 Ten 10 Hy. steps.

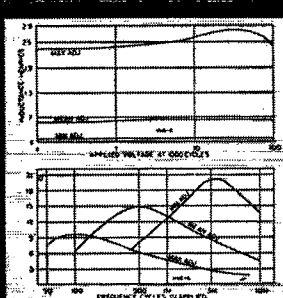


DI DECADE

Length	4½"
Width	4⅜"
Height	2⅜"

HVC Hermetic
Variable Inductors

A step forward from our long established VIC series. Hermetically sealed to MIL-T-27 . . . extremely compact . . . wider inductance range . . . higher Q . . . lower and higher frequencies . . . superior voltage and temperature stability.



Type No.	Min. Hys.	Mean Hys.	Max. Hys.
HVC-1	.002	.008	.02
HVC-2	.005	.015	.05
HVC-3	.011	.040	.11
HVC-4	.03	.1	.3
HVC-5	.07	.25	.7
HVC-6	.2	.8	2
HVC-7	.5	1.5	5
HVC-8	1.1	4.0	11
HVC-9	3.0	10	30
HVC-10	7.0	25	70
HVC-11	20	60	200
HVC-12	50	150	500

HVC case structure.

Width	Length	Height
25/32	1-1/8	1-7/32

SPECIAL UNITS TO YOUR NEEDS

Send your specifications for prices.

UNITED TRANSFORMER CO.

150 Varick Street, New York 13, N. Y. EXPORT DIVISION: 13 E. 40th St., New York 16, N. Y.

1955 Edison Award Offers Opportunity To Honor The Amateur Radio Service

ENTRIES for the 1955 Edison Radio Amateur Award close January 2. As in preceding years, the winner will receive the Edison trophy in a distinguished ceremony in a large metropolitan center, to which his expenses will be paid. A check for $500 will be presented to him in recognition of the public service he has rendered.

You can loyally serve the interests of a fellow amateur and the amateur service in general, by these steps:

1. Nominate an Award candidate yourself by letter. Address *Edison Award Committee, General Electric Company, Tube Department, Schenectady, N. Y.*
2. Discuss on the air with other operators what public service may have been rendered by an amateur you know. If your discussion reveals an Award candidate, follow with a nominating letter to the Award Committee.
3. Suggest that your local Radio Amateur Club review possible Edison Award candidates as an agenda item at the December meeting. Club nominations of candidates are welcomed.

Terms of the Award were given in full on this page in the September issue of this magazine. Please refer to these for your nominating letter. Extra copies of the rules are available on request from the Edison Award Committee.

Annually the Edison Award draws attention to the important work done by radio amateurs in the public interest. Winners W5PHP (1952), W9NZZ (1953), and W6VFT (1954) received wide TV, radio, and press recognition. Millions of people read about these amateurs and others who received special citations.

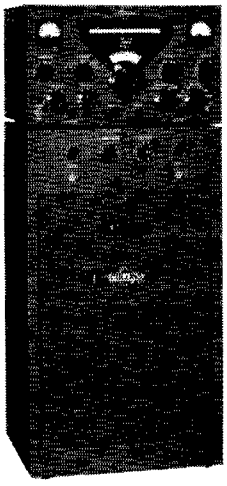
Pay tribute to all radio amateurs by helping select the 1955 Edison Award winner!

GENERAL ELECTRIC

166-1B7

ANOTHER REASON for Top Amateur Performance

Collins PRECISION VFO



Another reason for the superior performance of Collins KWS-1 Transmitter and 75A-4 Receiver is the use of Collins Variable Frequency Oscillator — famous for its linear calibration and stable output. The units in the KWS-1 and 75A-4 are designed specifically for Amateur operations and are 100% tested under lab conditions to rigid specifications.

ACCURACY—With Collins VFO, you accurately set dial calibration to 1 dial division (1 kc) on any band. And with the 75A-4 crystal calibrator, it gives even greater reset accuracy and accurate band-edge operation.

STABILITY

- An average of 24-hour stability of .003% or better is achieved under normal operating conditions.
- Precision ball-bearing construction allows single-knob, permeability tuning with rock-steady vibration stability.
- Each unit is hermetically sealed against atmospheric changes for life-long, drift-free operation.
- Each unit is individually temperature-compensated for minimum drift. Each is lubricated for life.

For more detailed information on Collins KWS-1 and 75A-4 visit or write the Collins distributor nearest you.

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

COLLINS

QST

DECEMBER 1955

VOLUME XXXIX • NUMBER 12

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OFFICES

38 La Salle Road
West Hartford 7, Connecticut
TEL.: AD 3-6268 TWX: HF 88

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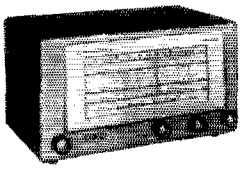
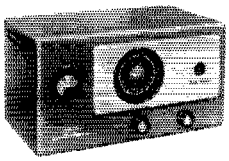


MODEL S-38D
$49.95

COVERAGE: Standard Broadcast from 540-1650 kc plus international reception on 3 Short-Wave Bands covering 1650 kc—32 Mc.

The radioman's idea of radio . . . This famous Hallicrafters' radio, now with smart new styling, amazes even the experts with its superior performance. Featuring the same skillful engineering found in much higher priced communications sets make the S-38D ideal for the Short-Wave listener or new radio amateur.

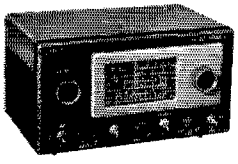


MODEL S-94 or S-95
$59.95

COVERAGE: S-94: 30-50 Mc—S-95: 152-173 Mc

For the thrill of emergency radio—Police, Fire . . . Two new high performance receivers replacing the popular Hallicrafters S-81 and S-82. Compact, easy-to-operate and covers police, fire, taxicab, bus, railroad, private telephone mobile, forestry and other industrial and emergency-service communications operating within models' frequencies. Newly engineered FM chassis provides low frequency drift and high signal-to-noise ratio.

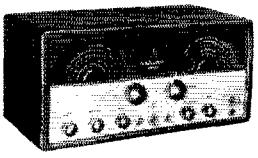
for hams • novices • short wave listeners...



MODEL S-53A
$89.95

COVERAGE: Standard Broadcast from 540-1630 kc plus four Short-Wave bands over 2.5—31 and 48—54.5 Mc.

FEATURES: Large easy-to-read overseas dial with international stations clearly marked. Electrical bandspread and logging scale. Five inch built-in PM speaker, jacks for headphones plus phonograph jack. Temperature compensated to reduce fading due to frequency shift. Two stages of i.f.

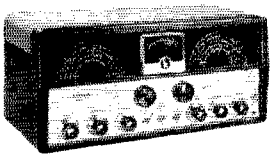


MODEL S-85 or S-86
$119.95

COVERAGE: Broadcast band 540-1680 kc plus three S/W bands 1680 kc—34 Mc.

This newly engineered Hallicrafters receiver has the 10, 11, 15, 20, 40 and 80 meter amateur bands calibrated on large easy-to-read dial. Over 1000° of calibrated bandspread for better selectivity on ham bands. Husky, full sized unit features separate bandspread tuning condenser and built-in PM 5" speaker.

world wide enjoyment is yours with hallicrafters ...at everybody's price!



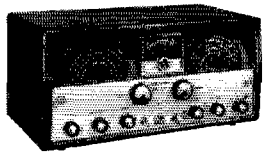
MODEL SX-96
$249.95
Matching R-46B
Speaker $17.95

COVERAGE: Standard Broadcast; 538-1580 kc; Three S/W Bands, 1720 kc-34 Mc. Band 1: 538 kc-1580 kc—Band 2: 1720 kc-4.9 Mc—Band 3: 4.6 Mc-13 Mc—Band 4: 12 Mc-34 Mc.

TYPE OF SIGNALS: AM-CW-SSB

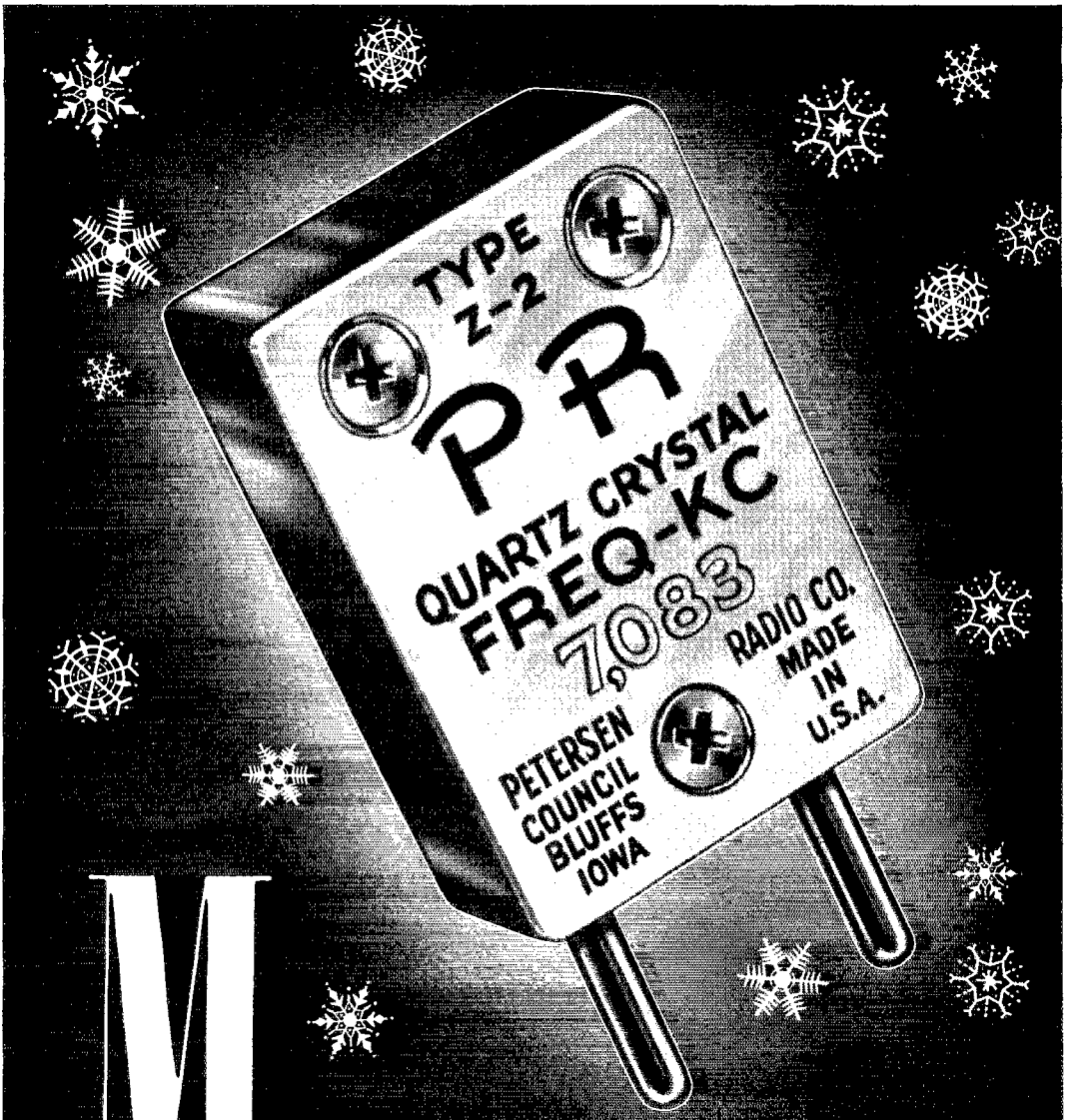
FEATURES: Precision gear drives are used on both main tuning and band spread dials.

Most talked about receiver on the air . . . This Hallicrafters double conversion selectable side band receiver offers major improvements in stability by the addition of temperature compensation in the high frequency oscillator circuits and the use of crystal controlled second conversion oscillators. Hallicrafters highly selectable 50 kc i-f system is used in this new precision-built receiver.



MODEL SX-99
$149.95
Matching R-46B
Speaker $17.95

COVERAGE: Broadcast Band 540-1680 kc plus three Short-Wave Bands covers 1680 kc-34 Mc. Packed with all the features most in demand by the DX enthusiast, this model is a real stand-out in its price range. The large, very easy to read dial features over 1000 degrees of calibrated bandspread through the 10, 11, 15, 20, 40 and 80 meter amateur bands. Incorporated in the advanced design are such much-wanted components as an "S" meter, a separate bandspread tuning condenser, a crystal filter and an antenna trimmer. Grey-black steel and brushed chrome cabinet is perfectly styled for appearance and function.



MERRY CHRISTMAS

BILL PETERSEN, WØJRY

PR CRYSTALS

PETERSEN RADIO COMPANY, Inc.

2800 WEST BROADWAY, COUNCIL BLUFFS, IOWA

Section Communications Managers of the ARRL Communications Department

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

ATLANTIC DIVISION				
Eastern Pennsylvania	W3PVF	Clarence Snyder	717 Porter St.	Easton
Maryland-Delaware-D. C.	W3PRL	J. W. Gore	3707 Woodbine Ave.	Baltimore 7, Md.
Southern New Jersey	K2BG	Herbert C. Brooks	800 Lincoln Ave.	Palmyra
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Western Pennsylvania	W3NCD	R. M. Heck	RFD 1	Sharpsville
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Indiana	W9NTA	Seth L. Baker	276 West Sumner Ave.	Martinsville
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Minnesota	WØMXC	Charles M. Bove	1611½ E. Lake St.	Minneapolis 7
DELTA DIVISION				
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Louisiana	W5FMO	Thomas J. Morgavi	3409 Beaulieu St.	Metairie
Mississippi	W5WZV	Julian G. Blakely	104 N. Poplar St.	Greenville
Tennessee	W4SCF	Harry C. Simpson	1863 So. Wellington St.	Memphis
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N. Y. C. & Long Island	W2TUK	Harry J. Dannals	139 East Zoranne Drive	Farmingdale, L. I
Northern New Jersey	W2VQR	Lloyd H. Manamon	709 Seventh Ave.	Asbury Park
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Nebraska	WØCBH	Floyd B. Campbell	203 W. 8th St.	North Platte
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New Hampshire	W1HS	Harold J. Preble	Route 4	Concord
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San Francisco	W6GGC	Walter A. Buckley	36 Colonial Way	San Francisco
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San Joaquin Valley	W6JPU	Ralph Saroyan	3639 Mono St.	Fresno
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South Carolina	W4ANK	T. Hunter Wood	1702 North Rhett Ave.	North Charleston
Virginia	W4KX	John Carl Morgan	c/o Radio Station WFVA, Box 269	Fredericksburg
West Virginia	W8PQQ	Albert H. Hix	1013 Belmont St.	Forest Hills, Charleston 4
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Utah	W7UTM	Floyd L. Hinshaw	165 East 4th, North	Bountiful
Wyoming	W7PKX	Wallace J. Ritter	P.O. Box 797	Sheridan
SOUTHEASTERN DIVISION				
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Eastern Florida	W4FE	Arthur H. Benzee	P.O. Box 358	Howey-in-the-Hills
Western Florida	W4MS	Edward J. Collins	1003 E. Blount St.	Pensacola
Georgia	W4NS	George W. Parker	226 Kings Highway	Decatur
West Indies (Cuba-P.R.-V.I.)	KP4DJ	William Werner	563 Ramon Llovet	Urb. Truman, Rio Piedras, P. R.
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San Diego	W6LRU	Don Stansifer	4427 Pescadero	San Diego 7
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Oklahoma	W5RST	Dr. Will G. Crandall	State Veterans Hospital	Sulphur
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New Mexico	W5FPB	Einar H. Morterud	2717 Quincy St., N.E.	Bel Air Albuquerque
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Ontario	VE3IA	G. Eric Farquhar	16 Emerald Crescent	Burlington, Ont.
Quebec	VE2GL	Gordon A. Lynn	R.R. No. 1	Ste. Genevieve de Pierrefonds, P. Q.
Alberta	VE6MJ	Sydney T. Jones	10706-57th Ave.	Edmonton, Alta.
British Columbia	VE7JT	Peter M. McIntyre	981 West 26th Ave.	Vancouver, B. C.
Yukon				
Manitoba	VE4HL	John Polmark	109–13th, N.W.	Portage la Prairie, Man.
Saskatchewan	VE5HR	Harold R. Horn	1044 King St.	Saskatoon

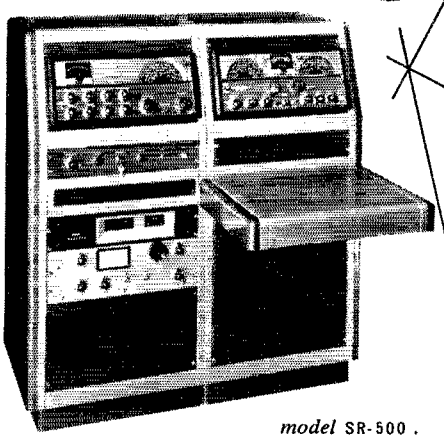
* Official appointed to act temporarily in the absence of a regular official.

PROFESSIONAL EFFICIENCY

For the first time
commercial broadcast styling in one
COMPLETE AMATEUR RADIO STATION

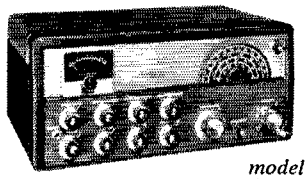
hallicrafters

model SR-500



model SR-500 .

A completely contained unit in a handsome console cabinet—transmitter/exciter, linear power amplifier, receiver—affording the finest in V.F.O. or crystal. SSB, AM and CW transmission and reception. You need supply only the antenna, microphone and AC power. All the wiring is complete, and external connections are provided for antennae and microphone. The transmitting and receiving units are located for maximum efficiency in coordinated operation. A special communications speaker is positioned above the operating shelf directly in front of the operator. Console is mounted on casters and is easily expandable. Three blank panels provided in the basic cabinet for installation of any additional equipment desired. All safety and protective features incorporated. Completely enclosed, fused with the main power relay controlled by a key lock. Entire back of cabinet is enclosed and perforated for maximum ventilation and heat dissipation. $1495.00



model HT-30
transmitter/exciter

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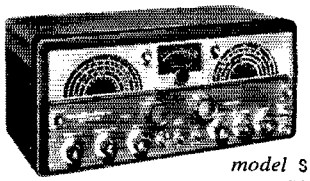

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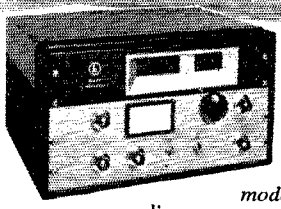
"Tee-Notch" Filter provides a stable non-regenerative system for the rejection of unwanted heterodyne in SSB. The "Tee-Notch" also produces an effective steepening of the already excellent 50 mc i-f pass band (made famous in the SX-96). Upper or lower side band selectable by front panel switch. Notch depth control for maximum null adjustment • Antenna trimmer • Plug-in laboratory type evacuated 100 kc quartz crystal calibrator—included in price • Second conversion oscillator crystal controlled—greater stability through crystal control and additional temperature compensation of high frequency oscillator circuits. $295.00



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Continuous frequency coverage from 3.5 mc to 30 mc • Pi-network output for efficient harmonic and T.V.I. suppression • Major T.V.I. suppression built in • Does not require an antenna tuner as will feed loads from 50 to 600 ohms • Full metering of all important circuits, including input in watts • Employs two 811-A zero bias triodes in parallel. The input system is designed to be fed from a 50-70 ohm unbalanced line and requires a maximum of 10 watts drive on 80 meters. The grid tank circuit is balanced to provide all band neutralization. $395.00

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THE AMERICAN RADIO RELAY LEAGUE, *INC.,*

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

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

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

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

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

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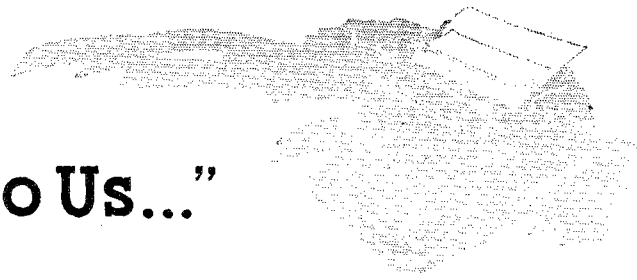

"It Seems to Us..."

QST's 40TH ANNIVERSARY

It is the autumn of 1915. The American Radio Relay League is nearly a year and a half old. It numbers some 600 members interested in radio relay routes, and functions solely under the joint guidance of Hiram Percy Maxim, as its president and Clarence D. Tuska, as its secretary.

Maxim and Tuska are increasingly aware of the need for some sort of bulletin for League members to keep them in better touch with each other, to announce the existence of new stations and to start additional relay routes. But how to finance it? The League has no funds. The two officers have already advanced money from their own pockets to print message blanks and "List of Stations" books. Yet the sale has been disappointing; most of the copies go as a bonus to amateurs sending in station dues of 50 cents.

They talk of the possibility of starting a magazine for amateur wireless operators. But could amateur radio possibly be ready for a magazine all its own? . . . One that would not only disseminate the needed bulletins but also serve its readers in additional ways such as publication of technical material? . . . Would it pay its own way? . . . Are there enough amateurs who would subscribe to enable the magazine to be self-supporting? . . .

Finally the decision is made: to risk a few more dollars in a three months' trial of a magazine. Its name? *QST*, taken from the international list of abbreviations, meaning "General call to all stations."

And so it was that just forty years ago this month appeared the first issue of what was later to become the League's official organ. We commemorate the event by publishing in this issue, in its entirety, Volume I, Nr. 1 — blue cover and all.

To the waiting, news-hungry amateur world, *QST* was manna from heaven. In three months it was obvious that the magazine was a thorough success. Maxim provided mature business guidance — and a Franklin motor car to carry *QST* to the post office. Tuska, a college freshman, provided the enthusiasm of youth — and most of the work: he was editor, advertising manager, production supervisor, circulation manager and errand boy. *QST*'s office was his attic, its mailing desk the Tuska dining room table. The size of the issue was whatever printer's bill the month's cash receipts could finance for the number of copies necessary. The third issue — February, 1916 — grew to 28 pages, showed its stability by an offer of a full year's subscription for $1.

It should be remembered that at this stage *QST* was not a League publication, officially, although of course it was filled with ARRL organizational news. Businesswise, it was an independent venture of Maxim's and Tuska's. It continued to grow because it adequately filled a need, and reached its prewar peak — 96 pages — in April, 1917, at which time it sported both a part-time steno and a part-time advertising manager. Then came the war and, after a few issues devoted largely to recruiting, Tuska got out a final September issue and himself joined the Signal Corps, heavily in debt for those last few months of operation.

Came 1919 and the postwar reopening of the League. Tuska wanted to go into manufacturing and the League wanted to own *QST*. The first ARRL Board meeting found the League with no funds; directors passed the hat among themselves, collected enough to finance the distribution of a four-page "QST" pamphlet announcing the reactivation of the League and soliciting funds through sale of ARRL bonds to members. With money thus acquired, the League purchased *QST* from Tuska, at no profit to him but only in the amount of his outstanding printer's bill. Since that day every member of ARRL has had *QST* sent him monthly.

The stature of a magazine is measured by the extent to which it serves its readers. By such a standard, *QST* ranks high. That is not self-praise. Like the League, *QST* is of, by and for the amateur. Restated, *QST* *is* the amateur. There is a full-time staff to provide the editorial and mechanical functions of producing the magazine, and a technical staff and laboratory which, assuredly, have contributed mightily to *QST*'s stature. But fundamentally the readers of *QST* are its authors as well as its owners. From amateurs employed in electronics come articles pioneering fields into which a personal interest draws them, as a

This ad in the December, 1916, issue of *Everyday Mechanics* helped spread the word about the new and growing amateur magazine, *QST*. Although not too apparent in this reproduction, the lad on the left is dismayed at seeing practically no current on his hot-wire ammeter. The gent on the right — a *QST* reader, naturally! — is putting all kinds of power into his antenna.

sideline to their work in professional laboratories. From a modest home workshop may come a story with novel ideas, such as on a transmitter design. From the newest Novice may come a hint or kink which can help his fellow amateurs, through his own magazine. From volunteers in the field organization come reports of station activities, emergency preparation, participation in contests and awards and other operating activities. From similar sources *QST* can chronicle the public-service achievements of amateurs. And we would be less than fair were we not to mention the vital importance to *QST*'s growth of participation by industry in the form of advertising support. Over the years, the advertising columns of *QST* tell as vivid a story of the growth and development of amateur radio as any text we could write.

Since its inception in 1915, *QST* has been of, by and for the amateur. The success it has attained results from the fact that League members are its owners, its authors and its readers. The forty-year record is one of which all ARRL members can be justly proud.

ANNIVERSARY ISSUE

Extra copies of this 40th Anniversary issue, complete with the Volume I No. 1 reproduction bound in, are available for 50 cents each, postpaid. Limited quantities have been printed, so don't delay if you want extra copies. Address ARRL Hq.

Strays

There's humor even among the ranks of the U. S. Navy Recruiting Service, as shown by this official dispatch received at Headquarters: "Dear Sir — Having the best interests of ham radio at heart, I am pleased to inform you that W1BCI no longer exists in the State of Maine — I just shipped him into the Navy." The communiqué was signed by W1ELW, Navy recruiter.

—···—

Overheard by W6MR at a recent ham convention during the discussion of a visit of one of the members to a mental institution: It is reported that the following conversation took place between two of the patients. One said to the other: "I'm a KZ1." The reply: "I'm KZ2."

—···—

A transistor transmitter has been made that is so small it can fit inside a golf ball. Dan Noble, W9GGJ, who is vice-president of the Communications and Electronics Division of Motorola, Inc., had the transmitter designed to demonstrate the compactness and shock resistance of the transistor. We're sorry to disappoint those ham golfers who are always losing golf balls, but this transmitter is strictly a novelty and it is doubtful that "radio golf balls" will be obtainable for a long time to come.

OUR COVER(S)

We hope this Anniversary issue's full-color "cover of covers" will help you to look back over the years and relive memories of the fun you've had in this great hobby of ours.

• **Hurricane Diane, having lost her fury and been called a "well-behaved hurricane" by the Weather Bureau, burst into tears on August 18th, dumping billions of gallons of water on the already water-soaked Northeast. This is the story of a flood, not a hurricane. The hurricane is *another* story and is printed elsewhere in this issue.**

Typical of the damage done by roiling waters to power and telephone lines is this scene from Unionville, Conn. With dirt washed away from the base, poles sagged, fell. (*Hartford Times photo by Morton J. Boardman*)

The Great Flood of 1955

Amateurs by the Thousands Come to the Aid of Stricken Communities

BY GEORGE HART, W1NJM

NOAH WEBSTER'S dictionary defines a flood as "a great flow of water." About 2000 amateurs in the northeastern United States, having experienced one of the most disastrous floods in our history, can add to that definition. They can tell you that it is not just water, but that it also includes mud, oil, debris, filth and contamination in the form of dead poultry, farm animals, rats and sewer back-up. They can also tell you that when the water recedes it leaves all this evil-smelling flotsam in yards, on streets and in houses inundated during the high water. The result is a sodden, soggy, mess wherever one looks; mess that must be cleaned up quickly, before its content of disease germs can become a menace to public health; mess that disheartens and discourages all who observe it.

And they can tell you also that there is no power on earth so ferocious as this debris- and filth-laden water on a rampage. It sweeps houses away like paper, tears down bridges carrying communications cables, inundates power stations, washes out or splinters poles carrying communications and electric wires. No disaster has ever done a more complete job of disrupting communications than the Diane floods of August, 1955. And never have the amateurs arisen in greater numbers to fill the communications gap until a semblance of normalcy could be restored.

It all began on Thursday, August 18th, when the remnants of a dying tropical hurricane began to spill, in the form of torrential rain, over the countryside of northeastern United States. Over most of the area it rained all Thursday night and far into Friday — nine inches in Philadelphia, twelve inches in Pennsylvania's Pocono Mountain summer resorts, *fourteen* inches in Connecticut! After Connie's heavy rains, there was no place for all that water to go. Every little brooklet swelled to become a raging torrent, angrily spilling its contents into larger creeks, which spilled them into the river. Placid rivers rose rapidly to overflow their banks and crest as much as 43 feet above normal. Not only did the water rise, but also increased the velocity of its flow, so that riverside roads and buildings were undermined, swept away or damaged beyond repair, if not beyond recognition. The current in the Delaware River was estimated at thirty miles per hour. As many bridges were swept away as remained standing. Every road which passed over the smallest brook (and that included most roads) became impassable.

Connecticut, Eastern Pennsylvania and Western New Jersey received the most damage, probably in that order of severity. Listening on the amateur bands during and just after the high water, one would have thought that every amateur in the Northeast was active, such was the turnout of operators wishing to assist. Operation was conducted on 80 c.w., 75 'phone, ten and two meters for the most part. Most of it was good, resulting from previous practice in simulated or experience in real emergencies. Some of it was mediocre, indicating lack of sufficient practice. A little of it, inevitably, was poor, indicating no

previous practice or experience at all in time of emergency.

We wish there were room, here, to give full vent to the glowingly descriptive material submitted by many of the amateurs who participated in emergency communications during and after the flood. There is, alas, room only for the facts, of which there are plenty. Even miscellaneous lists of participants this time must be relegated to footnotes, in order that the highlights can better be described. And as usual, we write on the basis of information received. If we don't know about it, we can't write about it.

The brunt of the floods seem to have been felt in two principal areas: the Delaware River Valley, and Connecticut. We'll deal with them first, then turn to data from less seriously affected areas.

Delaware River Valley

Fed by its swollen tributaries, many of which did considerable damage on their own, the Delaware River crested in Easton at forty-three feet above normal. This was enough to cover riverside roads and many of the bridges, enough to cause loss of communications among many of the communities along the river from Port Jervis to Trenton. Let's start at Port Jervis and work down the river.

During the high water itself, which occurred on Friday in the Port Jervis-Milford area, little could be done except wait for the waters to recede. New York State C. D. Radio Officer W2BGO ascertained early that help was needed in Port Jervis, and drove there with W2ZTZ and W2HTT, carrying along equipment to set up several stations on ten and two meters. The three operators were kept busy for four hours, and the Port Jervis RACES group was still in operation on August 26th, after having started their work on August 18th. Slightly downstream from Port Jervis is the little borough of Milford. One of the hardest hit of Delaware River communities, there is quite a story behind the emergency communications facilities supplied to Milford by amateurs. W3NNT, SEC of Eastern Pennsylvania, was asked to go there by the Red Cross, who succeeded in providing Army helicopter transportation for him and for W3ZOM, who accompanied him Equipment consisted of a small Field Day transmitter constructed by the latter. They set up at the fire house, stringing antennas in the dark with the assistance of many eager volunteers. Contact was made with W3PYF/3 at Easton and W3PQX at Bethlehem, de-isolating the isolated borough of Milford. Later, W3OK came on with a stronger signal. W3NNT/3 at Milford operated steadily from 2030 to 0300, handling floods of official traffic. On Sunday, the work continued, with prospect of a comparatively long stay in Milford. As QRM increased on 75, FCC declared 3850 kc. an emergency frequency on a voluntary basis. This helped reduce the QRM, and in general coöperation was excellent, says W3NNT. However, on Sunday conditions got so bad that they were reduced to using c.w., with W3OK still on the receiving end. On Monday, with an ever-increasing traffic load, a need was felt for more power or additional facilities. Health and welfare traffic was held up in favor of urgent requests for medicine, bulldozers, trucks, food supplies, and the like.

Late Monday night (Aug. 22nd), W2APF, with K2HOK and K2EXB, came down from upstate New York with better equipment. This was quickly installed at W3NNT/3. On Tuesday morning, W2APF, K2HOK and K2EXB, with K2JNF as guide, set out to reach Newfoundland, Pa., reportedly hard hit. They found the town in shambles, contacted W3NNT/3 and a new flood of traffic descended. More mobiles were requested from Bethlehem and the Delaware Lehigh Amateur Radio Club. Three mobiles (W3LCL, W3VSB and W3ELH) arrived Wednesday morning, with W3ZBE as an extra operator, and were dispatched to disaster points in the area. W2DXD /m arrived later and was sent to Newfoundland to relieve W2APF, who had to return to Albany. Hearing of the need for crystals for 3850 kc., W2IBH arranged to have some especially ground by Polytech Devices and delivered by New Jersey State Police messenger. W3QMN and W3TCN, arrived from Bethlehem, were sent to Newfoundland to assist, this town then being made the base of operations in the stricken area. Through a system of contacts using mobiles, portable and fixed stations, and pack sets, quite thorough coverage was effected throughout this stricken area. W3NNT/3 was closed down at

The team of W3ZRQ (left) and W3KJJ (right) kept communications open to and from Tamaqua during the Schuylkill River flood. W3ZRQ originated traffic on 80 c.w. to W3KJJ, who sent it to the "outside" with his 800 watts.

1915 on August 25th, after bringing the caravan of mobiles into Milford by circuitous routes to avoid washed-out roads.[1]

The appearance of W2APF & Co. in the Milford area was brought about by a request from K2EF via W2NOC for assistance in Port Jervis. Finding Port Jervis in pretty good shape, they were asked to go on into Milford; thence, they were dispatched to Newfoundland. K2CQS and KN2LPN from Westchester County served some isolated towns surrounding Port Jervis with two-meter contact.

On August 20th, W3YTM and W3RRI set up equipment at Red Cross headquarters in Honesdale, Pa. Finding 'phone channels congested, c.w. was used most of the time, 41 Red Cross messages being handled on c.w. between 1705 and 2046. Equipment was a 75-watt transmitter feeding a random-length wire atop the Red Cross building. The station was closed on August 21st, after telephone communication had been reëstablished with Newfoundland.[2]

The Second Regional 'Phone Net, the Interstate 'Phone Net and the New York State 'Phone Net combined forces to provide almost immediate contact with points in New York State.[3]

Three babbling mountain brooks trickle into the Delaware near Stroudsburg, Pa. On August 18th the trickle became a muddy freshet, then a raging torrent as the rain continued to come down. Brodhead Creek, running between Stroudsburg and East Stroudsburg on its way to the Delaware, crested at 2½ times any previously recorded level. Telephone, electric and gas service became inoperative as the water swirled madly over the streets and destroyed the bridge across the creek. Upstream, at Camp Davis, only nine of 46 people, mostly women and children, survived the roaring waters. More than twenty main road bridges and as many secondary bridges were swept away. With all available mobiles on the Stroudsburg side, amateurs were at a loss as to how to maintain communications with East Stroudsburg, by Friday morning completely isolated. W3UCY went into operation Friday morning to contact W3UA, state c.d. net control, to request help. At 1000 W3MAA obtained emergency power in East Stroudsburg and became active on 75 meters. By Friday evening, telephone service was partially restored into "Eastburg." K3WCQ at Tobyhanna Signal Depot was active and sent down some hand-carried units. On Saturday, W3PDJ arrived from Jenkintown with a 75-meter portable and was ferried across the still-rampaging creek, a most risky business. He set up shop in the East Stroudsburg jail (with doors unlocked). On Sunday several mobiles[4] arrived from Bucks and Berks County, bringing two meter portable gear with them. The mobiles were put to work in Stroudsburg, the portables ferried across the stream to "Eastburg." One was also taken to Analomink, near the Camp Davis site. Shortly after that, another group[5] led by W3BYF and W3LXM arrived on the scene to help.

Although the telephone company did a highly competent job of quickly restoring communication, there was need for amateur radio in the Stroudsburg area for fully a week after the flood struck. Radio Officer W3MDO in his report mentions the many lessons learned by the group, and the wonderful coöperation by amateurs everywhere, both on the air and in person in helping out through this stricken area.[6]

K2KGF and K2IAM were operating from a summer camp near Blairstown, N. J. W2TSN, in flooded Blairstown, deserves most of the credit for keeping that town in touch with the outside world, and kept KGF and IAM informed of road conditions, etc. K2KGF also mentions the work of W2ZQK at Warren County c.d. headquarters as being most outstanding.

In the Easton-Phillipsburg area, the most populous area on the Delaware above Trenton, the river rose far into the business districts of both cities. Of the two bridges, one had its middle span taken completely out as the river rose far above the traffic level, and the other's approaches were awash so that traffic between Easton and Phillipsburg was impossible during most of Friday and Saturday. Unfortunately, the washed-out bridge also carried the master telephone cable between the two cities so that not only were communications cut between them, but telephone communication within the city of Phillipsburg itself was completely cut off, all points being served from the Easton central exchange. The c.d. team in Easton, under SCM and RO W3PYF, went into action, W3PYF/3 being activated at the Northampton County courthouse. W3TWE/2 was set up at Phillipsburg's Municipal Building and mobiles placed at points of required communication, such as Warren County Hospital, toll bridge approaches, fire stations, etc.[7] These two control stations, operating on ten meters, maintained reliable communications for several days under EC/ROs W2ZVW and W3PYF. Mobiles from less-seriously-affected Bethlehem, and from points down the river were also on hand to assist and were dis-

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[1] Additional stations named in W3NNT's report: *W3s* YAZ TEJ DHJ QOL YDS QMW USB ALS BNR BRC CLC CUL GAG IBM ISN KBV CC LXO OGD PHZ SSE TNC TWN VDF WUE YYT ZLB; *K2s* DJN EIU MRW; *W2s* AF CYW DEL JWN NAI OXR UNF.

[2] Other participating: *W3s* KBV VZJ PVY BFF YEL CUL; *W2s* JOA RUT K2DSR; *W1s* WCC EPE.

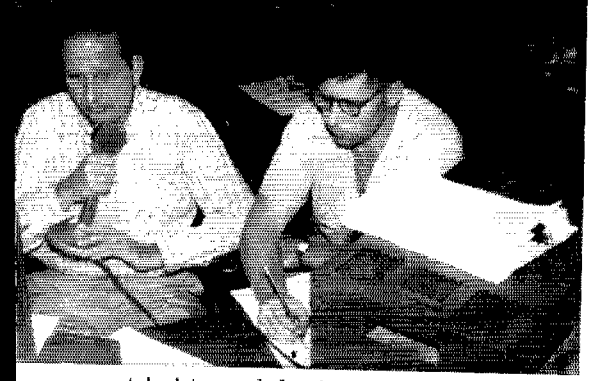
[3] W2NAI lists following participants: *W1s* AC CCE EG HNE JND LN LYL MJE RGR RVK TED UHL UKO VBG VLR WUO YAR YON YYI ZAO ZIX ZRP ZUR; *W2s* ABV ACZ AOW ADZ BBD BNC BO BWC CAG CCM CHA COB CMM CVF CVZ DCO DEM DIR DMD DRD EDF EEB EEO EFU EOM EXT FFU GDD GTC GTI HJO IFV JGV/1 JHQ JKA JNM JXT KHQ KKE KWF LSG MRZ ONP PEQ QAA QYT RGP RQF TRG UJS UQB UTH VDW ULR WNO ZLG; *K2s* AFM AHG ASD ASG AXU BDM BNI CEM CMM DEM DRM DYB EID EJC EKE EQY ERD EZH GAS GHS GRM GTX GUG IHX IJK ISN IWT KXZ LYE; *W3s* BFF NNK VVV YEO.

[4] *W3s* KCG YJM QZO IGW MLY BN WML URT URS URU.

[5] *W3s* SCT HPL HHC ZIF CML.

[6] Others active in Stroudsburg area: *W3s* KMM ZIV SBC RSI SLZ RHT SBB WMP ZMU KN4BXY/3.

[7] Operating at W3TWE/2 and/or serving as mobiles: *W2s* PXU ZVW; *W3s* LCL TNC NUW ZVL TWE TWD BNR OK VSB NIV RUY; W1NJM.



SEC W3NNT and W3ZOM, EC for Bethlehem, Pa., flew to Milford by Army helicopter and operated W3NNT/3 for six days as the only communications with the outside.

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patched to needed points of communications on the outskirts, as required — for example Raubsville, where W3OK put in some time, devastated Carpentersville, Harmony, and other river towns. W3QBF was on from Red Cross headquarters in Bethlehem, maintaining contact and handling traffic on ten meters with the Easton-Phillipsburg stations. W3PYF/3 also operated on 75 meters from the courthouse to connect Easton to other parts of the state, mostly through the state c.d. net on 3850 kc. North of Easton, at Martin's Creek, W3MAC, despite his visual handicap, remained on the air on 75 meters until flood waters rose in his shack, after which he was evacuated. Lew lost all his equipment, which might have been saved had he not insisted on staying on the air.

The Philmont Mobile Radio Club of Philadelphia turned in a terrific job of emergency communications in the lower Delaware River Valley. The day-by-day documentary, supplied by W3PXY, makes most interesting reading. We submit a boildown of it herewith:[8]

Thursday, August 18th — In the downpour that took place Thursday night, W3s EM, FUY and SSU at Doylestown c.d. headquarters were heard. They left to assist in the evacuation of Treasure Island, a Boy Scout camp on an island in the middle of the river a few miles below Frenchtown. At midnight, W2DKA/m called in with the information that hundreds of cars were backed up on Route 611 near Neshaminy because of a bridge washout. W3QV arranged to take traffic from the stranded motorists, passing it to other stations in the Philmont Net, who distributed it throughout the Philadelphia area as required.

Friday, August 19th — Network organization proceeded apace as the situation grew more serious. Late Friday afternoon 100 Philmont mobiles were pressed into service as fast as they could be recruited. The frequency of 29,626 was designated for operating, 29,493 for recruiting. W3SSU was set up at the Doylestown Court House, and other mobiles and fixed stations were distributed throughout the area as required.

Saturday, August 20th — The highlight of this day's operation was signaling the Navy helicopter to rescue some men stranded in the river near Yardley. State Police could not get word to them, but W3VXN called W3QV to assist, who called the Navy control tower who contacted the helicopter in flight. Within three minutes the Navy helicopter was on the scene. Otherwise, the intense operation of the day before continued, on an even broader scale. Operators disregarded their own needs for sleep and proper food to supply the urgently needed communications. W3YJM parked at the top of a hill to provide relay for communication between Upper Black Eddy and Doylestown. "Reems" of messages included requests for food, drinking water, cots, blankets and orders for rescue teams. Health and welfare traffic had, for the most part, to be deferred.

Sunday, August 21st — National Guard troops began to move in on this date, and the urgent need for communication was over. Many of the Philmont members reported at Doylestown, some of them volunteering for duty in the hard hit Stroudsburg area. After having taken the edge off the need in their own area, this bunch of live-wire emergency-minded mobileers still found work for their talents in the upper reaches of the Delaware River, where damage had been even more extensive.

From Kingston, where damage was not heavy, W3VZJ reports that he was able to serve by copying the list of camps reported safe by W3HA and W3UCY and feeding them to local radio and TV stations and newspapers. All concerned were happy to have this information of great interest to many of their listeners and readers.[9]

The Delaware Valley Two Meter Traffic Net was active on August 22nd in handling traffic connected with the Stroudsburg area. Contact was maintained with W3YDX at Stroudsburg on two meters, and much traffic was handled. W2YRW, a member of the net, was the principal contact and served as relay between Stroudsburg and several points, particularly with the Corps of Engineers in Philadelphia.[10]

The North Penn Amateur Radio Club's members were active in flood work in the Doylestown area. W3OKX and WN3BRU served at Yardley on Saturday and Sunday, and on Sunday W3VST and W3VSS supplied the North Penn Goodwill Service with communication.[11] On Thursday evening after the flood, six amateurs assisted police in patroling the river near Point Pleasant.[12]

W3KJJ sends us a story about the flood in Tamaqua, Pa., on the Schuykill, one of the Delaware's larger tributaries. This river reached its

[8] Other Philmont mobiles and operators not mentioned in this account but who also were on hand: *W3s* QQH AUF VVS MVG UIX VWX NIP GIF SAE HQJ CNO BYB FUS DOU BGR SUG OWX IRS RQZ JON LNQ VSW SAI VOW HFD TOZ GRG KNC DSG WNC UKF SAA VIX ULC IW QZP JYI DOE SBE ISE UZF PSC DKA CRU; *W2s* OAF ZEW DKS.

[9] Also active in Kingston: *W3s* VMS BBM.

[10] Additional Delaware Valley Net members active: *W3s* KBG MOM WQL K2ITP KN2KVE.

[11] Home stations assisting: *W2s* MAG PQB IMW SVL.

[12] *W3s* PNL VST VSQ VTR WBR YUI.

crest in Tamaqua about 1800 Thursday night, and the borough was without power or communication. W3KJJ, after power was restored at 1930, reported into the Penna. Fone Net. Later, W3ZRQ and W3ZXF set up an emergency station near the police station at Borough Hall, carrying the traffic W3ZRQ would originate from borough officials, sent it to W3KJJ who would relay it to the outside with his 800 watts. W3KJJ had to make emergency repairs to his antenna at the height of the storm. The operators at Borough Hall were released at 0500 and partial telephone communication was established by 0800. W3KJJ spent the rest of the time until August 25th in assisting stations in other areas, while W3ZRQ continued to handle emergency traffic from Borough Hall.[13]

The Pennsylvania CD Net was activated on 3915 kc. on Friday morning, with W3MAC and W3HA doing most of the control work. At 1000 W3MAC had to retire due to high water and W3UA came on the net. FCC declared the segment 3910–3920 a disaster frequency on a voluntary basis at 1100, August 19th, and a formal network was set up by W3UA. Contact was established and maintained directly with some fifteen cities and towns with no or limited long lines communications, and with others indirectly via ten- and two-meter circuits. NCS were changed from time to time to give relief from long hours of operation. Over 500 messages were handled in all, including river-stage and flood-crest reports, requisitions for helicopters, bridges, medical supplies, highway-condition reports, reports on the conditions at vacation camps, and press reports of flood progress and damage. Principal net control stations were W3UA, W3HA, W3UCY and W3MAC. Coöperation from amateurs on the frequency was excellent. The net was closed on August 22nd when a survey showed that telephonic communications had been restored with all except one town.[14]

One of the workhorses on 75 was W3HA. Dan started out on August 18th assisting the Tamaqua boys, then got Lehigh River readings to pass to W3SCT in Allentown, W3HFT in Northampton and W3PYF/3 in Easton. The following day, he joined W3UA on the Eastern Pa. C.D. Net, acting as NCS much of the time. On August 20th he handled a great deal of traffic in and out of the Pocono area with W3UCY in Stroudsburg, and W3NNT/3 in Milford. He assisted in this and other ways until August 22nd, losing much sleep; but his "big" signal was a definite asset to the 75-meter net.

Connecticut

Connecticut, although along its main waterways pretty well protected, received such a fearful drenching that the areas of greatest damage were those through which no large rivers flowed. The Connecticut River itself is pretty well diked against floods — and the dikes held, despite the unprecedented fourteen inches of rain. The other two principal rivers, the Thames and the Housatonic, although both above flood level, did little damage compared to the toll of life and property extracted by their many diminutive tributaries. A small stream rates a small stream bed. When that small stream becomes a mad, raging river full of mud, trees, houses and other flotsam adding to the destructiveness of its force, it does as much or more damage than a large river overflowing its banks. Such was the situation in Winsted, in Torrington, in Unionville, in Putnam, and in many other Connecticut communities situated along small streams.

Probably the greatest damage of all was done in the city of Winsted, a community of perhaps 10,000 souls in northeastern Connecticut. The little Mad River (an appropriate name, as it turned out) arose from its bed through the center of town and lived up to its name by sending a violent torrent of filthy water down Main Street Never was the center business district of a town so thoroughly destroyed as was that of Winsted. We don't know much of the communications story until the time that operators from other parts of the state began to come in. One such group came from Stamford on Sunday, August 21st, and consisted of mobile W1s FTM TZX WJD and PCZ. They were met near Ansonia by W1EXO who escorted them through Torrington into Winsted. There they reported to Winsted CD Communications Officer W1OTL. Three of the mobiles were dispatched to small communities surrounding the city, while W1PCZ parked outside c.d. headquarters as control. Telephones were all out and most roads impassable, so these mobiles in many cases furnished the first outside contact. Contact was also made with state civil defense control station W1TIA and important official messages handled.

Operation continued in this fashion on Monday, Tuesday and Wednesday, when telephone lines were rebuilt and the need for the Stamford

[13] The following stood by to handle traffic out of Tamaqua: *W3s* UEU NBJ HA BNR SCT PYF DJZ SEB OSE WII QEW. Also active in Tamaqua: W3RZV.

[14] Net participants not already mentioned: *W3s* AKF BBM BEP CYW LXQ LYP QPU TTQ TTW VMS WEM ZBW ZQK BBV BET FBF MKA QBA UWP VRN YBT WVE ZEK; *K3s* WCO WAZ WBZ; *W4s* BQH HFH.

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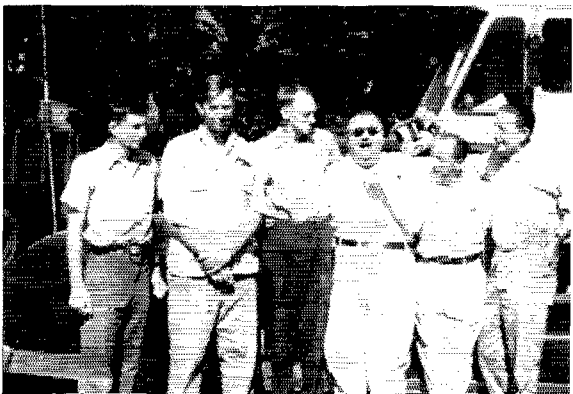


Some of the gang who helped during the flood in Pike County, Pa. Left to right, K2EXB, K2JNF, W2AF, K2HOK, W2APF, W3NNT. They are standing in front of W2APF's mobile, which saw service at Newfoundland, Pa.

crew's services lessened. However, mobile W1s PCZ and TZX returned on Saturday, August 27th, along with mobile W1s NER and UJB at the request of Winsted police to augment their police communications system for the week end. They brought plenty of equipment along to accomplish this objective. A Winsted policeman went on patrol with each car. An 80-meter station was set up to handle traffic with the Conn. 'Phone Net and W1AW. A 10-meter station was also set up to relay to the control station when required. On Sunday, August 28th, the same operation continued, aided that day by mobile W1YPA from Manchester.

W1RGB and W1IHP, who were at the time serving as relief operators at state headquarters in Hartford, answering a request for relief ops in Winsted for W1UZ, and to set up liaison between the W1UZ QTH and CD Headquarters. They were flown in by helicopter and went right to work. Traffic was handled on 3640 kc. with regular stations of the Connecticut Nutmeg Net, but mostly with W1AW.[15]

Connecticut SCM W1EFW journeyed to Torrington on Sunday, August 21st, after getting word that help was needed. A mobile was left on West Peak, Meriden, to relay if needed. Upon arrival, he checked with Torrington RO W1JJL and they decided to establish a station on 3640 kc. to maintain contact with W1AW and to the Red Cross, Civil Defense and other agencies. Finding a shortage of equipment, a request was sent back to Southington for portable two-meter gear via W1TIA and the ten-meter net. These were established at Red Cross stations throughout the city.

W1WHO in Ellington made early contact with W1JJL-2[16] in Torrington. Just a few houses away, W1ULY operated into the Connecticut 'Phone Net and had contact with W1AW. Thus, the traffic went from W1JJL-2 to W1WHO, thence by telephone or messenger to W1ULY to W1AW or other Connecticut points as required. This link was in operation until late Sunday evening, August 21st.

The Bristol c.d. control center was opened Friday morning and operated until Sunday, August 21st, using seven operators.[17] Contact was made with c.d. area control W1WSL and about fifty messages were transmitted during the emergency. W1KYQ took many messages going to other parts of the state. Bristol being cut in half by water, one mobile was stationed on each side of the city, and these two units gave invaluable aid during this emergency. W1s UCL and CLD established a station in Harwinton to act as relay between Torrington, Winsted and Bristol. A crew of operators[18] also went to the aid of Thomaston on August 21st to establish communications there; they put in 45 hours of operating and received strong commendation by Bristol EC/RO W1RLN.

The emergency in Putnam found most of that town's amateurs away. W1BOS strove to get something started. With permission of the Putnam Deputy C.D. Director, he contacted W1ALW in Norwich. The latter promptly sent up six mobile units and two operators,[19] all of whom did an excellent job of providing communications in the Putnam area. W1BOS himself was occupied in his job with the Park & Forest Commission.

On August 21st, the Providence gang, under R. I. SEC W1TQW, sent four mobiles toward Putnam. They dropped one off as a relay when the base station's signal began to weaken, dropped another one off when the relay unit's signals began to flutter. The last two cars proceeded into Putnam and set up at the Putnam Red Cross. All operation was on ten meters. This relay set-up worked very well, handling about 80 messages during its period of operation. When telephone communication was reëstablished, the network was closed down.[20]

The Hamden Amateur Radio Association sent 14 volunteer operators into flooded towns in the ravaged Naugatuck Valley and elsewhere to assist. On Friday morning, W1FKO opened up the c.d. control station at Bethany and established contact with towns and cities in the Naugatuck that had active c.d. organizations. Practically continuous communications were maintained with Waterbury, Watertown, Ansonia, Prospect, New Haven, Wallingford, Derby and Shelton until midnight Sunday when normal communication was restored. W1ZFF was sent to Waterbury and established one channel across the river, aided by Waterbury amateurs. Five amateurs kept their mobiles on the road for long periods, providing Bethany with other needed channels of communication as required. W1NFG, W1SBM and W1QXT went to Naugatuck to establish across-the-river communications, and succeeded in doing so. Later, they went to Litchfield and Winsted, being put to work at the latter place until released at 0300 Sunday. W1QXT served as relay atop Avon Mountain during part of this period, later relieved by W1ETF.[21]

This was an emergency in which ARRL Headquarters was right in the middle. W1AW suspended its regular schedule and plunged into the emergency operation with all its kilowatts. Operation was mostly on 3640 and 3880 kc., Conn. Net frequencies. Regular schedules were maintained with Torrington and Winsted, although traffic was handled for many other Connecticut points as well. Besides the regular station staff (W1WPR and W1QIS), several Hq. staff members operated from W1AW and many others assisted on the telephone, servicing messages, and the like.[22] The station suspended regu-

[15] Others in the Winsted operation: *W1s* PFS COR CTN FRD WSZ.

[16] Operated by W1ZLV and W1TZO.

[17] *W1s* PHF UCL YOE SBU CKA CLD ZQH.

[18] *W1s* SBU YOE PHF UCL ZQH.

[19] Mobile *W1s* BCE IWY KTH RFK GTV W5AYI/1; assisting, W1NDX and W1FOZ.

[20] W1TQW identifies the following R. I. participants; *W1s* BTV CPC HEH KCS KKE LU NZR OGY RAM SBP SGA VDI VZP YKQ YNE ZPG.

[21] Other active members: *W1s* UKL BVN UJG LQZ AEU CUX WHL UKX YBI UGG.

[22] Operating: *W1s* LVQ ZDP YNC ICP UED WPO YYM CUT RDV BDI; assisting: *W1s* ZCS ZID ZIB FGF CEG CIE.

lar operation on August 19th, resumed it on August 26th. During that period, W1AW was on the air almost continuously, handled 870 messages. Additional hundreds of "health and welfare" messages had to be refused because of the preponderance of official relief communications.

W1FGF set up a two-meter circuit with WN1FEA from the ARRL offices to handle some "agony" traffic, and succeeded in relieving the minds of many distraught relatives thereby. These two stations also handled messages regarding road conditions with considerable success. W1BDI was also active from his home station handling traffic with W1OTL and W1UZ in Winsted and W1JJL in Torrington.

ARRL received a letter from Connecticut's Governor Ribicoff, praising the work of Connecticut's amateurs in supplying much-needed emergency communications in this flood. The praise is well deserved; we pass it along to all of you herewith, and point to it as another hallmark in the annals of amateur radio service to the public.

Message to Amateur Radio Operators

"Among the outstanding services rendered during the recent flood were those contributed by the amateur radio operators. They spread the alarm, they summoned help, they directed the delivery of critically-needed supplies, they relayed messages to relatives. When all other means of communication failed, the 'hams' bridged the silence that lay between the devastated areas and the rest of the State.

"From all officials and all agencies involved in the flood work, I have heard nothing but unstinting praise for these operators. Their skills and energies were of invaluable aid in the midst of the greatest tragedy to ever strike Connecticut.

"On behalf of residents in the flooded communities and the State of Connecticut, I would like to extend both official and personal thanks to every amateur operator who gave so freely of his time and talent in this emergency. The State is especially fortunate in having such an outstanding group of volunteers as an integral part of the Connecticut Civil Defense organization."

Other New England Reports

New England's NTS First Regional Net was activated during the emergency, as it always is when needed. Aside from normal sessions, 1RN was on Saturday the 20th and Sunday the 21st. NCS of record were W1s WEF WCC QGU ZUU HRV and W2WFL. Close liaison was maintained with CN on 3640 kc. Some traffic was also handled with W3s who reported in. The net continued to operate on succeeding days, although not continuously.[23]

W1CLF reports operation by the New England Emergency Net on 3870 kc., controlled principally by W1GIX and W1SS. In his own back yard, W1CLF mentions in his report that the Shuttle Village dam let go on August 23rd, necessitating the evacuation of Woonsocket residents in its path. Three mobiles[24] went to Woonsocket to assist. W1CLF handled over 40 messages during the emergency period.

W1RO, EC for Worcester County and Mass. C.D. Area 3 Radio Officer, sent us a detailed report of operation in the Southbridge, Mass., area from Friday through Monday. Wish we had space for all of it. In brief, the Southbridge-Webster area was served by the New England Emergency Net on 3870 kc. and by W1BRF in Southbridge on ten meters supported by six mobiles operating 24 hours per day. Difficulty was experienced when the Webster and Southbridge areas were cut off from each other, but communication was quickly reëstablished. Welfare traffic had to be stacked up in favor of official c.d. and Red Cross communications. Power failure difficulties were largely solved on Sunday when W1RIL obtained the use of an emergency generator from Holy Cross College. Traffic was handled from W1RO to W1EES/m, who switched his mobile to ten meters to relay to W1BRF in Southbridge. On Monday official c.d. nets were closed up, but the boys in Southbridge continued operating to back up limited telephone communication which had by then been established.[25]

Worcester EC and RO W1SPF was unable to get to his control station W1YEW from his home in Rochdale, but W1YEW was activated by W1ZTL and W1QCQ. All work was done on ten meters. W1IBY/m came down from Harvard Laboratories with a beach wagon full of gear and set up a station in Southbridge which was of some assistance there.[26]

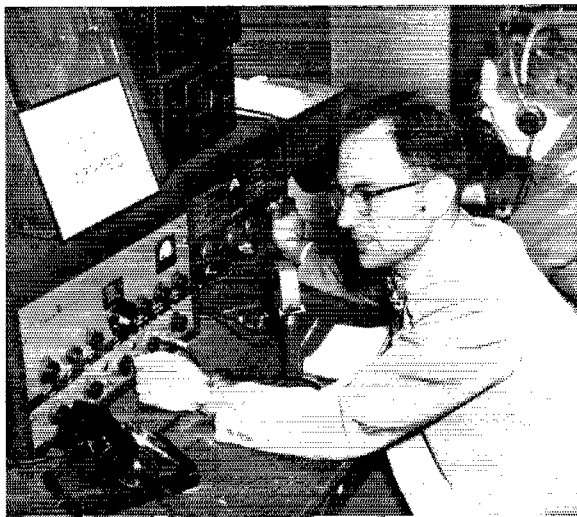
Regarding Southbridge, Communications Officer W1QFJ reports that W1BRF, the station

[23] Also on 1RN were *W1s* RBF ILV IMV IP: W2JOA; *K2s* LWK GZC AEQ; *W3s* AXA BUD.

[24] *W1s* WMN BFV VQN.

[25] W1RO's report also mentions the following: *W1s* JQJ TZI NAX AJV QEA AVW LIB CJU YCX DYI ZPW YPQ JWM ZMM YCW MJW NQN HIB LIY ZAM WCO MIA YXN CJL.

[26] Reported active by W1SPF: *W1s* VPD NZD SPG DQY AET VFF VHN.



Operation in the hard-hit Easton-Phillipsburg (Pa.-N. J.) area was controlled by W3PYF/3 at the Northampton County Courthouse in Easton. Shown at the controls of the 75-meter and 10-meter positions are W3PYF, Eastern Penna. SCM and Northampton County Radio Officer, and W2ZVW (W3NF), Southern N. J. SEC and Radio Officer for N. J. State Area 5 (RACES).

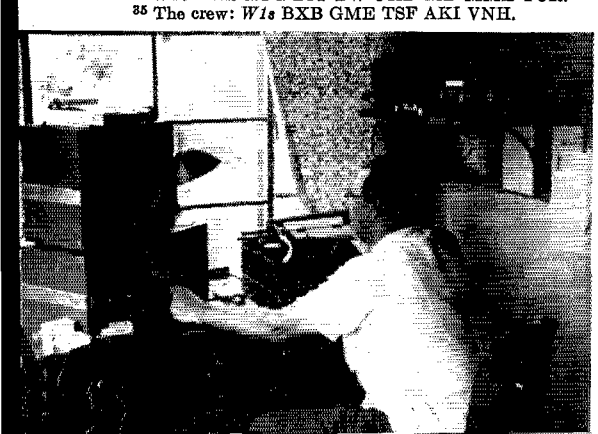
of the Quinebaug Amateur Radio Club, was on the air without let up from 0300 August 19th until midnight August 26th. The station controlled a crew of mobiles for local communications.[27] Two members of the group (W1EFC and W1TTK) were hospitalized from exhaustion. W1QJF submits commendation of the following for causes given.[28] (1) W1TTN, who manned his mobile for four days without leaving the car; he used up three batteries and his car suffered some damage. (2) W1TTK, who drove himself to exhaustion in supplying liaison with the New England 'Phone Net. (3) W1EFC, C.D. Director, who handled a 100-man organizational job for the first day. (4) W1PQZ, who drove to Lancaster, fifty miles away, to get a badly-needed generator. (5) W1LLT, who supplied the only communications from Sturbridge; parts to repair his rig were sent in by helicopter.

A newspaper clipping tells us of service rendered by W1MSN to keep the little town of Woronoco, in western Mass., from being isolated. Contact was maintained with W1UKR in Springfield and with the Westfield civil defense network. Assisting at W1UKR were W1KUE and W1TPH.

W1AVY performed yeoman service on the 75-meter band in the New England 'Phone Net, the Conn. 'Phone Net, the Cape & Islands Emergency Net, Deep Sea Dragnet and Transcontinental 'Phone Net, all of which were busy handling emergency traffic.[29]

The situation in Framingham became serious on August 20th, when the C.D. Director asked RO W1ZOP to alert the net. Mobiles were dispatched to maintain watch on water levels in rivers and reservoirs.[30] Contact was maintained with W1VBC (Mass. Red Cross) and also with the C.D. Sector 3 Net. On Monday, Aug. 22nd, W1MEG/m was dispatched to a dam holding back a large reservoir that appeared to be weakening, endangering the whole Framingham area.[31]

[27] *W1s* EFC EES CJL IBY LLT PQZ QFJ TTK TTN.
[28] Also participating were *W1s* YYR YQC ZD ZCL BGN.
[29] Additional mentioned by W1AVY: *W1s* WCW DV DDD UNW BRG TAG URM VVL UQW VSH K1FCC; *K2s* GHS/1 JNV/1.
[30] *W1s* QQW MQU ZOP ZMM QVK.
[31] W1QVK/m and W1QQW/m were alerted for relief of W1MEG/m.
[32] Additional participation from the Framingham area: *W1s* GAC HJP BSO LPF WLJ FMH MHC SAS WMT RCJ ZEN SRG HPB JUL YEJ ZEC MZF WTY SXV BDW BU WGM QFD CC; W2WFX/1.
[33] Other stations in the net: *W1s* DDK MYZ TNH ZL JHL AQ ALP.
[34] *W1s* DMS AYG BIY BW YKD MD MME YOR.
[35] The crew: *W1s* BXB GME TSF AKI VNH.



Water level reports were radioed from W1MEG to W1ZOP until it was determined that the danger was past.[32]

W1BB reports a 75-meter net functioning to serve the Southbridge-Sturbridge-Webster area, formed by W1KC. This net functioned all day Saturday and was "secured" Saturday evening when the ten meter net was functioning well enough to obviate it.[33]

In Hingham, the c.d. control station was operated by W1VAI as water threatened that city. Eight other amateurs, some of them mobile,[34] participated in supplying emergency communications in Hingham.

W1ZBD, EC for Hudson, Mass., operated portable at the Bay State Abrasive Products plant in Westboro, with W1QXE as relief operator and W1SNJ mobile to report road conditions for employees, sometimes transmitting from locations where his wheels were in water. Contact was maintained with the Sector 3 Emergency Net. In Agawam, W1OBQ put his crew[35] of communicators to work reporting damage to roads.

W1AHP did a service for his local Red Cross by getting some "worry" traffic through to Winsted and Waterbury and return assurances of safety, via W1TIA and the Conn. Net on 3640.

Odds 'n' Ends

It seems that the Emergency Radio Communications Association of Syracuse, affiliated with the Red Cross, under the direction of EC W2CYD, activated their station W2CRD during this emergency and turned in some good work on 75 meters. Contact was established quickly with the disaster area in both Connecticut and Pennsylvania, and word relayed to American National Red Cross. W2BTB and W2ZOL were, as usual, on deck to assist in the handling of health and welfare messages for the Red Cross. Full credit to amateurs was given by the Disaster Chairman of the Syracuse and Onandaga County Chapter, ARC.

From the New York City area, we receive reports of work done by W2KFV and W2KEB in handling traffic for the Red Cross into and out of disaster areas. Over the Aug. 20th–21st week end they handled some 300 messages. They also succeeded in getting typhoid serum to a doctor in Phillipsburg, N. J., all communications by amateur radio. Some of W2KEB's transmissions were taped and broadcast over a local radio station, and later a 'phone-patch relay from the Winsted police chief to W1GIX to W2KFV was broadcast.

(Continued on page 188

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This is W1RGB at the controls of W1UZ, Winsted, Conn., probably the hardest hit of any community anywhere. He and W1HP were flown up by helicopter from the state control center. Operation was on 3640 kc., with the Connecticut Net.

Design Notes on a Four-Band Rotary

Experimental Adjustment of Interlaced Elements

BY R. H. MITCHELL,* W5DWT

• These "notes" by W5DWT contain a lot of good information on the design, experimental adjustment and feeding of multiband arrays. Included is an interesting discussion of the practical aspects of beams of various types and some of the effects of interlacing.

IT LOOKED like a fairly simple project. All I wanted was a rotary beam that would cover the 14-, 21-, 27-, and 28-Mc. bands. This beam should have a minimum of 15 db. front-to-back ratio over each of the bands. Because of the TVI picture, the beam had to be fed with coax. Because of the coax and the low-pass filter in the antenna lead, the s.w.r. had to be limited to a maximum of about 2 to 1. Finally, the beam had to have enough gain over a half-wave dipole to make its construction worth while. The beam which was finally evolved was an electrical success, but wasn't satisfactory mechanically. However, the results and the experience obtained during a month of work on this project should be of interest to others who have contemplated building a similar antenna.

Choosing an Array

Being lazy, I decided to use the experience of other hams in the design of the antenna. The literature was consulted, but only two antennas were found which appeared to fill the above bill, and neither met all the specifications. W6CHE's antenna [1] was a dandy, but his estimated s.w.r. of 35 to 1 eliminated it. W2FBA's beam [2] also looked good. However, his beam had been built before the 21-Mc. band was opened, and his article could not include actual performance figures on this band. His method of folding the dipoles down into the stubs to form two half waves in phase on 21 Mc. didn't look like a really happy solution, and some tests on wire elements appeared to bear this out. A considerable loss in directivity and gain seemed to occur when an appreciable portion of the dipole was folded down from the principal plane of the element. So, reluctantly, the idea of using one set of elements on all bands was given up, and it was decided to use two sets of elements, one for 14, 27, and 28 Mc., the other for 21 Mc.

Now the project looked much easier. Two-band beams had been erected for years, and the 21-Mc. antenna could be mounted on the boom used for the other antenna. However, none of the previously described 14/28-Mc. antennas met the above set of requirements completely. W9TB's two-bander [3] didn't use relays, but also didn't permit separate tuning of the 14- and 28-Mc stubs. The W8JK multibander [4] lacked the desired front-to-back ratio on 28 Mc., and employed a 4-wire radiator which really complicated bandswitching. The experience of W9EGQ [5] with the W3NJE beam,[6] and some experimentation with coil-capacitor phasing devices, similar to those used by W3NJE, eliminated this beam. The phasing devices worked satisfactorily, but the parasitic-element lengths used on the fundamental frequency were not correct for the second harmonic. This could have been solved with relay switching of element lengths, but the W3NJE design then lost its attractiveness as a switchless device. W3DZZ's antenna [7] presented a mental hazard — the idea of phasing devices several feet out from the center of the elements in the New Mexico winds wasn't acceptable with the size tubing to be used as elements.

It was becoming obvious that the best solution would be something similar to the 14-and-28-Mc. section of the W2FBA beam which, in turn, was similar to W8JK's. So, the beam worked out to be a 3-element antenna on a 16-foot wooden boom, using nominal half-wave elements for 14 Mc., switched by relays to nominal half waves in phase for 28 Mc. While a longer boom would have given more gain and bandwidth on 14 Mc., the elements then would have been spaced more than a quarter wavelength on 28 Mc., which probably would have degraded the front-to-back ratio considerably. Wood was selected for the boom because of the high r.f. voltages present at the physical centers of the elements when the beam is used on 28 Mc.

Constructional Considerations

Some testing of 21-Mc. elements adjacent to 14-Mc. elements showed the optimum position for the 21-Mc. elements to be directly above or elow the 14-Mc. elements. Interaction between the beams dropped off as the spacing was increased. However, the decrease in interaction beyond about 2 feet wasn't rapid enough to gain much with wider spacing, so separation was set

* 7303 Hirsch Drive, S.E. Albuquerque, N. M.

[1] McCullough, "A Unique Five-Band Antenna System," *QST*, December, 1946.

[2] Haner, "Multiband Rotary," *CQ*, September, 1949.

[3] Schroeder, "The Two-Band Three-Element Rotary," *QST*, August, 1939.

[4] Kraus, "The Three-Band Rotary Antenna," *Radio*, February, 1940.

[5] Brier, "W9EGQ Builds Another Beam," *CQ*, August, 1950.

[6] Pichitino, "A New Principle in Two-Band Rotary-Beam Design," *QST*, October, 1948.

[7] Buchanan, "Duo-Band Ham Antenna," *Radio & Television News*, December, 1950.

at 30 inches. The 21-Mc. elements were to be mounted above the 14-Mc. elements in order to keep them out of the tower and guy wires. Incidentally, the beam was to be mounted on a guyed 50-foot triangular steel TV tower, and was to be turned by a TR-4 TV rotator.

The boom consisted of a pair of parallel 16-ft. 2 × 4s spaced 12 inches apart by 1-ft. sections of 2 × 4. A 2 × 12 × 24-inch block was placed at the center as a mounting. The crossarms were 8-ft. 2 × 4s laid on edge across the boom, at the ends, and at 7 ft. from one end. These crossarms provided support for the 14/28-Mc. elements. Vertical 33-inch sections of 2 × 2 at the ends of the crossarms and vertical 33-inch sections of 2 × 4 at the centers provided support for the 21-Mc. elements, and spaced them 30 inches above the 14/28-Mc. elements.

From one reference,[8] it appeared that the structure would weigh about 50 pounds. Instead, it weighed over 100 pounds, which was the first hint of the mechanical trouble encountered later. However, the boom was rugged, and looked like it wouldn't be damaged by anything less than an earthquake. The 2 × 12 × 24-inch mounting block was supported on a pipe flange which was to be turned by the rotator through a 2-foot length of 1-inch i.d. steel pipe. Another flange was mounted on the top side of the block, and the guying pipe — a 42-inch length of 1-inch i.d. pipe — was screwed into this. Steel guy wires, broken up with three strain insulators in each, were run to the ends of each crossarm, and were adjusted to length with turnbuckles. The 14/28-Mc. elements were mounted on stand-offs on the crossarms. The 21-Mc. elements were screwed directly to the vertical supporting arms.

Balanced Feed with Coax

As we had planned to use 52-ohm coax feed line, neither the W8JK nor the W2FBA feed system was practicable. Prior experience with coax feed systems had convinced me of the desirability of some method of converting the unbalanced output of the line to the balanced feedpoint of the antenna. Separate RG-8/U line was decided upon for each antenna. This cost very little more than the additional relays which would have been required to switch each antenna to one line, and resulted in a less complex electrical system.

The 21-Mc. beam presented no problem with coax. Gamma match was to be used. However, for 14 and 28 Mc., some sort of balun was necessary. Earlier experience with the half-wave coax balun had shown it to be extremely frequency sensitive, and a decent s.w.r. would be difficult to obtain over the 14-Mc. band, let alone across the 27-to-30-Mc. range. With the parallel-wire bazooka, fairly constant spacing of conductors is required. This is difficult to maintain while an antenna is being rotated about a mast. Finally, the low-Q L-C balun described by W3OCZ [9] was investigated. This is shown in Fig. 1. Bench models of this circuit were made up for 14 and 28 Mc. The outputs were terminated

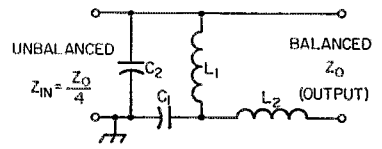

Fig. 1 — Low-Q LC balun.
C_1 = Capacitance required to tune to f when connected across L_1 and L_2 in parallel.
$C_2 = C_1$ (see text).
$L_1 = L_2 = \frac{Z_O}{10f}$.
f = Frequency in Mc.
Z_O = Output load in ohms.
14 Mc.:
C_1 — 180 $\mu\mu$f.
C_2 — 300 $\mu\mu$f.
L_1, L_2 — 1.4 μh. — 14 turns No. 12 enam., ¾ inch i.d., 1¾ inches long.
28 Mc.:
C_1 — 90 $\mu\mu$f.
C_2 — 180 $\mu\mu$f.
L_1, L_2 — 0.7 μh. — 8 turns No. 12 enam., 3/4 inch i.d., 1 inch long.

with a noninductive 200-ohm resistor, and the baluns were fed with RG-8/U through a good s.w.r. bridge. C_2 was resonated, with L_1 and L_2 in parallel, at the centers of the bands, checking with a grid-dip oscillator. However, when C_2 was made equal to C_1, as recommended by W3OCZ, the best s.w.r. that could be obtained without readjusting L_1 and L_2 drastically was about 1.5. Finally, C_1, L_1, and L_2 were readjusted to the band centers, and a variable was tried at C_2. It was found that C_2 required about twice the capacitance of C_1. With this increased capacitance, and a very slight respacing of turns in L_1 and L_2, the s.w.r. was 1.05 at 14.2 Mc., rising to about 1.1 at the band edges. At 28.5 Mc., the s.w.r. was again about 1.05, rising to about 1.15 at the band edges.

Impedance Matching

This was satisfactory, so the next problem was converting the 200-ohm balun output to the desired feed impedances of the antennas.

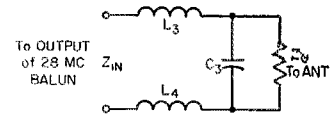

Fig. 2 — Balanced 28-Mc. network for matching antenna to balun output. Z_{IN} calculated at 200 ohms. Z_O estimated to be 3000 ohms.

$$X_L = Z_{IN}\sqrt{\frac{Z_O}{Z_{IN}} - 1} \qquad X_C = \frac{Z_O}{\sqrt{\frac{Z_O}{Z_{IN}} - 1}}$$

X_C = 815 ohms; C_3 = 7 $\mu\mu$f. (h.v. variable disk neutralizing capacitor).

$\frac{X_L}{2}$ = 375 ohms; L_3, L_4 = 2 μh. (8 turns No. 12, 2-inch diam., 2 inches long)

[8] Van Brunt, "A 4-Element 14-Mc. Beam," *QST*, November, 1947.
[9] Isley, "Coupling Unbalanced to Balanced Lines," *QST*, April, 1950.

The center impedance of a close-spaced 3-element beam, as was to be used on 14 Mc., is estimated variously at 8 to 25 ohms. On the 28-Mc. beam, where two half-wave dipoles were to be fed at their adjacent ends, the impedance has been estimated at 2000 to 6000 ohms. One "expert" gave me a figure of 1200 ohms. Actually, either figure could be anyone's guess in those ranges, depending upon tuning, element diameter, etc. I chose 15 ohms as a design figure for the 14-Mc. feed point, and 3000 ohms for 28 Mc. — both obviously being inaccurate averages.

Stubs and quarter-wave lines were not considered for the transformation devices because of their high Q, physical size, and unwieldiness in a rotating system. Balanced L-C transforming

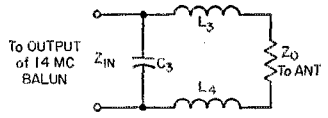

Fig. 3 — **Balanced 14-Mc. network for matching antenna to balun output. Z_{IN} calculated at 200 ohms. Z_O estimated to be 15 ohms.**

$$X_L = Z_O\sqrt{\frac{Z_{IN}}{Z_O} - 1} \qquad X_C = \sqrt{\frac{Z_{IN}}{\frac{Z_{IN}}{Z_O} - 1}}$$

$X_C = 57$ **ohms;** $C_3 = 200$ $\mu\mu$**f.**

$\frac{X_L}{2} = 26$ **ohms;** L_3, $L_4 = 0.3$ μ**h. (7 turns No. 12, ½ inch diam., 1 inch long).**

networks were decided upon and were designed for the above impedances.[10] The 28-Mc. net is shown in Fig. 2, while the 14-Mc. net is shown in Fig. 3. These are both low-Q devices, the Q of each running below 4 with the design impedances. Thus, when these are used with the LC baluns of Fig. 1, the over-all Q should be low.

The nets were tied onto the outputs of the baluns, and appropriate resistors were placed across the outputs of the nets. Turns in the 14-Mc. matching coils were adjusted for minimum s.w.r. This was 1.05 at 14.2 Mc., and 1.1 at the band edges. The output capacitor in the 28-Mc. device was tuned for minimum s.w.r., and the coil spacings were adjusted to bring the s.w.r. even lower. This reached about 1.03 at 28.5 Mc., and rose to about 1.25 at 27 and 30 Mc. (Very slight adjustment of the balun coils — by squeezing or spreading turns — helped to bring the s.w.r. to these figures. If major adjustment of the balun coils is necessary, the matching network is not working properly.) With the s.w.r. as low as these, the over-all bandwidth of the antenna system should be determined by the Q of the antenna, rather than that of the matching system, which was the desired situation.

Element Length

For years, I've been erecting beams according to an old formula: director length equals $444/f$; radiator length equals $468/f$; and reflector length equals $495/f$. All close-spaced 3-element beams put up according to this formula have given about the same gain as they did when painstakingly tuned for resonance. Maximum front-to-back ratio for any one frequency can be obtained only by careful tuning. However, front-to-back ratio, as averaged over an amateur band, generally has been better when the beam was cut to formula, rather than when peaked for any one frequency. This time I deviated from the formula and used a scientific-looking set of charts.[11] The 21-Mc. elements were set according to the charts. The length of the circuit through the shorting relays was computed, then deducted from the 14-Mc. element lengths, which were also set according to the charts. Quarter-wave phasing stubs for the director and reflector were added to the 28-Mc. sides of their respective relays.

The antenna was set up six feet above a ten-foot-high flat roof. Height above *effective* ground was probably 0.35 to 0.5 wavelength on 14 Mc. A field-strength meter was set up on the roof of a house about 150 feet away, with no obstructions between. W4SRC/5 was also on leave at the time, and his services were recruited for several days of tuning. Power was applied to each of the antennas. None of them worked like a beam in any way, and s.w.r. was high on all. On 21 Mc., a half-wave dipole was superior to the beam. Nothing tried improved the performance of this antenna materially, although the s.w.r. was lowered to about 2 when a capacitor of 50 $\mu\mu$f. was inserted between the feed line and the gamma match, and the gamma rod was readjusted for best s.w.r. No trouble had been expected with the 21-Mc. beam, as the tests with the wire model had shown that it operated correctly when spaced above the 14-Mc. wires. Then the dawn broke. With the relays de-energized, the 28-Mc. arrangement was below the 21-Mc. beam. So, the relays were energized, and the 21-Mc. antenna promptly became a beam, although the front-to-back ratio was virtually nil. After some resetting of element lengths, we came up with dimensions for antenna and reflector which were within an inch of the old formula. The director worked out to be 6 inches shorter than formula length.

It was reasoned that the 14-Mc. director had more effect on the 21-Mc. director than the other 14-Mc. elements had on their corresponding 21-Mc. elements. So, the 14-Mc. elements were removed. This made about an inch difference in the 21-Mc. radiator and reflector lengths, and the director came back to formula. The 14-Mc. elements were replaced and the 21-Mc. beam retuned for maximum. It was now possible to bring the s.w.r. down to 1 at 21.250 Mc. The s.w.r. rose to 1.15 at 21 and 21.5 Mc. The antenna had a front-to-back ratio of better than 20 db. across the band, and appeared to have a good gain over a half-wave dipole. Dimensions are shown in Fig. 4.

The 14-Mc. beam was tackled next. When

[10] *The ARRL Antenna Book*, 1949 edition, page 107.
[11] *The Radio Amateur's Handbook*, ARRL, 31st edition, page 350.

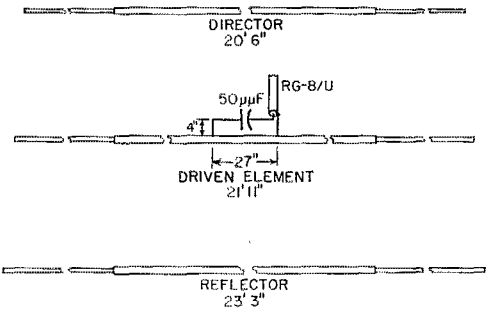

Fig. 4 — Final dimensions of the 21-Mc. beam. The center sections are all 12-foot lengths of ¾ × 0.049-inch 61ST tubing. The adjustable end sections are of ⅝ × 0.035-inch 61ST tubing. Those for the director are each 5½ feet long, those for the reflector are 6½ feet long, and those for the driven element are 6 feet long.

the beam was retuned for maximum gain, the optimum lengths again were those given by the formula. The s.w.r. was about 1.5 at 14.2 Mc. The turns in the matching section coils were readjusted. This brought the s.w.r. down to 1.15. The radiator was shortened slightly, and the s.w.r. dropped to 1.05. This rose to 1.2 at 14 and 14.4 Mc. Front-to-back ratio and gain were excellent. (As a matter of interest, the 21-Mc. elements were removed and were found to have only about one inch lengthening effect on the 14-Mc. elements. However, when placed in the plane of the 14-Mc. beam, the 21-Mc. elements caused considerable interaction. With the 21-Mc. elements a foot behind the 14-Mc. elements, the 14-Mc. director had to be shortened about six inches. The 21-Mc. elements were replaced in their original positions.)

28-Mc. Operation

This left only the 28-Mc. section. The stubs in the parasitic elements had to be shortened considerably from the starting lengths to get the antenna to work, although the radiator length appeared to be satisfactory using the length set up from the 14-Mc. adjustments. The director stub had to be shortened to 4 feet, 10 inches to hit 28.5 Mc., and the reflector stub was shortened to 6 feet, 6 inches. Removal of the 21-Mc. elements had a much greater effect on the length of the 28-Mc. elements than had been the case on 14 Mc., but this had been expected. However, the 28-Mc. beam would tune up with the 21-Mc. elements in place, so the elements were replaced. Initially, s.w.r. was about 2 at 28.5 Mc. Readjustment of the transformer network brought this down to 1.1. Front-to-back ratio was good at 28.5 Mc., and ran at least 15 db. from 28 to 29 Mc., but was nonexistent at 27 and 29.7 Mc. The s.w.r., as shown in Fig. 5A, was acceptable only over the range of 28 to 29 Mc. Since this was a wide-spaced array, only two possible causes were found for the problem. First, the stubs, being high-*Q* devices, could be resonating in the desired range. Second, the parasitic elements could be losing their effectiveness with wide frequency excursions, as the lengths of the elements were such that the director could be acting as a reflector around 29.5 Mc., and the reflector acting as a director around 27 Mc.

Both of these surmises appeared to be correct. The transmitter was tuned to 27.2 Mc., and the reflector stub was repeaked for maximum gain there. The transmitter was retuned to 29.5 Mc., and the director stub repeaked for maximum gain. Then the transmitter was retuned to 28.5 Mc., and the matching network was readjusted to bring the s.w.r. back down to 1.1. Field strength dropped about 2 db. at 28.5 Mc., but was much more constant across the band. The front-to-back ratio, while not quite so good at 28.5 Mc., was much better across the entire band, running about 10 db. at 27 and 29.7 Mc. The s.w.r. with this arrangement is shown in Fig. 5B.

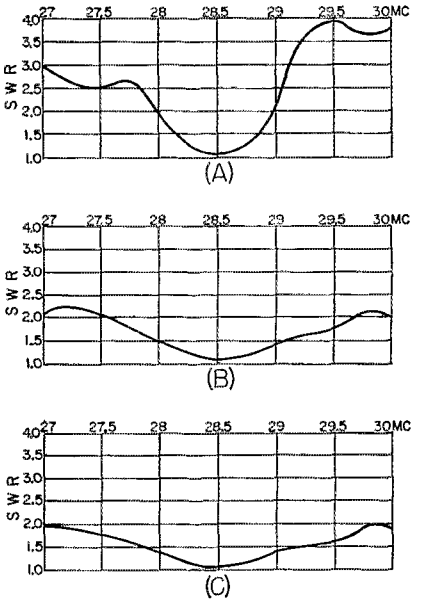

Fig. 5 — Measurements of s.w.r. under three different tuning conditions as described in the text.

This was almost satisfactory, but one more attempt was made to improve upon the antenna. The tuning stubs were removed, and the parasitic elements were tried as end-to-end half waves, as shown in Fig. 6. Extensions were tied to each parasitic-element center to permit tuning. The s.w.r. was readjusted for minimum at 28.5 Mc., and directors and reflectors were peaked at 29.5 and 27 Mc., respectively. The matching network was readjusted again to bring the s.w.r. down to about 1.05 at 28.5 Mc. Gain was now only about 1 db. down at 28.5 Mc. from the output previously attained with the stubs set for best gain at that frequency, and the front-to-back ratio was at least 12 db. across the entire 27 to 29.7-Mc. range, running about 15 to 20 db. across 28 to 29 Mc., which was the

important portion to me. The s.w.r. was also acceptable, as shown in Fig. 5C.

Unfortunately, I couldn't leave the beam in this condition, as my shorting relays were d.p.s.t. and I had no way to switch from the

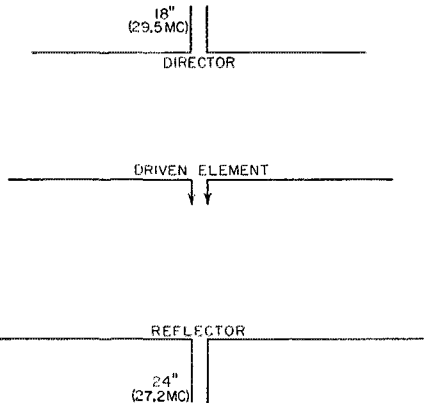

Fig. 6 — Removing the quarter-wave phasing sections and leaving only simple extensions at the centers of the parasitic elements for tuning broadened the response of the array across the 27–30-Mc. range. The extensions were made of ¼-inch aluminum tubing.

shorted element on 14 Mc. to the 28-Mc. "open" condition. It's possible that the extensions would have had no effect on the beam when the 14-Mc. short was introduced, but I didn't think of it at the time.[12] My leave was almost over, and I decided to put the beam up with the nominal quarter-wave stubs tuned for wide-band coverage.

One other idea tested had shown promise of being the best of all. The antenna was repeaked for optimum performance on 28.5 Mc., then the director stub was shortened 2 inches, and the reflector stub lengthened 2 inches. This gave good performance from 28 to 29 Mc. Then a short was placed across the director stub at the point which gave maximum output at 29.5 Mc. This gave good performance from 29 to 29.7 Mc. Then the auxiliary director shorting bar was removed, the reflector shorting bar was removed, and another shorting bar was placed farther out on the reflector stub at the point which gave maximum output at 27.1 Mc. Performance across the 27-Mc. band was good. It was planned to accomplish these procedures with relays at some later date.

Some Afterthoughts

The beam, with 14/28-Mc. element lengths as shown in Fig. 7, was raised to the top of the tower. This was one situation where it is much easier to write about a procedure than it was to accomplish it, as the completed structure weighed about 150 pounds. The elements were removed from the boom, which was raised first. After the boom was attached to the tilting mount, the radiator and director elements were attached. Then the boom was retilted to permit attaching the reflector. This required the service of four men on the ground, hauling on a rope attached to the reflector end of the boom, which had been uppermost. The beam was leveled after the reflectors were attached, and the beam was rotated a few times to make certain that everything worked. Sometime in there disaster struck. A routine check of the mounting revealed a crack in the radius of the pipe flange used for a mount. Naturally, the beam had to come down.

By the time we had removed the elements and lowered the boom to the ground, I had decided that wooden construction was not for me. My leave was up but my beam wasn't. A three-element interlaced 14/21-Mc. beam was built on a magnesium ladder and was erected handily. It has been working nicely since.

After thinking about the project for a few months, some of the constructional mistakes became evident. The boom could have been built with a 16-foot ladder. One, which weighs only 30 pounds, is available from a mail-order house for $12.95. The supports for the 21-Mc. beam could have been made of dural angle, and polystyrene strips could have been used for insulators. The crossarms could be shortened to 6 feet, and made of ladder rails or similar lightweight material. Thus, the entire beam could have been built to weigh about 75 pounds. A steel mount would be built to replace the pipe flange, which was the weakest point in the entire structure.

As for electrical changes, it is quite possible that, by capacitive shortening, the 14-Mc. elements could be used on 21 Mc. Preliminary tests bear this out, and it would help the appearance — and possibly the performance — of this hayrake. Also, the 28-Mc. elements would incorporate relay switching of stub lengths from the start, in order to secure maximum performance over the entire 27-to-30-Mc. range. Come to think of it, I have another leave coming up next summer. . . .

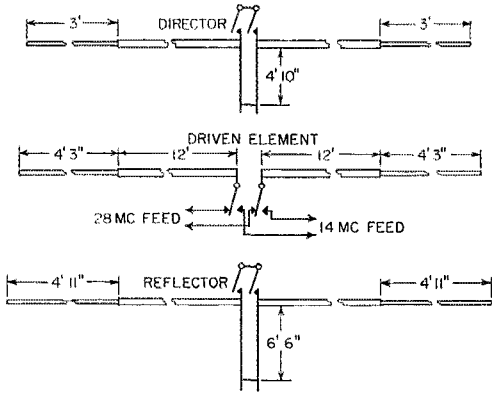

Fig. 7 — Final arrangement with stub dimensions. Center sections are all of 1 × 0.049-inch 61ST tubing. Extensions are all of ⅞ × 0.035-inch 61ST tubing. Over-all lengths of adjustable sections are 5, 6, and 7 feet, respectively, for the director, driven element, and reflector.

[12] Since the centers of the parasitic elements are at ground potential on 14 Mc., the extensions should have no effect if they are merely shorted. — Ed.

Multimatch Antenna for 'Phone

Alterations for Better Performance in the A3 Bands

BY J. MAX PEMBERTON,* W9JYH, EX-W4BOA

• In the March, 1955, issue of *QST*, W3DZZ described an antenna system that could be fed efficiently with low-impedance line on all bands from 80 through 10 meters. The original design was centered approximately on the middle frequency of each band. The dimensions given here are chosen to favor the 'phone bands. Included are suggestions for simpler trap construction and also some notes on a quarter-wave vertical operating on similar principles.

CONSIDERABLE interest has been aroused by the article on the "Multimatch" antenna system by W3DZZ[1] in the March, 1955, issue of *QST*. As the curves of his Fig. 2 show, the original dimensions for the wire antenna are not ideal for the 80- and 40-meter 'phone bands. As a result, several hams who have tried the antenna on these bands have found it impossible to compensate for reflected reactance in their pi-section output circuits.

Encountering this difficulty, "Lefty" Covert, W9KVE, and I undertook some experimental work to determine dimensions that would be more favorable in the 'phone bands. We also had some assistance from several other hams, including Fred Wiley, W9ACZ, and Roy Hall, W4WNF. The results are condensed in Table I. The values used in Test No. 4 represent the best compromise. Although the resonant frequency would appear to be low on 20, and somewhat high on the higher-frequency bands, this did not seem to affect the performance adversely. As a matter of fact, the antenna response at the higher frequencies is rather broad, and the principal need for readjustment is on 40 and 80 where the response is much sharper.

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[1] Buchanan, "The Multimatch Antenna System," *QST*, March, 1955.

Trap Capacitors

In trying to avoid the job of making tubular capacitors as described by W3DZZ, we first used mica "receiving" capacitors. But these would not stand up, even when connected in series-parallel. "Hi-Kap" ceramics did not break down, but thermal effects caused their capacitance to drift, resulting in a change in antenna resonance at the rate of about 100 kc. per minute! The only capacitors we found that would stand up were

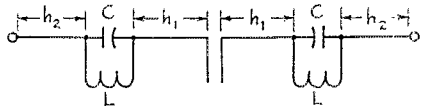
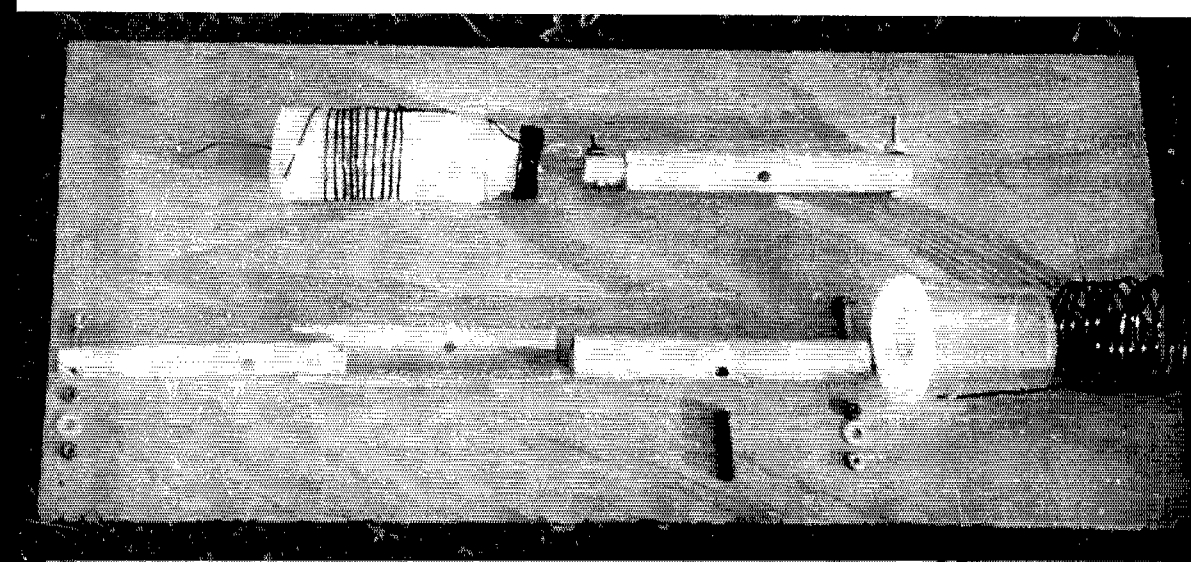


Fig. 1 — Schematic of the Multimatch antenna system. See Table I for dimensions.

TABLE I
Antenna Dimensions (Refer to Fig. 1)

Test No.	*Freq. of Min. S.W.R. (Mc.)*	*C (μμf.)*	*L (μh.)*	*h1 (ft.)*	*h2 (ft.)*
1	3.7, 7.2, 14.1 21.5, 30	65	8	32	22
2	3.85, 7.28, 14, 21.4, 29.8	85	5.8	32	22
3	3.92, 7.24, 13.8, 21.35, 29.1	102	4.6	32	22
4	3.9, 7.25, 14.1, 21.5, 29.9	95	5	32	21

Above: A completed inductor ready to receive the tubular capacitor. Below: Individual components used in the construction of the traps. From left to right, inner conductor, polyethylene strip, outer conductor with oak dowel, coil form, and coil winding.



the large transmitting mica and vacuum types, and both their weight and cost were considered prohibitive. We finally ended up building our own.

Our capacitors were constructed somewhat differently than those described by W3DZZ. Samples are shown in the photograph and the sketch of Fig. 2. Polyethylene strips, 1/16 inch thick, were used for insulation after one unit with polystyrene insulation had broken down. The polyethylene was cut from plastic mustard or catsup dispensers sold in many stores handling kitchenware. The smaller plastic wastebaskets

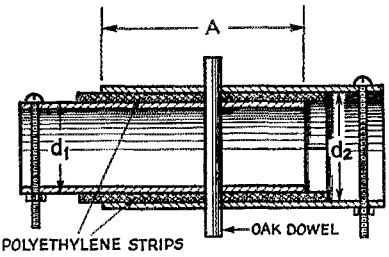


Fig. 2 — Sketch showing construction of tubular capacitors. See Table II for dimensions.

TABLE II
Capacitor Dimensions (Refer to Fig. 2)

C (*μμf.*)	d_1 (*in.*)	d_2 (*in.*)	*A* (*in.*)
65	3/4	7/8	4 1/2
85	3/4	7/8	5 3/4
85	1	1 1/8	4 1/4
102	1	1 1/8	5
95	1	1 1/8	4 1/2

(marked polyethylene), water glasses or coolers will also supply suitable material. We found it easiest in assembly to cut two strips, the width of each strip being half the circumference of the inner aluminum tubing. The length of the strips should be sufficient to extend about 1/2 inch at each end of the telescoped portion, as shown in Fig. 2. The end of the capacitor that has the exposed polyethylene insulation should be wrapped with Scotch electrical tape No. 33 and then sprayed with Krylon.

Using 3/4-inch o.d., and 7/8-inch i.d. (1-inch o.d.) aluminum tubing, the resulting capacitance was about 15 *μμf.* per telescoped inch. Using 1-inch o.d., and 1 1/8-inch i.d. (1 1/4-inch o.d.) tubing gave about 20 *μμf.* per telescoped inch. The inner and outer conductors were locked together to take the mechanical strain of the antenna by drilling a diametral hole through the capacitor at its midpoint, and running a piece of oak dowel through the hole. The dimensions of the capacitors tried are given in Table II.

TABLE III
Inductor Dimensions

L (*μh.*)	*Diam.* (*in.*)	*Length* (*in.*)	*Turns*
8	2	2	15
5.8	2	2	12
4.6	3 1/2	2	8
5	3 1/4	1 3/4	9

All wound with No. 14 wire.

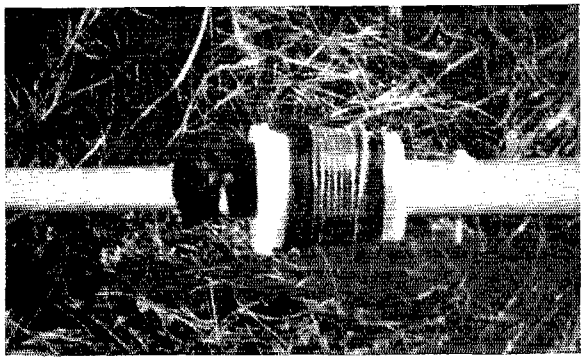
Inductors

Experience showed that the *Q*s of the coils were low unless the coil diameter was made considerably larger than the diameter of the capacitor. Various plastic containers, available also at stores handling kitchenware, were tried as coil forms. Highest *Q* was obtained with the more brittle jars normally used for saving leftovers in refrigerators. They are about 3 inches deep, have a diameter tapering from about 3 1/4 to 3 1/2 inches, have a tight-fitting cover, and sell for 15 or 19 cents. The wire is wound close-spaced at the smaller-diameter end of the jar, and then the turns are forced along the form to the correct turns spacing and length, and coated with "Q Dope" or other coil cement. The forms were mounted concentrically with the capacitors by cutting tight-fitting holes in the bottoms and covers, and inserting the capacitors in the holes. Weatherproof cement or other means may be used to seal the seams where the capacitors pass through the walls of the containers.

Table III shows approximate coil dimensions. The number of turns and/or the turn spacing may have to be adjusted experimentally to assure antenna resonance at the frequencies shown. "Formvar" motor wire is recommended, rather than enamel-covered wire, since the enamel has a tendency to crack when exposed to weather.

Although W3DZZ suggested feeding the system with low-impedance Twin-Lead, we found that coax feed also works well.

(Continued on page 160)



The completed trap for the quarter-wave vertical Multimatch antenna.

6AN8–6BQ6 Modulator

Audio Power for 25–50-Watt Transmitters

BY E. LAIRD CAMPBELL, W1CUT

• Here is a modulator designed especially for transmitters in the 25–50-watt class such as the Heathkit AT-1, Viking Adventurer, Eldico TR-75TV, etc. Good performance, simple construction and low cost are some of the features that make this a worth-while project for the budding 'phone man.

ALTHOUGH the amateur bands sometimes seem to be filled only with high-powered 'phone signals there are still a lot of medium- and low-powered stations in there pitching. The amount of r.f. power being used is an important factor but unless the carrier is fully modulated with an undistorted audio component your chances are slim for making those solid contacts.

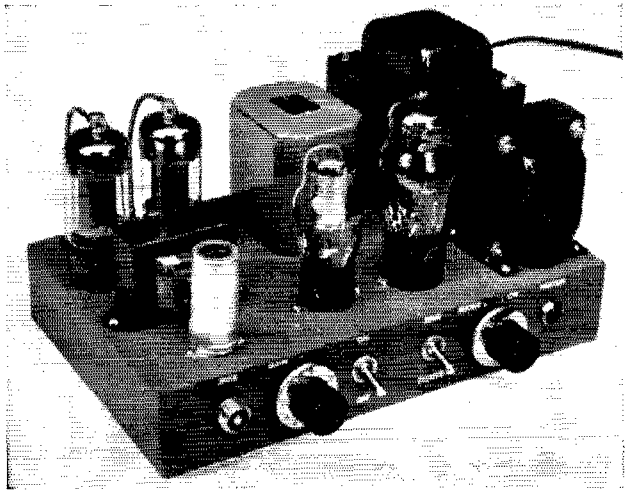
Of all the different types of modulation, plate modulation is the most effective for low power. You can try to save money by using other methods of modulation but you're just spinning your wheels unless you can boast of a high-power r.f. amplifier. If grid or screen modulation is used with a 50-watt transmitter only a few watts output can be expected. So, to get the most out of your transmitter, moneywise and powerwise, plate modulation must be used.

If you are using a rig in the 50-watt input (or lower) class, whether home-built or a new commercial job, this is the plate modulator for you. The modulator has an output of 25 watts with little distortion and contains its own power supply. Two connections to your c.w. rig will give you a 'phone transmitter you will be proud to use.

Circuit

The circuit, shown in Fig. 1, is based on providing ample gain from an inexpensive communications type crystal or ceramic microphone. With an input of 20 millivolts at the microphone jack the modulator is capable of 25 watts output. A 6AN8 pentode-triode is used as a speech amplifier. The microphone output is amplified in the pentode section and fed into the triode part of the tube by resistance coupling. Output from the triode is transformer-coupled to the grids of the modulator tubes, which may be any of the several varieties of 6BQ6s (GTA, GTB/6CU6, etc.). Although the 6BQ6 does not ordinarily carry an audio rating, having been designed for TV sweep-circuit work, it has an advantage over tubes such as the 6L6, for example, in that it will develop a given power output, within its capabilities, at relatively low plate and screen voltages. This saves considerably on power supply cost. Also, the tube itself is inexpensive.

The power supply, using capacitor input, has an output of about 300 volts under load. The voltage for the speech amplifier and modulator screen grids is obtained from the same power supply through a dropping resistor. A VR150 regulates this voltage on the screens at a constant 150 volts, regulated screen voltage being highly desirable in a Class AB amplifier. The VR tube also contributes to the power supply filtering for the speech amplifier. Note that it is



The modulator is constructed on a 7 × 11 × 2-inch chassis. The speech amplifier-modulator is at the left of the chassis and is separated as much as possible from the power supply. The output plug and line cord are located on the rear of the chassis.

connected between the screens and cathodes of the 6BQ6s, not from screens to ground. This makes the screen-to-cathode voltage an actual 150 volts, not 150 reduced by the grid bias developed in the 270-ohm cathode resistor.

Layout and Construction

One of the most important things to remember when laying out a modulator is to place the components for the least amount of a.c. hum pick-up. Particular attention should be given to

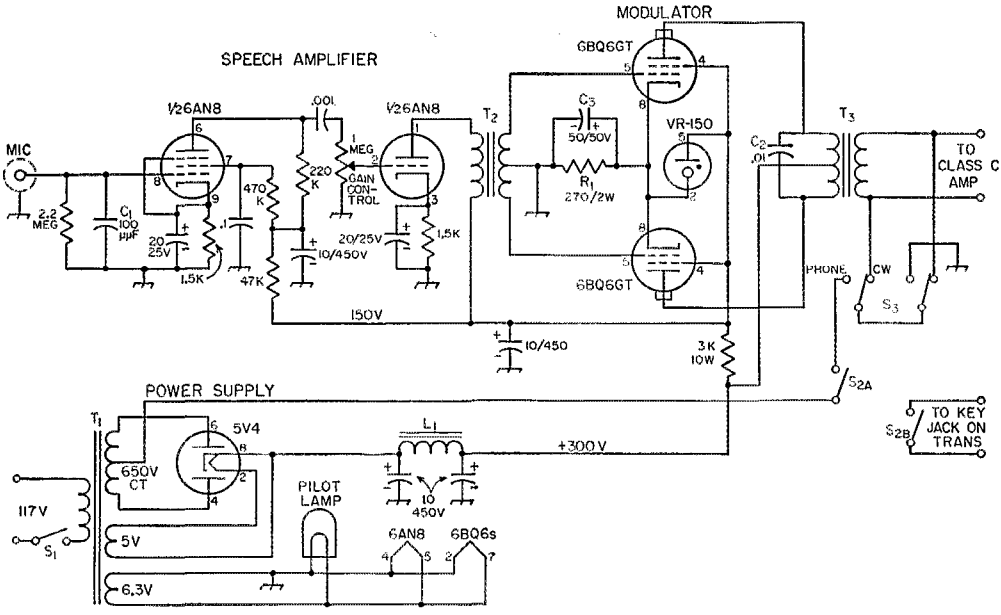


Fig. 1 — The speech amplifier-modulator circuit. Capacitances are in µf. Capacitors with polarities marked are electrolytic. Others are ceramic except the 0.01-µf. unit, which is paper. All resistors ½ watt unless specified otherwise.

L_1 — 8 hy., 150 ma. (Thordarson 20C54).
S_1 — S.p.s.t. toggle switch.
S_2 — D.p.d.t. toggle switch.
S_3 — 2-pole 2-position rotary switch (Centralab PA-2003).
T_1 — Power transformer, 650 v. c.t., 150 ma. (Thordarson 22R06).
T_2 — Interstage transformer 1:3 primary-to-secondary ratio (Thordarson 20A22).
T_3 — Modulation transformer, 4000–4000 ohms (UTC-S-19).

Maintaining the full screen voltage on the 6BQ6s is important, because the power output depends critically on screen voltage.

Bias for the 6BQ6 modulators is obtained from the cathode resistor R_1. About 45 volts of bias is obtained with the 270-ohm resistor and this voltage is subtracted from the plate voltage. If a battery of about 30 volts is used for bias, eliminating R_1 and C_2 and grounding the 6BQ6 cathodes, the output is about 30 watts as a result of the effective increase in plate voltage.

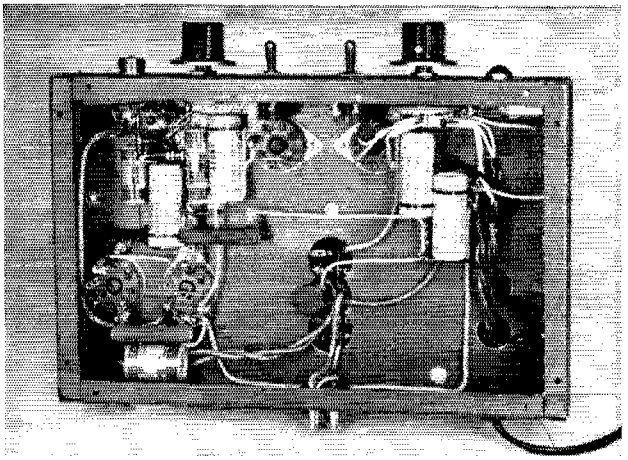
The capacitor C_2 on the primary of the modulation transformer is used to attenuate the high frequencies, and thus cut the frequency response of the amplifier to the most useful range for voice work. It is helped out in this by capacitor C_1 at the microphone input, which in addition provides an r.f. by-pass to ground.

For operating convenience, a send-receive switch, S_2, and a 'phone-c.w. switch, S_3, are built into the modulator. By connecting leads from S_{2B} to the key jack on the transmitter, the entire transmitter can be controlled at the modulator. The 'phone-c.w. switch shorts the modulation transformer and turns off the modulator high voltage when operating c.w.

the power transformer, filter choke and leads carrying a.c. All of these should be kept as far away as possible from high-gain input circuits and unshielded interstage transformers. As shown in the photographs, the microphone input, speech amplifier tube and interstage transformer are all placed at one end of the chassis with the power supply components at the other. It is also a good idea to separate the input stage from the modulation transformer to prevent feed-back.

The modulation transformer is a UTC S-19 and all of the terminals are located on the bottom of the case. Three holes (made with a tube socket punch) side by side will give enough room to connect leads to the terminals.

The hardest job is mounting the power transformer. Most of the "economy" transformers are made to mount in a large square hole in the chassis. Although the average ham usually has an assortment of drills and tube socket punches, it is quite a job to start forming square holes for transformers. Some transformers come supplied with brackets and others are made to mount in an upright position which presents no mounting problems. But if you're stuck with an old receiver power transformer or don't want to pay the



Bottom view showing placement of components. The two large capacitors at the right are the filter capacitors in the power supply. The bias resistor and by-pass capacitor (R_1, C_3) are in the bottom left of the chassis. Notice the three holes (made with a tube socket punch) which allow leads to be connected to the modulation transformer. Shielded wire is used for heater, microphone input and gain-control leads.

extra cost of the easy-mounting kind, it is a simple matter to connect the transformer to the chassis. If you're lucky enough to find them at a hardware store, four 8-32 machine screws about four inches long will hold the transformer on top of the chassis with the leads running through a grommetted hole. If you're one of the fortunate few who have threading tools, you can thread some ⅛-inch rods at both ends and mount the transformer above the chassis. In either case, some spacers (made from copper tubing, etc.) placed between the chassis and the transformer will hold it in place. Another method (as a last resort) is actually forming the square hole. Several round holes are made with a socket punch to form a rough hole, and then a file is used to square it up to size.

The other components such as tube sockets, operating controls and plugs are mounted in the usual manner. Before tightening the screws on these components, ground lugs and terminal strips should be attached. A ground lug at each tube socket is a must, and a few more located near the power supply will help. Terminal strips make excellent tie points for filter condensers and other small components such as resistors and by-pass condensers.

Operating Notes

The impedance ratio required in the modulation transformer depends on the load represented by the Class C amplifier, and the transformer taps must be chosen to reflect a 4000-ohm load, plate-to-plate, to the 6BQ6s. The Class C load is found simply by dividing the Class C plate voltage by the plate current (including the screen current) and multiplying the result by 1000. For instance, if the transmitter is running 400 volts at 100 ma. (to the final amplifier) the resistance is 4000 ohms. In this case the impedance ratio (and turns ratio) would be 1 to 1.

If a multimatch transformer is used, the taps that will most closely match the required impedances should be used. A chart will be included with the transformer showing how to make the desired connections.

To connect this modulator to a Heathkit AT-1 transmitter, the jumper between Pins 3 and 4 of the modulator plug on the transmitter should be removed. Leads from the modulation transformer are then connected to Pins 3 and 4 on the modulator plug.

For the Johnson Viking Adventurer, the jumper is removed from Pins 4 and 5 of the modulator socket. Leads are connected from the modulation transformer to Pins 4 and 5 on an octal plug which is inserted in the modulation socket on the transmitter.

It is not generally considered good practice to modulate an amplifier that is frequency-doubling, so if this modulator is to be used with a doubling-type transmitter such as the Heathkit AT-1, it is a good idea to make the modifications described in the article, "More Power with the AT-1," October, 1955, *QST*, page 36.

For checking purposes, a 0–200-ma. meter can be connected in the plate circuit of the modulator tubes. The meter is inserted in series with the lead that runs to the center tap on the primary of the modulation transformer. The average values of current will vary slightly but the static current (current with no signal) should be about 50 ma. At full output from an audio tone signal the current will swing to about 165 ma., but the same peak output from voice signals will cause the meter to kick only to about 60 to 70 ma. The plate current of the Cass C amplifier in the transmitter should stay constant with modulation.

When using the modulator with your transmitter, care should be taken not to operate at more than 100 per cent modulation. Several methods of checking modulation percentage are described in *The Radio Amateur's Handbook*.

The modulator should never be operated without the Class C load, or an equivalent resistance, on the output transformer; the transformer may break down because high voltages are developed under such conditions. A 25-watt resistor of the same resistance as the Class C load can be used as a dummy load for checking power output and wave-form as described in the *Handbook*.

A Composite Test Set

Modifying a Kit-Type Signal Generator for Antenna Measurements

BY ROY C. CORDERMAN,* W4ZG

• The measurements and test functions that can be performed with this one-package device ordinarily require three or four separate pieces of equipment. Relatively simple modification of a readily-available signal generator kit is all that is required. The original utility of the signal generator is unaffected.

MANY things we amateurs do are done the hard way. We spend much time and material in trying to improve the performance of our equipment. We could save a lot of effort and spend less money if we made more use of test equipment.

A good example is the adjustment of an antenna, particularly a mobile antenna for any of the bands requiring a loading coil. We read all of the available literature, wind a coil according to the data from the article which seemed most likely to meet our needs, and install the coil — only to find that we can just be heard around town. If we can afford a manufactured coil, we buy one and install it, with little improvement in the signal. Next we try pruning the coil and end up with a weaker signal than before.

If one of our friends happens to own a grid-dip meter, we borrow it and after rewinding the coil, we start the pruning process again. This time we get closer and, if quite careful, we will probably be satisfied with results, even though we do not have the loudest signal in town.

Others try a different approach. They either build, borrow or buy a field-strength meter and decide that when the measured field strength is at a maximum, the transmitter and antenna are doing all that can be expected, although the results may still be disappointing.

Such were the conditions at W4ZG until about a year ago, when it was decided that a test set could be built for testing antennas, particularly mobile antennas. After studying the problem it was determined that the basic requirements of a test set for such work are:

1) A stable signal source, variable in frequency.

2) A power supply for the signal source.

3) An output control.

4) A bridge for measuring the standing-wave ratio.

5) A means for varying the value of the known bridge arm, so that the test set could be used with the various types of transmission lines.

Some Considerations

To meet the first requirement, the grid-dip meter was considered, but was discarded because its frequency varies with changes in coupling between the output pick-up loop and the tuned circuit. The station transmitter was also considered and discarded. In most cases the power level is much too high and has to be cut down by makeshift arrangements. In addition, the frequency range is limited by law as we are only permitted to transmit within the officially-assigned amateur bands. If the antenna is not tuned within the band, we cannot find out whether we need to add to or remove wire from the coil.

It was therefore decided that a low-power oscillator would have to be built for the desired range of frequencies. An amplifier was also considered to be necessary, so that the load on the oscillator would not change with changes in coupling to the output circuit. The third requirement, an output control, was easily met by the

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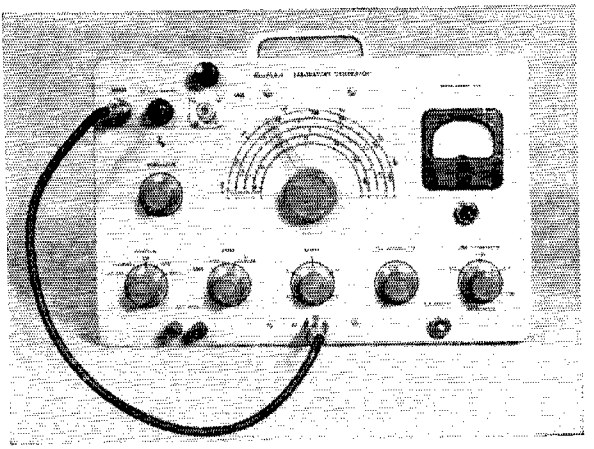


Panel view of the signal generator after modification as described in the text. The new r.f. output terminal below the range switch permits connecting the maximum output of the generator to the s.w.r. bridge installed in the upper left corner. The binding post above the coax socket is for an external ground connection or one side of parallel-conductor line. These changes do not affect the normal operation of the instrument.

introduction of gain control in the amplifier output circuit.

For maximum stability the signal source should include a voltage regulator tube in its power supply. As the test set is likely to be used with antenna systems having one terminal at ground potential, a transformer power supply rather than a direct-connected a.c.-d.c. power supply is most necessary. To prevent interaction between the circuit being tested and the power lines feeding the test set, each of the power leads should be filtered with r.f. chokes.

An inspection of the commercially available equipment offered to amateurs for the measurement of s.w.r. showed a number of these devices to have the characteristics needed to meet requirements four and five. The only objection to their use was that they were separate units and hence would have to be connected to the signal source and the antenna terminals each time a test was to be made. It was therefore decided to copy one of these circuits and build it into the signal source.

Having resolved the general problem, a study of the details was begun. A breadboard model for one band of frequencies, using a plug-in coil, was built. A cathode follower amplifier was used. The results were so satisfactory that several amateurs who saw the test set in use wanted a similar unit for their own use. As had been anticipated, they wanted the test set to cover several bands. The problems encountered in designing the tuned circuits, calibrating the dial, and such details, on the first set built for others were such that an investigation of commercially available signal generators was made to see whether the cost of the unit could be reduced. The Heathkit Model LS-1 (now LG-1) Laboratory Signal Generator was found to qualify in all respects and was used in building antenna test sets for the additional "customers."

Modified Signal Generator

The relatively few modifications of the signal generator can be made in a kitchen workshop.

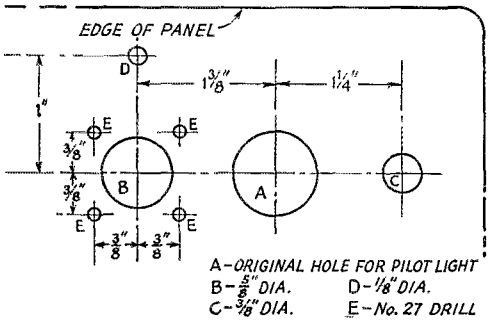


Fig. 1 — Dimensional layout for mounting the fuse holder, r.f. input and r.f. output connectors. The fuse holder mounts in the hole originally used for the pilot light. This view is from the rear of the panel.

The only tools needed, besides those used in assembling the kit, are a center punch, a hand drill and several sizes of drills for making additional holes in the front panel and in one of the shields. The locations of the additional holes in the front panel are shown in Figs. 1, 2 and 3.

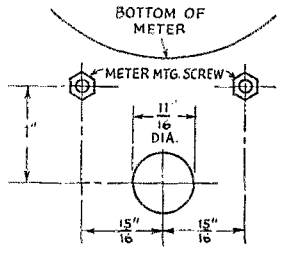


Fig. 2 — Location of new mounting hole for pilot light.

The position of the additional hole in the front cover of the internal shield for the oscillator is shown in Fig. 4.

If the instructions furnished with the kit are carefully followed, no trouble will be experienced in its assembly or in subsequent test and operation. It is suggested that the entire kit be completely assembled and tested before making the

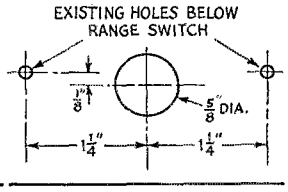


Fig. 3 — Location of mounting hole for r.f. output connector (J3) from signal generator.

modifications which permit its use as an antenna test set.[1] Two changes should be made during assembly. One of the original parts, the two-pole double-throw meter switch, should be discarded and replaced by a two-pole three-position wafer switch. The pilot light should be mounted in the new location beneath the meter.

After the signal generator has been tested and has been found to operate in accordance with the instructions given in the manual furnished by the supplier, it should be modified as described below.

The circuit diagram and additional parts list is shown in Fig. 5. Mount the fuse holder in the large hole previously used for the pilot light. Mount the Amphenol 75-CL-PC1M connector in the hole to the left of the fuse holder and the coax connector in the hole to the right of the fuse holder. Mount the terminal strip under the nut on the upper left screw of the 83-1R connector as you face the panel, with the single insulated lug uppermost.

Connect a piece of No. 12 tinned copper wire, bent at 90 degrees, between the front terminal of the fuse holder and the 75-CL-PC1M connector. Connect a second piece of No. 12 tinned copper wire, also bent at 90 degrees, between

[1] It should be kept in mind that changes in the original wiring of the instrument are not the responsibility of the manufacturer.

the back terminal of the fuse holder and the 83-1R connector.

Mount the r.f. choke between Terminals 1 and 4 of the terminal strip, a .01 ceramic capacitor between Terminals 1 and 2, a 350-ohm resistor between Terminals 2 and 3 and the crystal between Terminals 3 and 4. After mounting these parts on the terminal strip, run a wire from Terminal 1 to the meter switch. Ground the opposite contact terminal of the meter switch. Solder a .01 ceramic capacitor between Terminal 4 and the wire between the fuse holder and the 83-1R connector. Mount a 350-ohm resistor between Terminal 3 and the wire between the fuse holder and the PG1M connector. This completes the wiring of the bridge circuit.

Mount the Amphenol 80-C connector in the hole below the range knob. Run a piece of coax about 4 inches long between this connector through the hole in the oscillator shield to the middle terminal on the "fine" potentiometer. Ground the shield of the coax at the attenuator end, by soldering it to the shield can. Make no ground connection at the panel end. Attach the Amphenol 75-MC1F connector to one end of the remaining coax (about 14 inches long), and the Amphenol 80-M connector to the other end. Tighten the clamping screws against the springs. This cable carries r.f. from the r.f. jack below the range switch to the input jack of the bridge.

Mount the remaining Eby No. 43 binding post on the 83-1SP connector, making sure of a good solder joint without too much heat, as excessive heat will soften the insulating material of the connector. This combination is screwed on the 83-1R connector when testing open wire or 300-ohm Twin-Lead lines.

The fixed resistors, Z_o, for installation in the fuse holder are made from one-watt carbon resistors, using ends taken from 3AG fuses soldered to each terminal of the resistor. Be sure the finished unit is the same length as the standard fuse. Five per cent tolerance resistors are satisfactory for most purposes, but if a higher degree of accuracy is desired and a Wheatstone bridge is available, resistors of the next lower value may be filed on one side until the value is exactly that desired. After filing they should be painted with coil dope to keep out moisture.

Resistors of 36 ohms (for mobile antennas), 52 ohms and 72 ohms (for coax lines), 300 ohms (for Twin-Lead), and 450 ohms and 600 ohms

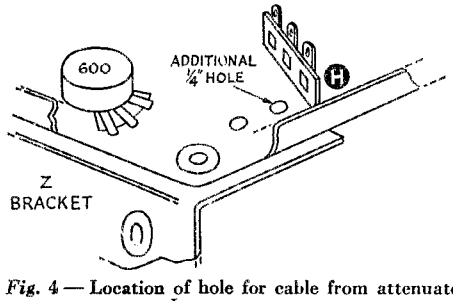


Fig. 4 — Location of hole for cable from attenuator to output connector J_3.

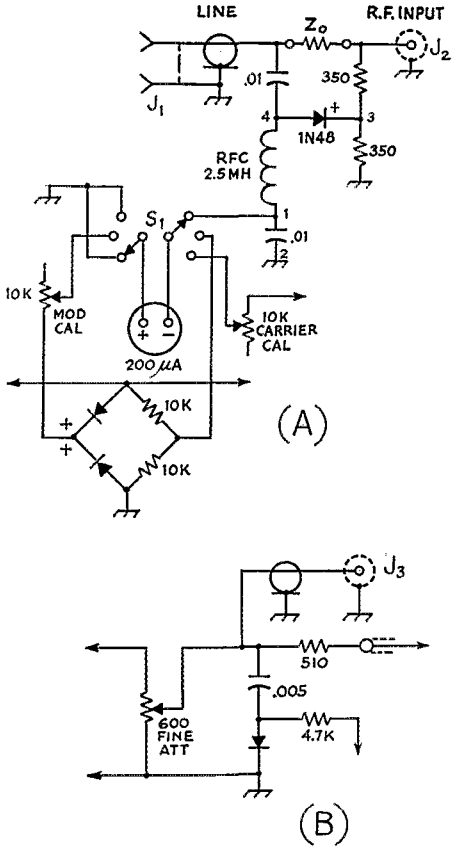


Fig. 5 — Circuit modifications. A — S.w.r. bridge circuit and modifications to meter switch wiring. Arrows indicate continuation of existing circuit. B — R.f. take-off for J_3. Except for J_3 and coax cable to it, the existing circuit remains unchanged.

Resistors are ½-watt carbon; 0.01 capacitors are ceramic. Small numerals at wiring junctions refer to lugs on terminal strip numbered as mentioned in text.

J_1 — Coax connector, chassis-mounting type (Amphenol 83–1R).
J_2 — Microphone connector, chassis-mounting (Amphenol 75–CL–PC1M).
J_3 — Microphone connector, chassis-mounting (Amphenol 80-C).
S_1 — 2-pole 3-position rotary (Centralab 1473).
Z_o — See text.

The following material is used in addition to components shown in circuit diagram:

1 Buss HKP fuse holder
1 4-terminal strip, (Cinch-Jones 53-F).
2 Binding post (Eby No. 43).
1 Coax connector, cable mounting (Amphenol 83–1SP).
18 inches RG–58/U cable.
Wire, screws, etc.

(for open-wire lines) may be used for testing the several types of lines mentioned.

Using the Test Set

With the lead to the r.f. jack disconnected, the signal generator functions as described in the Heathkit instruction book. To use the antenna test bridge, connect the r.f. jack below the dial to the input jack of the bridge. Set the

(Continued on page 160)

A Simple 144-Mc. Converter for Mobile or Novice Use

Double Conversion to 1.5 Mc. with Two Dual Triodes

BY C. VERNON CHAMBERS, W1JEQ

THIS converter was planned and constructed especially for mobile operation at 144 Mc. It is, however, well suited to fixed-station operation and should therefore appeal to Novices and v.h.f. beginners who are interested in a simple and comparatively inexpensive 2-meter converter.

The converter uses only two r.f. tubes and works with any receiver that covers 1.5 Mc. This means that the mobile ham may use his car b.c. set as the i.f. and audio systems for the unit. Fixed-station operators may use the converter in conjunction with a communications receiver that covers the b.c. band. The plate power requirements for the unit — 150 volts at approximately 17 ma. — can be handled safely by the power supply of most car or home-type receivers.

Double conversion and careful attention to the selection of the first i.f. minimize the image problem usually associated with converters having a low i.f. output. The use of a simple trap completes the job of reducing image response.

Bandspread of the converter may be adjusted so that either a section or all of the band may be spread out across the calibrated limits of the tuning dial. Therefore, if he so desires, a Novice may adjust for full bandspread over the 145- to 147-Mc. range.

Plate voltage for all circuits is held constant by an 0B2 regulator tube with the result that the converter is adequately stable for mobile operation. Fixed-station operators may eliminate the 0B2 if the power source is already regulated.

Circuit Details

The schematic diagram of the converter is shown in Fig. 1. Two 12AT7 twin triodes are used, each as a mixer and oscillator, the first converting the signal frequency to 11.4 Mc., the second working from this frequency to 1500 kc. The high-frequency oscillator is tunable, and the second oscillator is crystal controlled. Crystal control adds to the stability of the converter, and simpli-

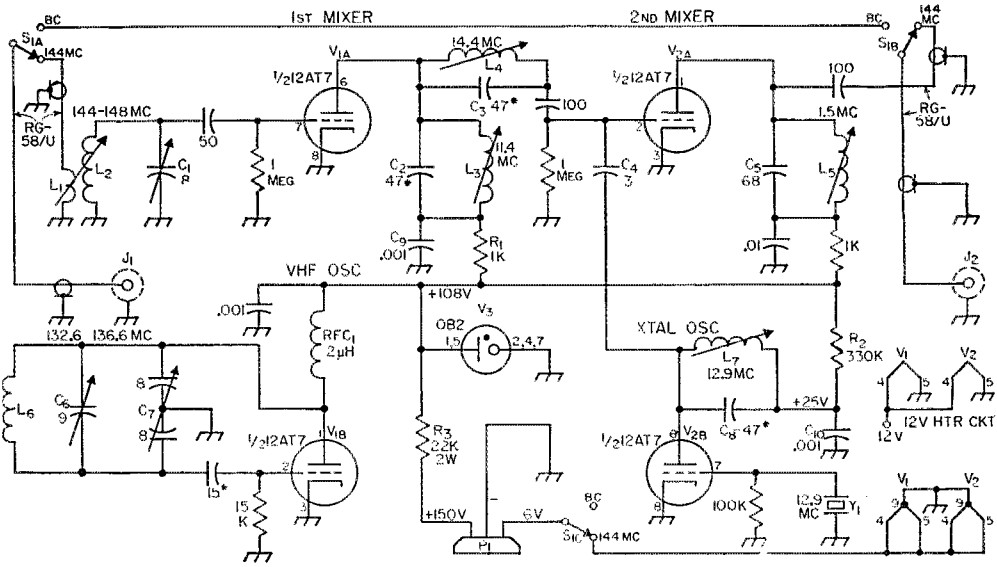


Fig. 1 — Schematic diagram for the 144-Mc. mobile converter. All resistors ½ watt unless otherwise specified. Capacitor values below 0.001 μf. are in μμf. All 0.001 and 0.01 capacitors are disk ceramic. * Indicates a silver-mica capacitor. Other fixed capacitors are tubular ceramic.

C_1 — Approx. 8-μμf. variable (Hammarlund HF-15 reduced to 2 stator and 1 rotor plate).
C_6 — 9-μμf. miniature variable (Johnson 9M11).
C_7 — 8-μμf.-per-section variable (Bud LC-1659).
L_1 — 4 turns No. 22 enam. interwound between turns at cold end of L_2.
L_2 — 4½ turns No. 16 tinned, ⅜-inch diam., ½ inch long.
L_3, L_4, L_7 — Slug-tuned; inductance range 2–3 μh. (North Hills Electric type 120-A).
L_5 — Slug-tuned; inductance range 64–105 μh. (North Hills Electric type 120-G).
L_6 — 4 turns No. 16, ⅜-inch diam., ¾ inch long.
J_1, J_2 — RCA-type phono jack.
P_1 — 3-prong male plug (Cinch-Jones P-303-CCT).
RFC_1 — 2-μh. r.f. choke (National R-60).
S_1 — 3-pole 5-position (used as 3-p.d.t.) selector switch (Centralab PA-2007 or PA-5 wafer mounted on PA-300 index stop).
Y_1 — 12.9-Mc. crystal (International Crystal FA-9).

The 144-Mc. converter is housed in a cabinet measuring 5 by 5 by 7 inches. A National type AM dial is the frequency tuning control. Knobs for the input peaking capacitor, C_1, and the on-off switch, S_1, are at the lower left and right, respectively.

• Here is a simple but effective 144-Mc. converter that uses a broadcast receiver — or a communications receiver covering the b.c. band — as the sources of fixed i.f., audio output and power. The use of double conversion results in freedom from serious image response. Bandspread can be adjusted to suit individual requirements, and no r.f. circuit tracking problems are involved. Construction is just about as uncomplicated as one could hope for.

fies both the construction and the adjustment of low-frequency-oscillator circuit.

The first mixer tube, V_{1A}, has its grid circuit resonated at 2 meters. C_1 is the input peaking capacitor, and L_1 is a link for coupling to coaxial feed lines. The plate circuit of V_{1A} is resonated at 11.4 Mc. by C_2 and the slug-tuned coil, L_3. The first oscillator tunes from 132.6 to 136.6 Mc. It uses V_{1B} and, beating with the incoming signal, produces an i.f. of 11.4 Mc. which is then capacitively coupled to the grid of the second mixer tube, V_{2A}. The oscillator can be made to cover a smaller or a larger range than that given above so that the tuning range of the converter may be adjusted to individual requirements. C_6 is the bandset capacitor and C_7 is the bandspread capacitor. Stray capacitance between grid pins of the socket for V_1 gives adequate injection coupling between oscillator and mixer.

A second mixer-oscillator combination uses V_2 and converts the 11.4-Mc. i.f. to 1500 kc. for working into the b.c. range of a receiver. The trap, C_3 and L_4, connected in series with the coupling capacitor between the two mixer circuits, is tuned to 14.4 Mc. This trap attenuates image response at a frequency removed from the signal frequency by 3000 kc. The image, which falls within the 2-meter band when the converter is tuned to the low edge, can be reduced by 30 db. or more through adjustment of the trap.

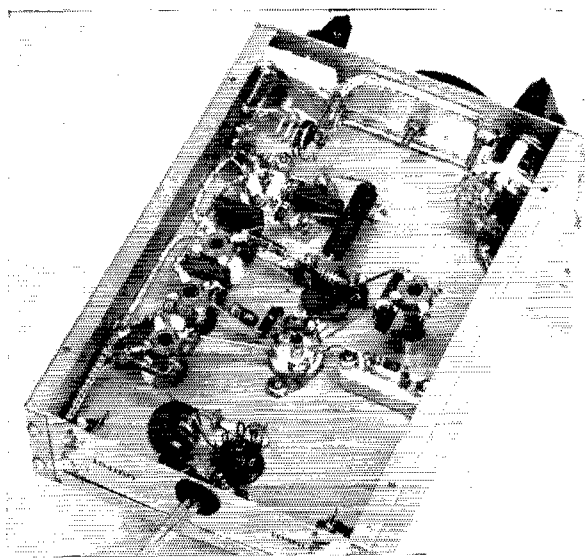
♦

In the mixer plate circuit, L_5 is resonated at 1500 kc. by the fixed capacitor, C_5. A 100-$\mu\mu$f. capacitor couples output from V_{2A} to J_2. A short length of coaxial cable is used between J_2 and the receiver.

The oscillator for the second mixer is crystal controlled at 12.9 Mc. The circuit uses V_{2B} and is tuned by C_8 and the slug-tuned coil, L_7. Radiation from the oscillator, when the latter was operated with 108 volts applied to the plate of the 12AT7, reached the first mixer and caused several birdies as the converter was tuned through the band. This condition was eliminated by lowering the oscillator plate voltage to approximately 25 volts by means of the 330K dropping resistor, R_2. The reduction in oscillator signal affected the mixer sensitivity, and it was necessary to introduce 3 $\mu\mu$f. (C_4) of capacitive coupling between V_{2A} and V_{2B}.

The 22K resistor, R_2, in series with the 0B2 regulator tube adjusts the current to approximately 17 ma. (with the 12AT7s removed from the sockets) with 150 volts applied to the converter. If the supply voltage available for the converter is in excess of 150 volts, it is advisable to regulate the 0B2 current drain to 17 ma. by means of an external dropping resistor or by an increase in the value of R_3. An input of less than 150 volts is not recommended to assure reliable operation of the voltage-regulator tube (ignition voltage 133 volts).

Sections A and B of S_1 shift the antenna from the broadcast receiver to the converter, while



A bottom view of the 144-Mc. converter. L_7 is centered above the crystal socket at the right. L_3, L_4 and L_5 pass through ⅝-inch holes punched in the chassis to the left of the socket for V_2. As seen in this view, RFC_1 is at the right of the feed-through bushings which carry r.f. leads between V_1 and the bandspread capacitor, C_7.

S_{1C} turns on the heaters of V_1 and V_2. Heater circuits for both 6- and 12-volt operation are shown in Fig. 1. There is no connection to Pin 9 of the 12AT7 in the 12-volt circuit.

Construction

The photographs illustrate how the converter is built into a Hamcab [1] type A-10-A chassis-cabinet assembly. Of course, a homemade chassis and enclosure may be used by those who prefer to do their own metal work. Dimensions for the chassis, cover and panel accompany the front and the top views of the converter. The over-all size of the unit may be reduced if the constructor wants the ultimate in compactness.

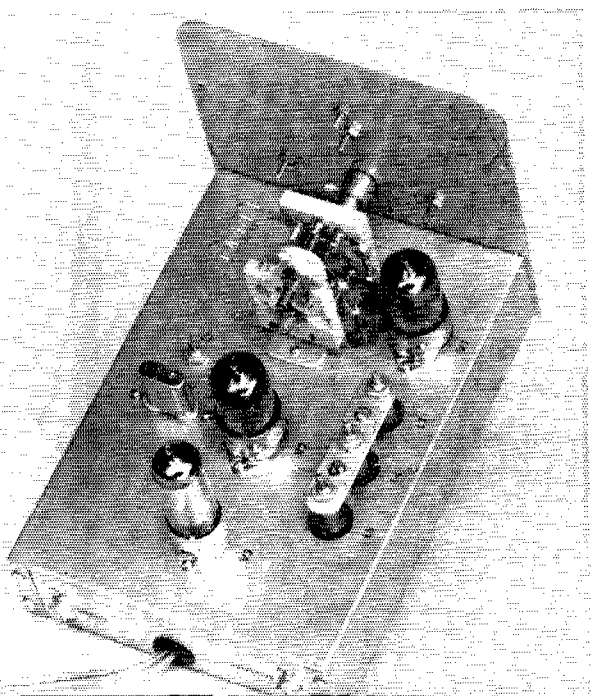
The top view shows the bandspread capacitor, C_7, centered on the chassis, with its forward frame 15/16 inch in from the front edge. L_6 is soldered directly to the left-hand stator terminals of the capacitor, and a pair of National type TPB feed-through bushings are mounted below the right-hand stator terminals. The socket for V_1 is centered between C_7 and the right side of the chassis, with Pins 4 and 5 facing toward the rear.

As seen in the top view, V_3 is centered 1¼ inches in from the rear edge of the chassis, and V_2 is 1¾ inches farther to the front. Pins 4 and 5, and 3 and 4 of V_2 and V_3, respectively, face toward the front of the unit. Y_1 is ⅞ inch to the rear of L_7 and is centered between V_2 and the left edge of the chassis.

Inductors L_3, L_4 and L_5 are mounted (over ⅝-inch holes punched in the chassis) on a strip of aluminum measuring 7/16 by 2 5/16 inches. The distance between mounting centers of the coils is ⅞ inch. Machine screws, nuts and ⅝-inch metal spacers support the shelf above deck. L_3, L_4 and L_5 are mounted in that order from front to rear.

[1] Manufactured by Prefect Mfg. Co., 102 Westport Ave., Norwalk, Conn.

[2] Chambers, "Bandswitching a Crystal-Controlled Mobile Converter," *QST*, January, 1955.



The bandset control, C_6, is a miniature variable capacitor, used in preference to a compression type for better stability and easier adjustment. It should be rigidly mounted directly above C_7. This is accomplished by allowing C_6 to rest on C_7 with the isolantite plates meeting, and then using a strip of flashing copper as the connection between the rotor shaft of C_6 and the rear stator support bar of C_7 (see top view). A short length of No. 16 tinned wire is used between the stator of C_6 and the front right-hand stator terminal of C_7.

If a Hamcab assembly is used, it is necessary to close in the rear end of the chassis with an aluminum plate to provide a mounting surface for J_1, J_2 and the power-lead grommet. Holes for the three components may be drilled or punched in the plate before the latter is attached by means of self-tapping screws.

Now, fasten the panel to the chassis (self-tapping screws provided with the unit), and then spot the location of the hole for the hub of the AM dial. This is done most easily by sliding C_7 forward on the chassis until its control shaft touches the panel. After the center of the shaft has been located and marked on the rear side of the panel, remove the panel and drill the mounting holes for C_1, S_1 and the dial. The shafts for C_1 and S_1 are centered 13/16 inch in from the left and the right sides of the panel, respectively, and each is ¾ inch up from the bottom of the panel.

The bottom view shows L_7 centered above the crystal socket at the right. A two-terminal tie-point strip to the left of L_7 supports C_9 and C_{10}, and the B-plus ends of R_1, R_2 and RFC_1. The top end of RFC_1 is connected to the TPB bushing located to the right of the socket for V_1. The capacitor located between the two feed-through bushings is the h.f. oscillator grid-coupling capacitor. A two-terminal tie-point strip, attached to the mounting foot of C_1 by a machine screw, provides termination for L_1 and the coaxial cable, and supports the grounded end of L_2.

The padder capacitors for L_3, L_4, L_5 and L_7 are mounted directly on the terminals of the inductors. In the case of L_5, spare terminals on the form are used for the support and termination of the associated decoupling resistor (1K) and the 100-$\mu\mu$f. output coupling capacitor.

A three-terminal tie-point strip having the center post grounded, mounted to the rear of the regulator-tube socket, is used to terminate the incoming power leads. R_3 is mounted between this strip and Pin 1 of the 0B2 socket.

To assure mechanical stability under the most adverse conditions — mobile operation —

(Continued on page 164)

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Chassis measurements are 1½ by 4⅞ by 6⅞ inches. C_7, the bandspread capacitor, is at the top center, just to the left of V_1. The crystal, Y_1, is below L_7 (tuning slug visible) and to the left of V_2. The 0B2 regulator tube is at the rear of the unit. L_3, L_4 and L_5 are mounted on a shelf at the right side of the chassis. J_1, J_2 and a grommet for the power leads are on the rear wall.

Designing the VFO

Circuits Constants for High Stability

BY LOUIS HOWSON,* W2YKY

• The ever-interesting question of oscillator stability is examined in this article. Although some of the important ingredients of the design formulas are of necessity known only approximately, careful reading will give an insight into oscillator operation that will be of great benefit to the builder who wants to arrive at optimum circuit constants for his VFO with a minimum of cut-and-try.

As a result of continual striving for improved frequency stability, we are confronted today by innumerable VFO types, with special virtues being claimed for each. To those contemplating the construction of a VFO this situation can be confusing.

It is not the purpose of this article to compare the various VFO types. The author believes that stable oscillators are more the result of careful design and construction than the use of a particular circuit configuration. The two broad oscillator types which will be discussed are the Colpitts and Hartley circuits. For certain practical reasons the simple Colpitts and Hartley oscillators prove inflexible. The main emphasis will therefore be placed on modifications of these circuits, the Clapp[1] and Lampkin[2] oscillators, respectively.

Feed-Back Oscillators

The Colpitts and Hartley oscillators belong to the general class of feed-back oscillators. This type of oscillator functions by exciting an amplifier from a portion of its own output. If the amplifier has sufficient gain to overcome the losses in the feed-back loop, oscillation may result.

The usual feed-back oscillator may be represented as shown in Fig. 1A. The amplifier is generally a single vacuum tube. The coupling network feeds back a specified portion of the amplifier output to the input terminals. In general, the coupling network has transmission or phase characteristics such that the circuit is self-exciting at a single frequency. Fig. 1B illustrates how a Colpitts oscillator circuit may be redrawn to conform with Fig. 1A.

Suppose initially that, in Fig. 1A, S_1 is opened and that E_{in} is supplied from an external source not shown. If the coupling network delivers a voltage E_{fb} identical with E_{in}, E_{fb} may be substituted for the externally supplied E_{in} without disturbing the voltages and currents in the circuits. Therefore, if the external source of E_{in} is removed and S_1 closed, the circuit will supply its own excitation and will oscillate continuously.

Two conditions are necessary for sustained oscillations in feed-back oscillators. These are that the amplitude and the phase of the voltage fed back must equal the amplitude and phase of the initially assumed input voltage. Stated in other words, the conditions are a loop gain of unity and a loop phase of zero or 360 degrees.

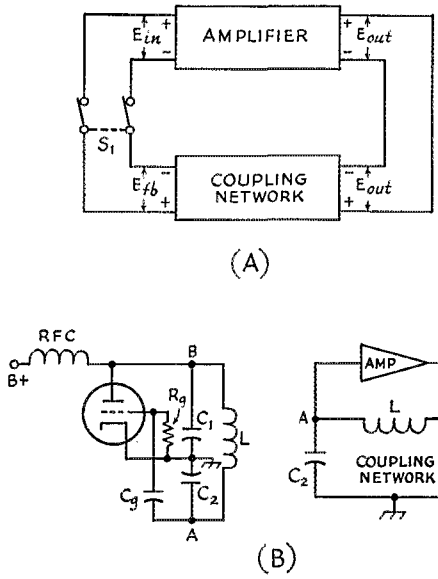


Fig. 1 — Feed-back oscillators. A — generalized oscillator; B — Colpitts oscillator circuit (*left*) and (B) the basic circuit redrawn to show its resemblance to A.

It is unreasonable to suppose that the gain of the amplifier would remain sufficiently constant so that after an initial adjustment the loop gain would forever remain at unity. In practice, feed-back oscillators are always designed so that, with the loop opened, the loop gain exceeds unity. When the loop is closed and oscillations begin, some nonlinear circuit element is used to control the loop gain and automatically maintain it at unity.

In the Class C oscillator, the nonlinear properties of the tube stabilize the oscillation amplitude if a grid leak is used to obtain self-bias. When the oscillator is first turned on, the grid

* 120 Summit Ave., Bloomfield, N. J.

[1] Clapp, "An Inductance-Capacity Oscillator of Unusual Frequency Stability," *Proc. I.R.E.*, 36, 356–358 (1948).

[2] Lampkin, "An Improvement in Constant Frequency Oscillators," *Proc. I.R.E.*, 27, 199–201 (1939).

bias is zero and the amplifier gain is maximum. In response to any circuit disturbance oscillations will start. The amplitude of these oscillations will grow until the grid bias resulting from the rectifier action between grid and cathode is just sufficient to reduce the loop gain to unity. At this point the amplitude of oscillation will remain constant.

With the relatively high grid bias and a.c. grid voltage peaks in a Class C oscillator the plate current is not a linear function of the grid voltage. It contains, in general, a d.c. component, a component at the fundamental frequency, and many harmonic components. For this reason the coupling network in Class C oscillators usually includes a high-Q resonant circuit. The resonant circuit discriminates against the harmonics and feeds back an essentially sinusoidal voltage, at the fundamental frequency, for grid excitation.

When an oscillator is required to deliver a pure output, free from harmonics, it is usually operated in a Class A condition. In order that the tube may operate as a linear amplifier, it is necessary to use a nonlinear element in the external circuit to control the oscillation amplitude. For instance, it is possible to rectify some of the output of the amplifier and obtain a negative d.c. potential. If this potential is applied to the grid of the amplifier in a suitable manner it will control the amplifier gain in response to oscillation amplitude. The amplifier itself can then operate Class A.[3]

Another example of the Class A oscillator is the Wein Bridge audio oscillator. This circuit uses the nonlinear resistance properties of a lamp filament to control the feed-back in such a way as to maintain the loop gain equal to unity.

The Clapp Oscillator

Fig. 2 shows the a.c. conditions in the Clapp oscillator, neglecting for the moment the d.c.

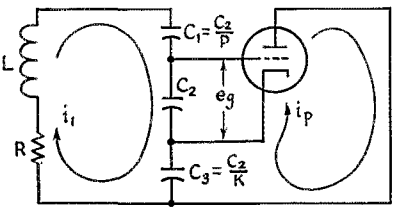


Fig. 2 — The a.c. circuit essentials of the Clapp or "series-tuned" Colpitts oscillator.

connections. C_2 is used as the reference capacitor. The capacitances of C_1 and C_3 are expressed as ratios with C_2 by P and K. If P is made zero (corresponding to short-circuiting C_1) the Clapp oscillator is reduced to a Colpitts oscillator. Therefore, if design equations are obtained for the Clapp oscillator, it will only be necessary to make P equal to zero in these equations to get the corresponding equations for the Colpitts oscillator.

When the Clapp oscillator is analyzed two equations may be obtained:[4]

$$f = \frac{1}{2\pi}\sqrt{\frac{1+K+P}{LC_2}} \text{ or}$$

$$f = \frac{1}{2\pi\sqrt{LC_1}}\sqrt{1+\frac{C_1}{C_2}+\frac{C_1}{C_3}} \qquad (1)$$

$$R = \frac{Kg_m'}{(2\pi f_2 C_2)^2} \qquad (2)$$

Equation (1) is simply a statement of the resonant frequency of the circuit formed by L, C_1, C_2, C_3 and R, neglecting any tube effects; the circuit meets the necessary condition of a loop phase of 360 degrees. Equation (2) states the requirements for a loop gain of unity. If the oscillator operates Class A, g_m' equals the normal tube transconductance. For other than Class A operation, g_m' equals the fundamental component of the plate current divided by the fundamental component of the signal voltage between cathode and grid. It might, therefore, be called the "effective" transconductance. This effective transconductance is always less than the Class A transconductance.

When oscillations exist, Equations (1) and (2) must be satisfied simultaneously. Simultaneous solution yields Equation (3).

$$C_2 = \frac{Q\, g_m'\, K}{2\pi f(1+P+K)} \qquad (3)$$

$$\text{where } Q = \frac{2\pi fL}{R}\ .$$

Equation (3) is a convenient design equation for the Clapp oscillator. (To obtain the corresponding equations for a Colpitts oscillator we need only make P equal to zero.) It determines C_2 in terms of f, Q, g_m', K and P. The choice of values for these constants will be discussed later; for the moment, consider that the values are known. We may then evaluate C_2 and therefore C_1, C_3 and L. The resonant circuit will then be completely determined.

A Comparison of the Clapp and Colpitts Oscillators

The alternate form of Equation (1) indicates that when the ratios $\frac{C_1}{C_2}$ and $\frac{C_1}{C_3}$ are very small the frequency will be primarily determined by L and C_1. Since the relatively fickle input and output capacitances of the vacuum tube comprise portions of C_2 and C_3, respectively, one might feel that the oscillator frequency in the Clapp connection is not as greatly affected by changes in the tube capacitances as would be the case with the Colpitts oscillator. To test this hypothesis it is necessary to determine the rate at which the frequency varies with changes in C_2 and C_3, for both Clapp and Colpitts circuits. Mathematically, this requires differentia-

[3] Bernstein, "Amplitude Limiting for the VFO," *QST*, Feb., 1954.

[4] Proofs of these and subsequent equations accompanied the manuscript, but are not included here since they have been given (in slightly different form) in other papers; e.g., Gouriet, "High-Stability Oscillator," *Wireless Engineer*, April, 1950. — Ed.

tion of Equation (1) with respect to C_2 and C_3. When this is done we find

$$\frac{\partial f}{\partial C_2} = -\frac{\pi f^2}{Qg_m'K} \quad (4)$$

$$\frac{\partial f}{\partial C_3} = -\frac{\pi f^2 K}{Qg_m'} \quad (5)$$

For those not familiar with the calculus, Equation (4) states that, for small changes, the change in frequency is $\frac{\pi f^2}{Qg_m'K}$ times the change in C_2. For maximum stability, therefore, the factor $\frac{\pi f^2}{Qg_m'K}$ must be made as small as possible. This points out the desirability of the highest possible values of Q and g_m'. Notice that K appears in the denominator of Equation (4) and the numerator of Equation (5). If K is made large to increase the frequency stability with respect to C_2 it decreases the stability with respect to C_3. This factor will determine our subsequent choice of a value for K.

Since P does not appear in either Equation (4) or (5), these equations apply equally to a Colpitts oscillator. Therefore, if the coil Qs are equal, the stabilities of the Clapp and Colpitts oscillators with respect to tube capacitance changes are identical. Clapp's addition of a third

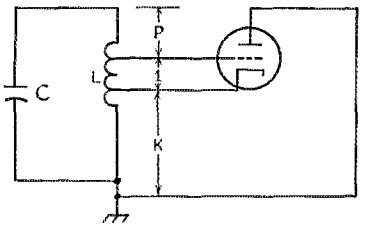


Fig. 3 — The Lampkin oscillator circuit.

capacitor to the Colpitts oscillator does not improve its frequency stability.[5] However, the extra element adds an additional degree of freedom to the oscillator design. We shall use this freedom later in choosing a value for P.

The Lampkin Oscillator

Fig. 3 is a schematic diagram of the Lampkin oscillator. It bears the same relationship to the Hartley oscillator that the Clapp does to the Colpitts. The coil, L, is tapped in the ratio 1, K and P. If it contains N turns, there will be $\frac{N}{1+K+P}$ turns between grid and cathode, $\frac{NK}{1+K+P}$ turns between plate and cathode

[5] In practice it would be difficult, although perhaps not impossible, to construct a low-inductance coil for the "high-C" Colpitts or Hartley having as good Q as a coil of the larger inductance typical of the series-tuned Colpitts, within the same physical dimensions. Also, impractical values of variable capacitance are required in the Colpitts and Hartley circuits at the lower frequencies.

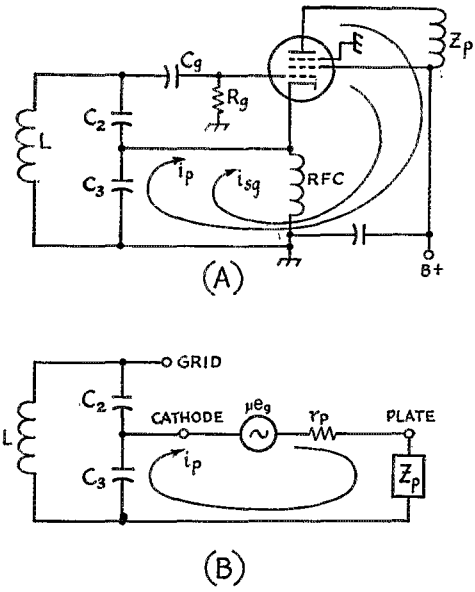


Fig. 4 — Grounded plate "electron-coupled" oscillator (A) and (B) its equivalent circuit.

and $\frac{NP}{1+K+P}$ turns between the grid and the hot end of C.

Using techniques equivalent to those employed in the analysis of the Clapp oscillator the following equations are obtainable for the Lampkin oscillator.

$$f = \frac{1}{2\pi\sqrt{LC}} \quad (6)$$

$$L = \frac{(1+P+K)^2}{2\pi f K Q g_m'} \quad (7)$$

Equation (7) is the design equation corresponding to Equation (3) for the Clapp oscillator. It determines L in terms of the circuit constants. Substitution of the value of L into Equation (6) will yield C and again the resonant circuit design is complete. The analogous equations for the Hartley oscillator are obtained by setting P equal to zero in Equations (6) and (7).

It can also be shown that the stability equations, (4) and (5), apply equally to the Lampkin and Hartley oscillators, where C_2 and C_3 are now the grid-to-cathode and plate-to-cathode capacitances, respectively.

Electron-Coupled Oscillators

The circuits being discussed are often incorporated into electron-coupled oscillators. E.c.o.s are usually thought of as two-section devices, comprising individually an oscillator and an amplifier with the coupling between them due to the common electron stream. Whether or not this is true depends on the circuit configuration.

Consider the circuit of Fig. 4A. This is a conventional e.c.o. of the Colpitts type with the ground point at the screen grid or "plate" of the oscillator section. The equivalent circuit is

shown in Fig. 4B. Notice that the total a.c. tube current flows through the feed-back element C_3. This means that the screen and plate currents are both available for feed-back. The plate current predominates because it is larger than the screen current.

With the average pentode the plate resistance r_p is very much larger than the sum of Z_p (the plate load impedance) and the impedance seen looking into the resonant circuit across C_3. When this is so the plate current is independent of the load impedance, to a first-order approximation. For this reason the frequency of oscillation is relatively independent of variations of the plate load, but it is evident that the e.c.o. of Fig. 4 is not a two-section device. The circuit would therefore be designed in the same manner as any simple oscillator, neglecting Z_p. If the ground point in the oscillator is moved to the cathode, as illustrated in Fig. 5, only the screen current flows through the feed-back element. In

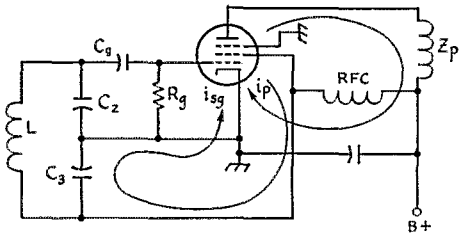


Fig. 5 — Grounded-cathode electron-coupled oscillator. The coupling between the oscillator section and output circuit is actually through the electron stream in this circuit, providing there is negligible capacitive coupling between the screen grid and plate. Neutralizing usually is required for eliminating such undesired coupling.

this case the oscillator section of the e.c.o must be designed using the characteristics of the triode formed by the cathode, grid and screen of the tube.

Selection of g'_m

As indicated earlier, the effective transconductance in Class B or C is smaller than the Class A value. Fig. 6 illustrates the variation of the effective transconductance with grid bias. This graph is the result of a theoretical calculation of g'_m *versus* grid bias, assuming that the plate current is a linear function of the grid voltage. While this will never be strictly true, the graph gives a fair engineering approximation. Incidentally, wherever cut-off bias is mentioned in this article it refers to the projected cut-off, and not the actual cut-off bias. This is also illustrated in Fig. 6.

The stability formulas, (4) and (5), show that the frequency stability increases directly with g'_m. Therefore, when maximum stability is desired, Class A operation is indicated. As mentioned earlier, Class A oscillators are two-loop devices, and the problems affecting the design of the auxiliary amplitude-controlling loop are a subject in themselves. We shall therefore consider only oscillators in which the amplitude of oscillation is limited by the nonlinear properties of the vacuum tube.

The desirability of operating with g'_m as large as possible suggests that the operating bias should be kept as small as is consistent with the requirement that the gain be effectively controlled. Experience indicates that the operating bias will be the neighborhood of cut-off under these conditions, so that where highest stability is desired g'_m can be assumed to be approximately one-half g_m. However, in view of manufacturing tolerances in tube constants and the decrease in g_m toward the end of the tube's life, as well as other factors, a conservative approach would be to use $g'_m/3$ for initial design purposes.

There are times when an oscillator must be designed to develop a specified output voltage. Because of the essentially peak rectifier action between grid and cathode of the oscillator tube the operating bias is very nearly equal to the peak a.c. voltage between grid and cathode. The peak a.c. voltage between grid and plate will therefore be $(1 + K)$ times the operating bias and the peak a.c. voltage across the entire resonant circuit will be $(1 + P + K)$ times the operating bias. When the desired output voltage is known the required operating bias is readily determined. With a knowledge of the cut-off voltage of the tube and the graph of Fig. 6, the required effective transconductance may be found.

A choice of g'_m in Class C operation could also be made on an efficiency basis. Terman shows that the optimum length of the plate current pulse, in electrical degrees, is between 120 degrees and 150 degrees for operation at the fundamental frequency. In electron-coupled oscillators, where the plate circuit may be tuned to a harmonic of the oscillator frequency, the optimum angle of plate current flow depends upon the desired harmonic. Terman indicates that the optimum angle is 90 degrees to 120 degrees for the second harmonic, 80 degrees to 120 degrees for the third, and 70 degrees to 90 degrees for the fourth. The corresponding value of g'_m may be obtained from the graph of Fig. 6 by first finding the ratio of the operating bias to the cut-off bias from Equation (8):

$$\frac{\textit{operating bias}}{\textit{cut-off bias}} = \frac{1}{1 - \cos 1/2\ \theta_p} \qquad (8)$$

where θ_p is the angle of plate current flow.

As an example, if the desired angle of flow is 90 degrees, cos $1/2\ \theta_p = 0.707$. The ratio of operating bias to cut-off bias is therefore 3.42. From the graph we find the effective transconductance is 1/11 the normal transconductance at this point.

Another factor involved in the discussion of g'_m is the choice of a vacuum tube type. When stability is important it would appear that the best tube would be that with the highest g_m. This is not categorically true. We could always double g_m by using two tubes in parallel. Would this increase the stability? The answer is no.

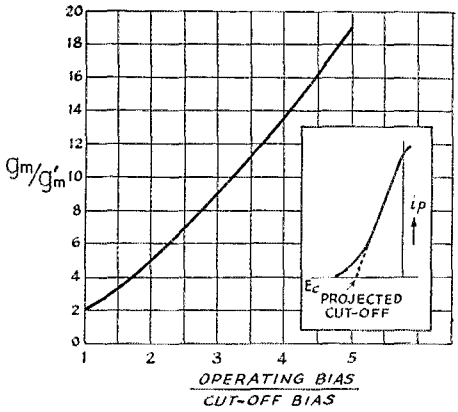


Fig. 6 — Approximate relationship between operating bias and effective grid-plate transconductance. The effective transconductance is expressed as a ratio with the normal transconductance of the tube as a Class A amplifier, and the operating bias as a ratio to the projected cut-off bias.

While the g_m is doubled, so are the tube capacitances and their resultant instabilities; therefore we just break even.

In the writer's view, the best choice is a tube with a high figure of merit, where figure of merit is defined as the g_m divided by the sum of the input and output capacitances of the tube. The pentodes used in television r.f. and i.f. circuits are usually tubes with high figures of merit.

Choosing K

The factor that adjust the feed-back ratio is K. In so doing, it also sets the ratio of impedances presented by the resonant circuit between grid and cathode and plate and cathode. The choice of a suitable value for K therefore depends upon the relative stabilities of the input and output impedances of the tube.

If the input and output capacitances of the tube were subject to equal random deviations, a comparison of the stability equations, (4) and (5), indicates that the optimum choice of K would be 1. In typical pentodes, however, the grid capacitance is about ten times less stable than the plate capacitance. Therefore, the normal random deviations in these capacitances will produce the least frequency deviation if $K = \sqrt{10}$ or about 3.

Selection of P

Earlier, in discussing the stability equations, the value of P was found not to affect the frequency stability of the oscillator. If it does not affect frequency stability we are free to choose any convenient value for P. A convenient value may be determined by considering the resonant circuit design in a VFO from a practical viewpoint.

The object of the resonant circuit design in the average VFO is to produce an oscillator that will tune between two frequencies, f_1 and f_2, using the maximum rotation of the variable air condenser. That is, maximum bandspread is desired.

The initial conditions imposed on the resonant circuit are two: the tuning range, f_1 to f_2, and the value of variable capacitance ΔC. When a given frequency range must be covered by a specific variable capacitor, the values of L and C are predetermined.

In the Colpitts and Hartley oscillators the resonant circuit yielding maximum stability is determined by the circuit constants Q, g'_m and K. It is therefore only a fortunate accident when a commercially obtainable variable air condenser is found which, without modification, will simultaneously satisfy the requirements for bandspread and maximum stability.

In the Clapp and Lampkin oscillators the resonant circuit is controlled by Q, g'_m, K and P. Since the frequency stability is unaffected by the value of P we can choose values of Q, g'_m and K yielding maximum stability and then choose P so that the oscillator will cover the desired frequency range with whatever variable capacitor is available. The advantage of the Clapp and Lampkin oscillators resides in this ability to match a particular resonant circuit to a specific tube in a manner resulting in maximum frequency stability.

When the frequencies between which the oscillator is to tune and the size of variable capacitor are known, it is merely a mathematical exercise to arrive at the proper value for P.[6] For a Clapp oscillator having a frequency ratio of 1.14 to 1 (the ratio covered by the 3.5–4 Mc. band), P may be found from the following simplified equation, in which K is selected to have the value 3:

$$P = 0.61 + 0.38\sqrt{\frac{Qg'_m}{f_2\Delta C}}$$

In this equation f_2 is the highest frequency to which the oscillator is to tune, and ΔC is the change in tuning capacitance between the maximum and minimum settings.

The value of P may be found in other ways. In the Clapp oscillator, if C_2 is arbitrarily selected P may be found from Equation (3). If L is arbitrarily chosen P may be found from Equation (7). Lastly, P itself may be arbitrarily selected. In any of these cases it is of interest to find the value of variable capacitance required to tune between f_1 and f_2.

In the Clapp oscillator we design around the upper frequency f_2. At the lower frequency, f_1, P will have a new value P_1

$$P_1 = (1 + P + K)\left(\frac{f_1}{f_2}\right)^2 - (1 + K)$$

and

$$\Delta C = \frac{C_2}{P_1} - C_1$$

This value of variable capacitance probably will not be commercially available and ΔC must then be tailored to fit, by appropriately modify-

[6] See Appendix for complete design equations.

(*Continued on page 166*)

The "EZ-Couple"

Coupling Odd Antenna Lengths to the Rig

BY LEWIS G. McCOY, W1ICP

• Many times an odd length of wire is the only antenna an amateur can use at his location. The simplest antenna coupler that will insure proper coupling between the wire and a low-impedance output transmitter is the "L" coupler described in this article. If, for one reason or another, you are one of the unfortunates who can't put up a textbook antenna, *here is the next best solution.*

THE following is an excerpt from a recent letter to Headquarters: "I have a problem concerning an antenna installation for my shack. I am located on the second floor of an apartment in a development which does not allow any outside antenna. I have an antenna in mind which I can install on my window sill and use it during the nighttime. Can you help me?" This is a type of question that turns up quite frequently in our mail bag, indicating that many amateurs are confronted with the same problem.

Probably in about 90 per cent of the cases an amateur can string up a wire *somewhere*. It will work better if it is high and in the clear, but this is not always possible. With a "random" wire of this type (it usually doesn't work out to be a textbook length of ¼ or ½ wavelength) the remaining problem is to load the transmitter with it. To handle all cases, an antenna coupler is required.

There is nothing new about the system but it bears repeating for the benefit of the new crops of amateurs that have come along in recent years. Briefly, the system consists of using an L-section coupler, which can be used to couple power from the transmitter to an antenna of any length. By "any length" we mean the antenna should be as long as possible, but a wire as short as 20 feet will work on 80 meters.

In testing the coupler shown in the photographs and in Fig. 1, a 20-foot length of wire proved to be sufficient to produce three contacts on 80, and two on 40. This was with the antenna entirely indoors in the second-floor shack of a frame house. The power input was approximately 50 watts.

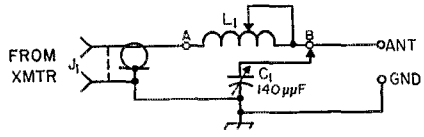


Fig. 1 — Circuit diagram of the antenna coupler. L_1 — 30 turns No. 16, 10 turns per inch, 2-inch diam.

Coupler Details

As can be seen from the circuit diagram, the coupler is very simple. The inductance L_1 is obtained by using part of a length of Air Dux 1610S coil stock.[1] The proper amount of inductance for a given antenna and frequency is obtained by shorting out a portion of L_1. A clip lead is used to connect the stator plates of C_1 to point A or B, depending on the antenna length and the frequency of operation.

Any type of variable capacitor that has a maximum capacitance of approximately 140 $\mu\mu$f. can be used. For inputs up to 75 watts, 0.025-inch plate spacing is sufficient.

Construction

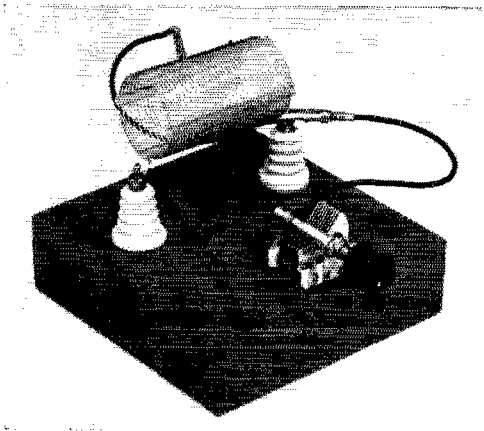
The coupler described here was mounted on a metal chassis. However, if one desires, the unit can be built on a piece of board, saving the cost of a chassis. If the unit is bread-boarded, a common ground bus can be made from a length of wire. The bus connects J_1, C_1, and the ground terminal together. A coax fitting was used for the input terminal because these days most transmitters are built to work into a coaxial line.

Using the Coupler

To make the tune-up of the coupler easier, a table is given that shows the tap points for the various bands with antennas up to 100 feet in length. There might be a slight variation in the tap position with the lengths given because of different ground conditions, surrounding objects,

(Continued on page 170)

[1] Made by Illumitronic Engineering, Sunnyvale, Calif.



The coil is mounted on the stand-offs by wrapping the ends of coil around the screws and tightening the nuts. The wire size is large enough to furnish sufficient rigidity for this type mounting.

How To Tune In A.M. 'Phone

Using the Crystal Filter to Best Advantage

BY GEORGE GRAMMER, W1DF

• Although the receiving method described here has been around a long time, only a few of the more cagey 'phone operators have been taking advantage of it. It doesn't cost anything to give it a try.

FROM contacts with amateur groups in various parts of the country it is evident that comparatively few operators are aware of the potentialities for better 'phone reception inherent in a receiver of ordinary design. The "conventional" method of reception, in which a.v.c. has the dominating role, requires little or no skill on the part of the receiving operator; it is hardly more than "BCL-type" tuning. But the amateur who is willing to exert a little effort will be surprised at how much can be done to reduce interference in a.m. 'phone reception, by using more advanced tuning techniques that utilize the possibilities built into any good-grade communications receiver.

The kind of receiver we're talking about is one that has reasonably good frequency stability and a garden-variety crystal filter. Receivers that meet these specifications have been on the market for the past two decades.

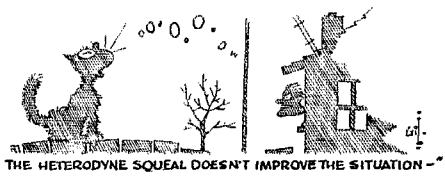
Carriers and A.V.C.

Although there is always a lot of talk about sidebands, two real villains in the QRM act usually get by unsuspected. Acting hand in glove to circumvent the selectivity built into the receiver, these two are the carrier of the a.m. signal and the a.v.c. system of the receiver. It

"TWO REAL VILLAINS IN THE QRM ACT USUALLY GET BY UNSUSPECTED"

happens, unfortunately, that they are sacred to some of the a.m. population, and since any real improvement in selective reception (with the class of receiver we have in mind) will hinge on getting rid of both of them, we can probably say farewell to a portion of the audience right now.

However, those that are left probably will be interested to know why the carrier and a.v.c. are being put on the spot. It's pretty largely tied up with the process of detecting an a.m. signal. The familiar type of a.m. detector — a diode, usually — is a "linear" rectifier which gives a varying d.c. output that reproduces the modulation envelope of the incoming signal. This is fine when only the desired signal gets through the selective circuits of the receiver to actuate the detector. Conditions are not always so ideal, though, and very often an interfering signal will be close enough to the desired one to get through, too. Now detectors of this type have the peculiarity that when more than one carrier is present the strongest one tends to suppress the modulation on the weaker ones. If the desired signal happens to be one of the weaker ones, the interfering signal "takes over." In this it is abetted by the a.v.c. action of the receiver, which will respond to the strongest carrier present at the a.v.c. rectifier and reduce the r.f. gain accordingly, thus pushing the desired signal farther down into the background. The heterodyne squeal that accompanies this doesn't improve the situation, either.

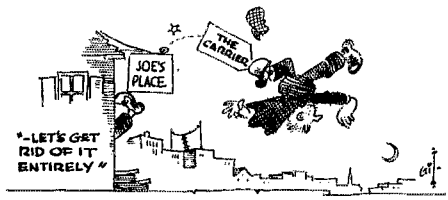

"THE HETERODYNE SQUEAL DOESN'T IMPROVE THE SITUATION—"

There is an obvious remedy: Don't let any undesired carrier ever get stronger at the detector than the desired one. This simply requires high enough selectivity. But as the selectivity is increased — and it has to be quite high when the carriers are separated by only a couple of hundred cycles — the sidebands of the desired signal become more and more attenuated. Sufficient selectivity to take care of practical cases of interference not only greatly reduces the audio output of the detector but concentrates what is left in the low audio region, so speech becomes "drummy" and loses intelligibility. That is just what happens when the crystal filter is advanced notch by notch to increase selectivity to take care of bad QRM. This method of coping with the situation, although universally practiced, leaves a lot to be desired.

Another approach is that of "exalting" the desired carrier; that is, using a high-selectivity channel to amplify the carrier only — using many times the amplification given the entire signal, which is handled by a second channel of sufficient width to pass the sidebands. The much-amplified carrier is then combined with the sidebands in the final detector. This works well but takes a rather elaborate receiving set-up, and is out of the question with our standard communications receiver. (Actually, a form of exalted-carrier reception *is* possible with an ordinary crystal filter if its sharpest position is really

sharp. However, it imposes such severe stability requirements that it is not very practical with most receivers, and in addition the audio output from the detector is very much below normal. Those who are interested can find the method described in *QST* several years ago.[1])

However, there is still another method. The essentials of it are in everyday use, but not often for a.m. reception. The basic idea is simple: If there is no easy way to exalt the incoming desired carrier without introducing some other undesirable effects, then let's get rid of the carrier entirely. It serves only two purposes in reception: to provide a steady frequency against which the sideband frequencies can beat and



thus produce the audio output, and to actuate the a.v.c. system. The former is a necessity and the latter is merely a convenience. But *any* steady r.f. voltage of the same frequency as the carrier will serve equally well in place of the actual carrier for detection purposes.

Certain conditions must be met. The substitute carrier must be at least as strong, at the detector, as the original carrier; otherwise there will be distortion because the detected signal will be overmodulated. However, this is taken care of automatically since the whole purpose of substituting a locally-generated carrier is to get one *much* stronger than any carrier that might be tuned in. The other condition is that, if both sidebands are passed through the receiver's selective system to the detector, the substitute carrier must have the same phase as the original carrier. This would be so difficult to accomplish (and maintain) that the whole scheme would be impractical, if accomplishing it were actually necessary. Fortunately, it isn't. The phase requirement, and much of the stability requirement along with it, disappears if one of the incoming signal's sidebands is eliminated along with the carrier.

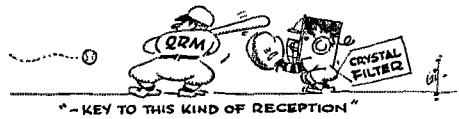
In other words, the a.m. signal is turned into an s.s.b. signal before detection. Yes, it requires much the same sort of tuning that a real s.s.b. signal does — strong medicine for some to swallow, no doubt, but it provides a real answer to the selectivity problem. Actually, the tuning is easier than with pure s.s.b., as will be seen.

In eliminating the carrier, a.v.c. operation is also automatically eliminated in practically all receivers of the type under consideration. It could be restored (at least in some cases) if it seemed worth while, by a revision of the i.f. system. It isn't essential.

[1] Grammer, "House-cleaning the Low-Frequency 'Phone Bands," *QST*, May, 1947.

A.M. into S.S.B.

The key to this kind of reception is the crystal filter. It has a type of selectivity that is very well suited both to carrier rejection and selection of



one sideband. A fairly broad setting of the filter selectivity control is capable of handling most interference. Fig. 1 is typical of the response curve of a crystal filter and i.f. amplifier at such a selectivity setting. The frequency scale is plotted a little differently than is usual, in that the frequency is in terms of departure from the frequency at which the phasing notch is set. The incoming carrier is eliminated by dropping it into the phasing notch; by this means it can be attenuated some 40 db. or more below the amplitude it would normally have at the second detector.

The notch is always offset from the peak frequency of the crystal (should the phasing control be set to neutralize the holder capacitance exactly, the notch will disappear and the reso-

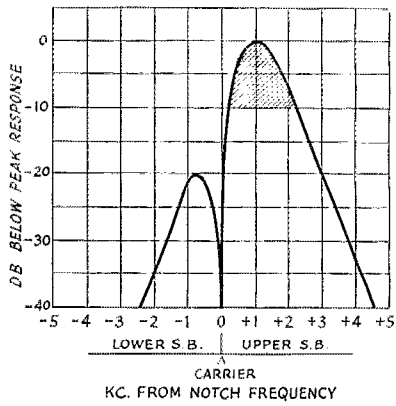


Fig. 1 — This is typical of the relative response of a crystal filter, with its associated i.f. amplifier, at a moderately broad selectivity setting, with the phasing notch set 1 kc. off the filter peak on the low-frequency side. The useful response band of the filter is about as shown by the shaded region. If an a.m. signal is tuned so its carrier is exactly in the notch, the lower sideband is attenuated a minimum of about 20 db. as compared with the upper sideband, and the signal becomes essentially a single-sideband one.

nance curve will be practically symmetrical about the peak frequency) and this is responsible for the fact that the response on one side of the notch is many decibels below the response on the other side. In the figure, the attenuated side is the low-frequency side and the pass-band is on the high-frequency side of the notch. This state of affairs can be reversed by adjustment of the phasing control. It is also possible to change the frequency separation between the notch and the peak, as indicated in Fig. 2, again by adjustment

of the phasing control. None of this is news to those who have made a point of observing what happens when the filter controls are manipulated. Many have not, however, and it helps to know how the filter operates when using it for the type of reception under consideration.

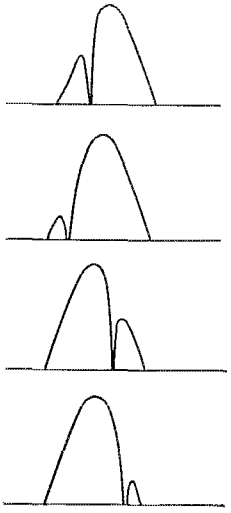


Fig. 2 — Illustrating the way in which the phasing notch can be moved with respect to the peak response frequency of the filter.

Suppose the selectivity curve is as shown in Fig. 1. Tuning in a signal is the same thing as moving it across the selectivity curve. At one setting of the tuning control, the carrier will drop down into the notch. This lets the upper (at i.f.) sideband on the signal pass through, but greatly attenuates the lower sideband. Essentially, we now have a single-sideband suppressed-carrier signal at the second detector, although it is a normal a.m. signal at the crystal-filter input. Thus the first step is accomplished.

The only thing remaining is to supply a substitute for the original carrier. Most readers will be way ahead of us by this time — the b.f.o., of course. Its frequency is simply adjusted to be the the same as that of the rejected carrier — to the identical frequency at which the phasing notch is set, in other words. The b.f.o. supplies a constant r.f. voltage to the second detector, a voltage that can always be made much larger than that of any incoming carrier. The simplest way to maintain this voltage relationship is to keep the r.f. gain down, by means of the manual gain control, with the a.v.c. off. Any loss in audio volume can be regained by opening up the audio gain control. In fact, the *best* way to operate is with the audio gain full on and the r.f. gain cut back to give a comfortable level of audio output. Best, that is, if you have a receiver that doesn't get noisy when operated this way. More later on this point.

Voice Frequency Response

A commonly-voiced objection to the crystal filter for 'phone reception is that it is "boomy" or "drummy" or "doesn't sound natural." This is because the selectivity is such that, as used in conventional reception, the higher-frequency components in the sidebands are badly cut. "Normal" reception places the incoming carrier on the peak of the selectivity curve, so if the curve has a useful width of, say, 1500 cycles, both sidebands suffer undesirably high attenuation above 750 cycles.

With the method of reception just described, the same selectivity can be used to make the signal sound normal, tinny, or almost anything you like. In the first place, the a.f. output from the detector has the same bandwidth as the selectivity curve, not half of it as in double-sideband reception. Thus the identical r.f. selectivity gives twice the audio bandwidth. In the second place, the available bandwidth can be placed in practically any desired section of the a.f. spectrum. Suppose that the shaded area in Fig. 1 represents the useful bandwidth. As shown, it lies between about 200 cycles and 2200 cycles from the phasing notch, so the audio output from the detector would be concentrated in the band between 200 and 2200 cycles. If more emphasis on the higher frequencies were wanted (to get better differentiation between those Ss and Fs) the phasing notch could be moved to a lower frequency — say 500 cycles lower — and the principal audio output would be shifted to the band 700-2700 cycles. (This would require resetting the b.f.o. to the new notch frequency, of course, as well as slightly different tuning of the signal).

In other words, you can put the emphasis on whatever a.f. region you prefer, simply by choice of the phasing-notch frequency. The actual width of the a.f. band can be changed, too, by changing the selectivity setting of the filter. In fact, the selectivity can be changed without changing the character of the voice particularly, since the peak stays at almost the same frequency regardless of the selectivity. As compared with the loss of "highs" with increasing selectivity in conventional reception, this scheme is more like going from a console radio to the midget variety. The midget doesn't lose any intelligibility for you, and neither does rather high selectivity with this variety of s.s.b. reception.

Setting Up and Tuning

Proper setting up may be a little tricky at first trial, but isn't really hard. A reasonable start can be made by choosing to put the peak of the a.f. response at about 1000 cycles. Using a moderately-selective setting (about No. 2 position on most filters) adjust the controls as you would for c.w. reception — a.f. gain high, r.f. gain down, b.f.o. on, a.v.c. off. Tune in a steady carrier (preferably unmodulated) and peak it to the filter, and then set the b.f.o. for a 500-cycle beat note. (If you don't recognize a 500-cycle tone, listen to WWV for a few minutes and then split the difference between the 440- and 600-cycle tones WWV transmits in alternate five-minute periods.) Then tune the signal through zero beat to the other side — with the main tuning control, not the b.f.o. — and set the phasing control to eliminate this "a.f. image." This places the

phasing notch 1000 cycles away from the peak response frequency of the filter.

Now leave the tuning control alone and adjust the b.f.o. control to zero beat. Since the incoming carrier is practically eliminated in the phasing notch, the beat note will be quite weak. However, careful listening will allow you to set the b.f.o. control properly — or, if you like, make a note of the exact setting of the phasing control and then move it off enough to let you hear the b.f.o. go through zero beat; after the b.f.o. is set, move the phasing control back to the right setting.

That's all there is to the initial set-up. At this stage it is well to try out the receiver on an a.m. signal. As you tune through an a.m. band you will hear heterodynes against the b.f.o., naturally, but they are strong only on one side of zero beat; the crystal filter rejects them pretty well on the other side. As you come into exact zero beat on a signal the single-sideband "monkey chatter" clears up and you have a perfectly normal-sounding 'phone signal. The fact that you can hear the incoming carrier go into zero beat is a big help in tuning; zero beat is your "tuning indicator." Even though the a.m. signal has been converted into a pretty good s.s.b signal, it is easier to tune in, on account of the presence of the carrier, than a regular carrierless s.s.b. signal; tuning a.m. signals by this method is good practice for those who have difficulty with s.s.b. reception.

After listening to some signals you may decide that you would prefer shifting the a.f. band either higher or lower; maybe your pals don't sound quite like themselves with the a.f. band centered at 1000 cycles. Such a shift is easy. To get more "highs," go through the set-up procedure again but start out with an initial beat note higher than 500 cycles; to get more "lows," start with a lower beat note. Following through the set-up procedure will result in moving the phasing notch and final b.f.o. setting farther from or closer to the filter peak, which corresponds with moving an audio bandpass of fixed width up or down the a.f. spectrum. You can put the audio band where you want it — something you can't do with the "conventional" reception method.

Interference

The effects of interference are considerably different with reception of this type as compared with detection using the incoming carrier. A strong interfering carrier will never "capture" the detector, providing the b.f.o. voltage is large compared with all incoming signals. Interference that falls in the rejected sideband region is of course highly attenuated, a normal consequence of the selectivity. Some of the side frequencies from a signal in the rejected sideband may fall inside the passband of the receiver but they will not be intelligible; their carrier is gone and the only one they can beat with to produce audio output is the b.f.o. Since this is on a different frequency, the effect is quite similar to that from a mistuned s.s.b. signal — noise and crackles, but nothing that can be understood. This is also true of sidebands associated with an interfering carrier that falls *inside* the passband — beating against the b.f.o., they make only monkey chatter and tend to be suppressed by the strong b.f.o. signal. Thus the tables are turned on the interfering carrier that is stronger than the desired one.

Converting all undesired sidebands into monkey chatter means, in practice, that interference can be quite strong before it seriously degrades the desired signal. The mind is highly capable of ignoring noises of this kind and concentrating on the intelligible voice of the desired signal — much more so than if interference of the same intensity were also intelligible. Clear copy is readily possible under conditions where the desired signal would be washed out with normal-type reception.

The heterodyne from an undesired carrier falling in the passband is, of course, an important factor, although here again it simply adds a noise and does not otherwise affect the desired voice. Heterodynes can be attacked in a couple of ways. One is to use an adjustable rejection system of high selectivity, either at audio as in the "Selectoject" or "Hetrofil" or at i.f. as in the "Q Multiplier." These devices are not normally included in receivers, but can be added without too much trouble. The other is to arrange things so that either sideband of the desired signal can be selected, thus making it possible to place an interfering carrier in the rejected-sideband region; i.e., selectable-sideband reception. This means moving the phasing notch from one side to the other of the filter peak, as indicated in Fig. 2. Since this necessitates resetting the b.f.o. frequency and retuning to move the incoming carrier into the notch, it is not well adapted to quick change from one sideband to the other. This is unfortunate, but instantaneous selection requires a specialized system. With an ordinary receiver, the best that can be done is to mark the proper settings of the phasing and b.f.o. controls, or switch in padding capacitors that accomplish the same result.

Receiver Modifications

We have been talking about a method of tuning, not a circuit, and using the method doesn't necessitate any changes in your receiver. However, the performance of particular receivers may leave something to be desired in a couple of respects. One is the behavior of the manual r.f. gain which was hinted at earlier. When the overall gain is changed by means of the r.f. rather than the audio gain control there should be no change in the signal-to-noise ratio of the receiver. Nevertheless, with many receivers the signal will tend to disappear into noise as the r.f. gain is turned down, instead of both noise and signal being reduced together.

This can almost always be traced to the fact that the manual gain control operates on the first tube in the receiver. If the gain of the first tube is cut far down there is still noise generated in the plate circuit of this tube to be amplified in subsequent stages. Likewise there is noise gener-

(Continued on page 172)

Multiband L Matching Network

Wide-Range Matching by Capacitance Variation

BY R. W. JOHNSON,* W6MUR

• Making use of the reactance-variation characteristics of series- and parallel-tuned circuits as the frequency is varied provides the means for impedance matching over a wide range of frequencies without changing inductance. The tank circuit described in this article covers two bands with capacitive tuning only. Design information covering practical amateur applications is given.

VARIOUS forms of *T*, pi and *L* matching networks are becoming very popular in amateur transmitters, because of the relative ease with which coupling can be adjusted, and because of good harmonic attenuation for TVI reduction. For work on more than one band, however, it is usually necessary to vary inductance as well as capacitance in the usual circuits. This leads to tapped coils, roller coils or plug-in coils when more than one band is to be covered. This article describes a two-band *L* matching network, patterned on the principles of the multiband tuner.[1] This *L* network requires varying only two capacitors to achieve a match to a similar load on each band.

An *L* matching network can be of two forms, as shown in Fig. 1. Either shunt *L* and series *C* can be used as in Fig. 1A, or shunt *C* and series *L* can be used as in Fig. 1B. Each reactance of Fig. 1 is uniquely defined by the specified matching conditions, according to the relations shown in the figure, which apply for resistive loads. These relations are well known and can be easily derived.

* 1202 Avoca Ave., Pasadena 2, Calif.

[1] Johnson, R. W., "Multiband Tuning Circuits," *QST*, July, 1954.

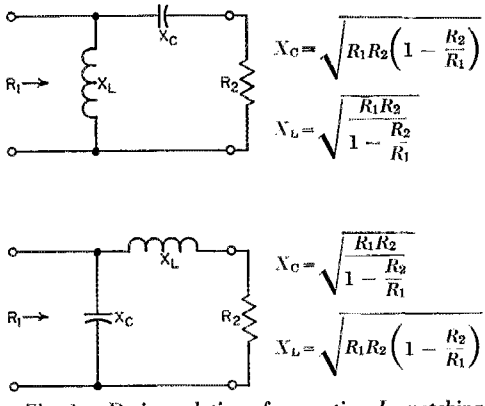


Fig. 1 — Design relations for reactive *L* matching networks.

Now if the series arm is replaced by a series-tuned circuit and the shunt arm is replaced by a parallel-tuned circuit, the circuit would be that of Fig. 2. If we choose both the series-resonant frequency of the series arm and the antiresonant frequency of the shunt arm to lie between the lowest and highest desired matching frequencies f_A and f_B, respectively, then at frequency f_A the circuit will be equivalent to that of Fig. 1A, and at frequency f_B it will be equivalent to Fig. 1B. This is because a series-tuned circuit is capacitive below its resonant frequency and inductive above it, and the parallel-tuned circuit is just the opposite. Thus, if we properly proportion the circuit reactances in Fig. 2, we can achieve a resistive impedance match at both frequencies f_A and f_B.

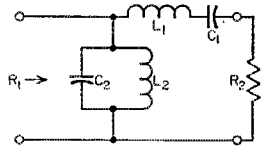


Fig. 2 — Two-band reactive *L* matching network.

The desired matching condition could be realized simultaneously at the two frequencies f_A and f_B, but this would be undesirable because of harmonic response, since f_A and f_B are harmonically related in amateur applications. Therefore, we need to adjust the circuit constants so that the two capacitors of Fig. 2 can each be varied by a specified amount when changing from one band to another. In the relations to be given, we will let the capacitances at frequency f_A be C_{1A} and C_{2A}, and at frequency f_B, C_{1B} and C_{2B}, respectively. For convenience, we will assume that each capacitor is varied by the same ratio when going from f_A to f_B; that is, $C_{1A}/C_{1B} = C_{2A}/C_{2B}$. We will also make the following assumptions:

1) The load impedance R_2 is a pure resistance at both frequencies f_A and f_B. This assumption is valid if there is a low v.s.w.r. on the feedline, or if the feedline is a resonant length and is connected to a broadly resonant antenna such as a dipole. Where the assumption is not valid — that is, where there is reactance present in the load — then C_1 can be varied to tune out reactance within limits, or an additional coil or capacitor can be added in shunt or in series with the load so as to make it resistive.

2) The load impedance R_2 is the *same* at both frequencies f_A and f_B. This assumption is also reasonable, especially when coaxial cable is used

for each antenna on each of the two given bands. Many amateurs use a vertical on the lower bands, matched to a 50-ohm coax, and a beam on the higher bands, also matched to a 50-ohm coax. The circuit can be analyzed for the general case, of course, but the result is not as simple as that given here. For convenience, we will define the following relations:

$$R_m = \sqrt{R_1 R_2}$$

$$s = \sqrt{1 - R_2/R_1}$$

$$k = \frac{f_A}{f_B} \quad (>1) \qquad (1)$$

and $$a = \frac{C_{2A}}{C_{2B}} = \frac{C_{1A}}{C_{1B}} \quad (>1)$$

Under the above assumptions and with the parameters defined in Equation (1), the necessary reactances *at the lowest frequency*, f_A, are given exactly by

$$X_{L1} = R_m s \left(\frac{a + k}{k^2 - a}\right) \qquad (2)$$

$$X_{C1} = R_m s k \left(\frac{1 + k}{k^2 - a}\right) \qquad (3)$$

$$X_{L2} = \frac{R_m}{sk} \left(\frac{k^2 - a}{a + k}\right) \qquad (4)$$

$$X_{C2} = \frac{R_m}{as} \left(\frac{k^2 - a}{1 + k}\right) \qquad (5)$$

Also from the above relations,

$$X_{L1} X_{L2} = \frac{R_m^2}{k} \qquad (6)$$

$$X_{C1} X_{C2} = \frac{R_m^2 k}{a} \qquad (7)$$

The latter two relations are convenient when rearranging values to fit components on hand.

For most applications the transformation ratio R_1/R_2 is much greater than 10, so that the quantity s in Equations (1) through (5) is very closely unity. R_m is, of course, the geometric mean between impedances to be matched, and k will normally be an integer, such as 2, 3 or 4 for amateur work where bands are harmonically related. The quantity a is chosen arbitrarily, within the limits of available tuning range of capacitors, and can be adjusted to fit particular components on hand. Choice of $a = 1.5$, $s = 1$ and $k = 2$, for example, gives from Equations (2) through (5):

$$X_{L1} = 1.4R_m \qquad (2a)$$
$$X_{C1} = 2.4R_m \qquad (3a)$$
$$X_{L2} = 0.357R_m \qquad (4a)$$
$$X_{C2} = 0.556R_m \qquad (5a)$$

which are the values of reactance, at the lowest frequency f_A, in terms of the geometric mean of impedances to be matched, and for two adjacent amateur bands harmonically related by 2:1.

Curves of the four relations of Equations (2) through (5) are given in Figs. 3, 4, and 5 for three values of k. To design the circuit, it is

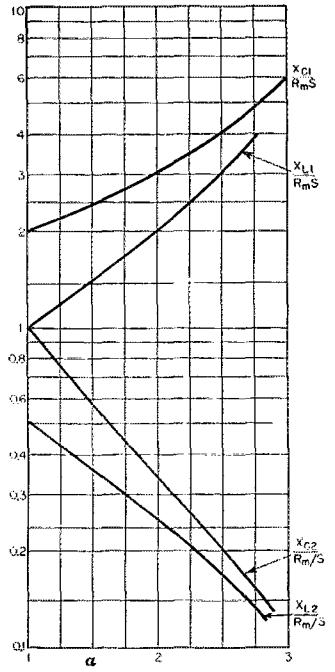


Fig. 3 — Reactance values at f_A as a function of a, for $f_B/f_A = 2$.

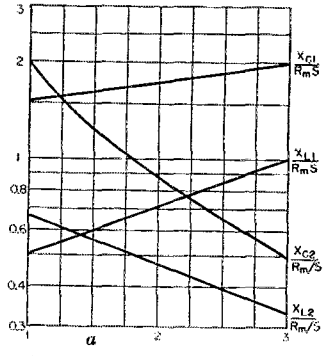


Fig. 4 — Reactance values at f_A as a function of a, for $f_B/f_A = 3$.

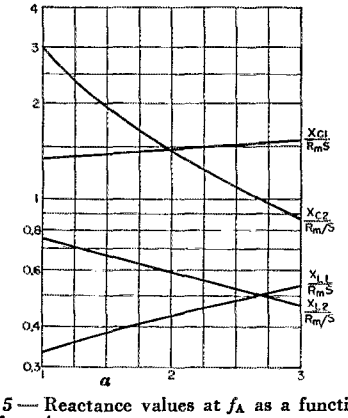


Fig. 5 — Reactance values at f_A as a function of a, for $f_B/f_A = 4$.

only necessary to choose a value of a, the desired capacitance tuning ratio, read off the values from the curves, and multiply these values by the desired value of $R_m s$ or R_m/s, which both are very closely the geometric mean between R_2 and R_1 for most applications.

Spurious Responses

It was mentioned earlier that it is desirable to vary the capacitors between bands in order to avoid harmonic response problems. While it is possible to determine the spurious responses of the circuit with a fixed value of R_2, and choose the value of a so as to avoid these responses (that is, keep them from being harmonically related to either f_A or f_B), this analysis would mean little in the practical case. This is because the load impedance is *not* a pure resistance R_2, except possibly at the harmonics themselves, because of the fact that an antenna and feedline comprise the load. Therefore, it is better to choose the value of a arbitrarily, within limits, and determine in the actual case with an absorption wavemeter or field strength meter whether or not the harmonic output is excessive. Tests with this circuit have shown that as long as the tuning ratio a is greater than about 1.3, the spurious responses will not be harmonically related to either f_A or f_B for the most commonly used antennas.

A Design Example

Suppose we wish to match a parallel 813 final amplifier to a 50-ohm load, which load is resistive and the same on two bands: 3.5 and 7.0 Mc. Suppose we wish to operate the tubes at 2000 volts plate voltage and 400 ma. plate current. We should then have a load resistance of about $2000/(2 \times 0.4) = 2500$ ohms. The transformation ratio $R_1/R_2 = 2500/50 = 50$, so that parameter s in Equation (1) is very closely unity. The geometric mean between 2500 and 50 is $R_m = \sqrt{2500 \times 50} = 354$ ohms, and $k = 7/3.5 = 2$. We will choose $a = 1.6$ to insure that spurious response is well away from harmonics. From Fig. 3 (for $k = 2$) at $a = 1.6$, we find

$$\frac{X_{L1}}{R_m s} = 1.5$$

$$\frac{X_{C1}}{R_m s} = 2.5$$

$$\frac{X_{L2}}{R_m/s} = 0.34$$

$$\frac{X_{C2}}{R_m/s} = 0.50$$

Since $R_m = 354$ ohms and $s = 1$, then

$X_{L1} = 1.5 \times 354 = 531$ ohms
$X_{C1} = 2.5 \times 354 = 885$ ohms
$X_{L2} = 0.33 \times 354 = 117$ ohms
$X_{C2} = 0.50 \times 354 = 177$ ohms

which are the reactance values at the lowest frequency of 3.5 Mc. The corresponding values of inductance and capacitance are then

$L_1 = 24.1$ μh.
$C_{1A} = 51$ $\mu\mu$f.
$L_2 = 5.3$ μh.
$C_{2A} = 256$ $\mu\mu$f.

At the higher frequency, 7.0 Mc., since $a = 1.6$ by choice, $C_{1B} = 51/1.6 = 31.9$ $\mu\mu$f., and $C_{2B} = 256/1.6 = 160$ $\mu\mu$f. So for C_1 we would choose a capacitor tuning from about 30–50 $\mu\mu$f. and for C_2 a capacitor tuning from about 150–250 $\mu\mu$f. (the latter could be 100 $\mu\mu$f. variable with 150 $\mu\mu$f. of fixed capacitance across it). The complete circuit would be as shown in Fig. 6.

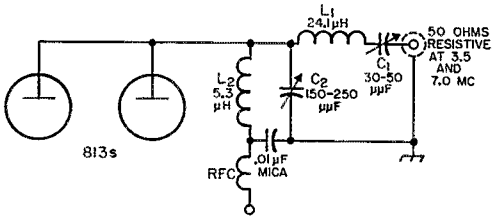


Fig. 6 — Circuit of a two-band L matching network for 2500- to 50-ohm transformation at 3.5 and 7 Mc.

As is evident from Fig. 6, this circuit has one additional advantage over the customary pi network, that being a high-quality r.f. choke is not required, and series feed can be used. For other bands, such as 14, 21 and 28 Mc., the design procedure would be the same, requiring a change in coils and capacitor settings if more than two bands are to be covered for the same load impedance.

This circuit is by no means a universal replacement for pi or coupled circuits when very high transformation ratios are to be handled. Whenever the geometric mean between R_1 and R_2 is high, it will be found that L_1 becomes quite large and C_1 quite small, so that this circuit is not ideal for all matching problems. It can be used in many transmitters, however, where transformation ratios are not too high and reactance in the load is not too severe. Theoretically, it is possible to gang C_1 and C_2, but this would preclude tuning out reactance in the load such as inevitably appears in varying degree, and still maintain an optimum match, so it is recommended that C_1 and C_2 be left as separate controls. As with most pi networks, the best tuning procedure is that which uses antenna current (output) as a basis for tuning, although the circuit given here is not difficult to tune using only plate current as an indicator. A current dip at resonance will be found as C_2 is varied.

The same principle used here can be applied to other arrangements of matching networks, such as the pi, but the number of components required becomes high (3 coils and 3 capacitors), and this disadvantage is not offset by the increased advantages obtained, such as the ability to handle a wider variation in load reactance. It is also possible to have a parallel-resonant circuit for the series arm and a series-resonant circuit for the shunt arm, for which the design relations are quite similar.

25 Years Ago
this month

December 1930

. . . An editorial in the issue declares: "We have a birthday! Fifteen years ago this month, when the American Radio Relay League was only a year and a half old, the first issue of *QST* was brought out. Published by Hiram Percy Maxim and Clarence D. Tuska, the founders of the League, in response to a need which had been found for some sort of regular bulletin, its object was 'To help maintain the organization of the ARRL and to keep the amateur wireless operators of the country in constant touch with each other.' That has been its policy ever since."

. . . Clinton B. DeSoto, in an article titled "Amateur Radio at Eastern States Exposition," reveals that the call W1ESE derived its initials and its existence from the Exposition. The station, which was a part of an extensive program of coöperation between Junior Achievement, Inc., and the ARRL, was set up in a booth in Junior Achievement Hall, on the exposition grounds at West Springfield, Mass. Heard by many amateurs, the call was never listed in any call book.

. . . The Doublet Antenna, particularly a Hertz antenna with two-wire matched impedance feed, is described in detail by Clyde J. Houldson, W1KP. Mr. Houldson's article is written for the benefit of amateurs who experienced difficulty in coupling their push-pull transmitters to Hertz antennas that were generally used and which really loaded each tube equally, creating an ideal condition.

. . . Listed in "Who's Who in Amateur Wireless": Allen H. Babcock, Consulting Electrical Engineer of the Southern Pacific Company with offices in San Francisco, who is the director of the Pacific Division of the ARRL; he was first elected to the League's board in 1923. Also, Louis R. Huber, retiring director of the League's Midwest Division, whose start in radio came at the age of eight by gathering bits of wire while the telephone men were at lunch. He is said to have been the owner of a one-half-inch spark coil at the age of ten.

. . . Solving many an amateur's problem, C. W. Klenk, W9AAU-W9ZK, presents an article on "A New Type of Crystal Holder" in which he describes difficulties experienced in finding a suitable device to hold a crystal properly and at the same time allow for the changing of crystals by the plug-in method. Klenk's article states that "nothing on the market was found to be quite satisfactory."

1955 DX CONTEST CORRECTION

In connection with the results of the 21st ARRL DX Contest (October *QST*), a question of certain evidence in the cited disqualifications of W3ALB and W6BYB was brought under review. Accordingly, we are now happy to announce withdrawal of these disqualifications. In W3ALB's case, this fine multioperator score should be considered added to the Eastern Pennsylvania 'phone tabulations: W3ALB (W3s ALB JNQ) 105,732-132-267-C-75. Note also that this raises the official aggregate of Frankford Radio Club from 3,753,930 to 3,859,662. W6BYB, with a single-operator score of 21,216-52-136-C-52, becomes San Francisco 'phone winner, and the Northern California DX Club total becomes 1,867,111 points. Our sincere apologies to all concerned.

• *Technical Correspondence*—

TRANSISTOR DX AND TWO-WAY QSOs

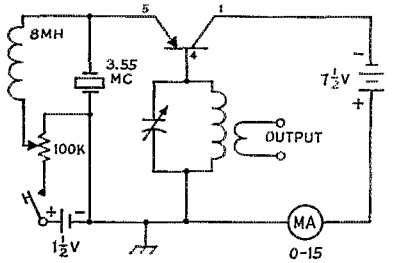
345 N. Fullerton Ave.
Upper Montclair, N. J.,

Technical Editor, *QST:*

. . . I threw together the few parts that make up the transistor circuit shown by W7UUZ in October *QST* and gave it a try on 80 Monday morning, Oct. 10th. My first transistor contact was W1QGU, Keith Henney, at Snowville, N. H., a distance of 266 miles, using a power input to the collector element of 30 milliwatts: $-7\frac{1}{2}$ volts on the collector at 4 ma. Transistor was a Raytheon PNP type 2N113 (CK-761). Interestingly enough, this transistor crystal-controlled signal was copied farther north by W1BB at Harrington, Maine, 430 miles from Upper Montclair.

On Oct. 16th I had contact with W2PEO while running the high power of 30 milliwatts input to my transistor, and he was putting 20 mw. to his which, by the way, is a unit similar to mine. He reported my signals 559; however, I was hearing him about 50 per cent copy due to QRM and being rockbound. By repeating, I was able to get everything. He was crystal-controlled on 3538 and I was on 3556 kc. W2PEO has had a QSO with W8MIS in Grafton, W. Va., some 350 miles away.

2N113 (CK-761)



The enclosed circuit differs from the original in the new location of the key. By placing the key in series with the small 1½-volt penlite cell, there is zero current drawn from the cell when the key is up and no current drawn in the collector circuit. Keying is also slightly improved with regard to thumps (which were small, anyway).

— *Charles Atwater, W2JN*

Silent Keys

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

W1WCF, Victor Johnson, Providence, R. I.
W2VOD, Burnham Sheedy, Saranac Lake, N. Y.
W2WBH, Arthur Worsnop, Boulder Creek, Calif.
W3IS, John T. Lamore, Haddonfield, N. J.
W3PPL, Mike Rabelyn, Cheswick, Pa.
WN3DIJ, Vaughn W. Young, Brady, Pa.
W4HSZ, George A. Hoffman, Fort Meyers, Fla.
W5FVN, Eldon Garrison, Perryton, Texas
W5IUU, Howard L. Jeter, Del Rio, Texas
W5LSN, Oscar J. Spetter, Dallas, Texas
W6TV, Burton R. Cole, Fresno, Calif.
W7FIT, Raymond T. Corey, Spokane, Wash.
W7GUX, Michael L. Conors, Sheridan, Wyo.
W7GVT, Arthur J. Stimson, Nine Mills Falls, Wash.
W7WL, Frank Bernhardt, North Bend, Ore.
W9UKH, Henry J. Neilson, Rock Island, Ill.
WØDK, Hurlburt Anderson, sr., Boulder, Colo.
WØLXG, Merton A. Countryman, Ames, Iowa
DL1VT, Werner Haage, Jahren, Germany
VK2DG, Keith Rudkin, East Maitland, N. S. W.

• Recent Equipment —

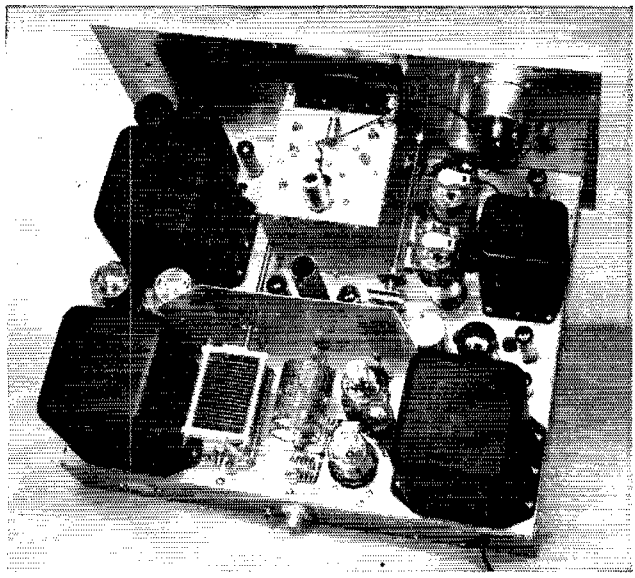
The Heath DX-100 Transmitter

THE POLICY on reviews of new equipment in *QST* is like Joe Friday's. "All we want are the facts." The reviewer's job is to present demonstrable facts and, to the best of his ability, keep his opinion out of the article. This is a nice idea when the subject for discussion is a factory-built product, but what does the poor guy do when the subject for discussion is a kit? In a kit the manufacturer assumes responsibility for the design and for the completeness of the parts and the instructions; if the thing doesn't work when you're finished it obviously isn't his fault, unless the kit is a dud. Well, rest assured; the DX-100 is no dud — there are too many of them on the air for that.

The manufacturer rates the power output of the D-X100 at 100–125 watts on 'phone and 125 watts on c.w. When you buy the DX-100 you don't get a transmitter, you get a kit. At home you add time and elbow grease and attention to details and, barring errors, you wind up with the transmitter. These ingredients you add at home.

But let's get on with the report. The block diagram of Fig. 1 spells out the tube line-up much better than a mess of verbiage. The output stage in the DX-100 is a pair of 6146s running in parallel, with a pi-network circuit that has enough range to handle nonreactive loads from 50 to 600 ohms over the transmitter's ham-band range of 160 to 10 meters (including 11 meters). The inductance is switched, and the input and output capacitors are variable. For a.m. 'phone the 6146s are modulated by a pair of AB_2 1625s, and a 6AQ5 clamp tube holds the screen voltage down when there is no excitation. The r.f. drive is furnished by a 5763 that has a variable screen-voltage control for adjusting the drive on the final to the correct value. For spot-frequency or Novice operation (at reduced power, of course) there are four crystal sockets and a crystal switch in the 12BY7 oscillator-buffer circuit. In a fifth position the crystal switch cuts in the 6AU6 VFO. On c.w. the VFO and buffer are cathode-keyed — bias on the 5763 grid and the 6AQ5 clamp tube in the 6146 screens holds down the no-excitation plate current in the following stages. In general, the circuitry is standard, and the all-band operation with adequate drive and only four stages is possible because the VFO works on 160 meters for the two low-frequency bands and on 40 meters for the others. Frequency multiplication is thus held down to a maximum of 4 times. The screen voltage of the VFO is regulated by a 0A2.

In the audio, the 12BY7 is transformer-coupled to the grids of the 1625s, and the speech amplifier is a resistance-coupled 12AX7. According to the instruction book, small coupling capacitors in the speech amplifier and the 0.02-μf. capacitor across the modulation transformer secondary restrict the major response of the audio system to 250 to 3000 cycles. The 1625 modulators have fixed bias and are driven into Class AB_2 operation, but 1000-ohm resistors in series with the grids limit the drive and tend to prevent over-modulation.



Top view of the DX-100 removed from its case. The box at the center of the panel houses the VFO unit; the modulator tubes and transformer are to its right. The r.f. buffer and driver stages are between the VFO and the baffle shield, and the output stage is at the center foreground.

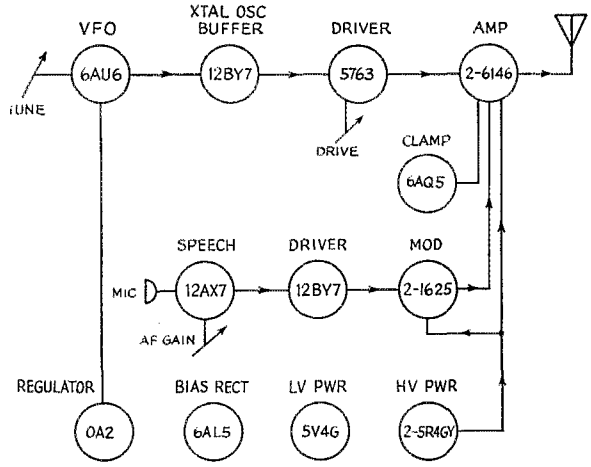


Fig. 1 — A block diagram of the DX-100 transmitter. This 'phone/c.w. bandswitching transmitter operates in all of the amateur bands 160 through 10 meters, with VFO or crystal control.

A measure of high-level speech-clipping is obtained by a turns ratio in the modulation transformer that presents a higher than optimum load to the modulator tubes. The 0.02-μf. capacitor across the secondary by-passes the high-frequency products of speech clipping and holds down the splatter. A low-impedance tap on the secondary of the modulation transformer makes it possible to use the audio power to drive a higher-powered modulator.

Panel controls on the DX-100 include the VFO, Driver and Amplifier tuning, as well as the Loading control of the pi network. There are coarse and fine adjustments on the Loading control: an outer knob switches in fixed capacitors in various combinations, and an inner knob turns a variable capacitor for fine adjustment. This concentric control helps a lot to reduce panel crowding. Concentric controls are also used for the Drive (5763 screen) pot and the Crystal-VFO switch. The remaining control on the panel is Audio Gain. Panel switches include the Band switch, Power on, Plate on, CW-Phone, and the Meter switch. The Meter switch has five positions: driver plate current, final grid current, final plate (and screen) current, modulator plate current, and high voltage. The microphone and key jacks round out the panel, together with the VFO dial light that goes on with the Power switch and a red lamp that lights when the high voltage is switched on by the Plate switch.

The VFO scale is printed on celluloid and back-lighted through a green celluloid shield. A saw slot in the shield passes a thin line of light that provides a no-parallax index on the scale. The drive for the VFO is rim drive on the scale. To avoid crowding of the scale, the 160-meter band and corresponding harmonics are printed on one 180-degree half and the 40-meter band and corresponding harmonics are on the other, with the 11-meter scale sandwiched in on an unused portion of the 14-Mc. scale.

On the rear of the rig there is a coax connector for the output, the line cord (fused) for power, a "remote control" socket for making up to other control or controlled circuits, and a husky ground terminal.

There are few unusual tricks in the circuit, and most of it is standard. The VFO is the series-tuned Colpitts or "Clapp" circuit, and the crystal-oscillator circuit uses the crystal in series between screen and control grid. The coupling circuit between the 5763 and the final 6146s is different; at least it is the first application of interstage pi coupling we have seen in a commercial rig. As shown in the simplified sketch of Fig. 2, a 47-$\mu\mu$f. output capacitor is in the circuit all of the time. According to the instruction book, this method of coupling is used to reduce harmonics. Fig. 2 also shows the clamp-tube circuit. Since there is fixed bias on the 6146s, the clamp-tube grid is biased back from a +

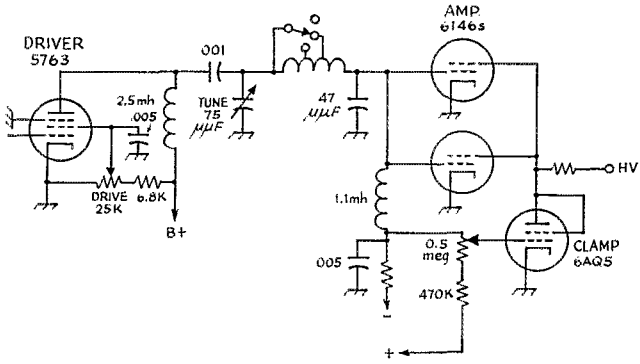
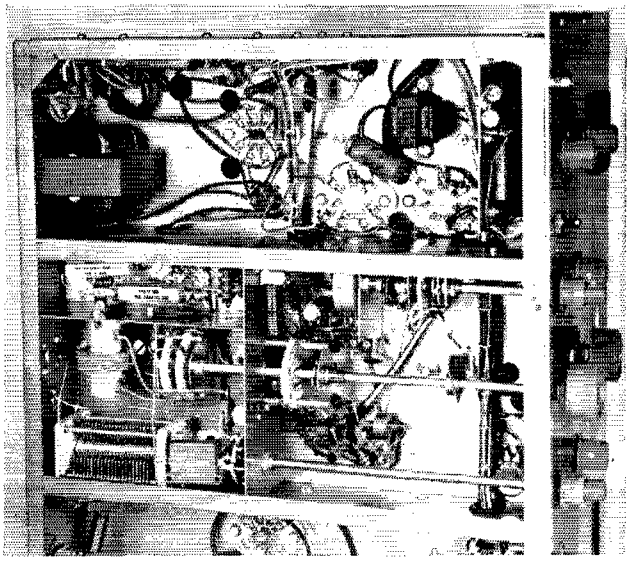


Fig. 2 — A simplified schematic of the driver-final interstage pi coupling. The Drive control (adjustable screen voltage on the 5763) and clamp-tube circuits are also shown.



This view of part of the DX-100 shows the speech amplifier and modulator (upper right) and the r.f. section below. The 3-section bandswitch (center shaft in r.f. section) has an arm (near panel) that switches the VFO section on some of the bands. The shaft below the bandswitch shaft is hollow; the outer shaft switches fixed output loading capacitors, and the inner shaft tunes the variable loading capacitor (lower left). The coil above this capacitor is the 160-meter coil. Another concentric shaft at the upper part of the r.f. section switches to VFO or crystal (outer shaft) and controls the drive to the final.

The cabled leads near the panel are part of the preformed cable furnished with the kit. Examples of the r.f. chokes used in every outgoing lead from the rig (for TVI protection) can be seen at the extreme upper and lower left-hand corners of the picture.

source to permit the clamp to work in the normal fashion. When the transmitter is adjusted for the first time, the 0.5-megohm potentiometer is set to give low no-drive 6146 plate current. No further adjustment is necessary.

As mentioned at the start, we are without precedent in reviewing a kit and, at the risk of being blue-pencilled, we are going to throw in some personal observations, in the hope that they will help others who build the DX-100. This reviewer has access to a good workshop and a lot of tools. Many amateurs don't. In order to see how the other half lives, we limited the tools used in the assembly of the DX-100 to a couple of screwdrivers, long-nosed pliers, diagonal cutters, a knife, a soldering iron, and a 12-inch scale (for measuring lead lengths per the instruction book). We then had to cheat, and ring in a reamer (a rat-tail file would have done as well) to drag a couple of holes. These were all of the tools we needed, but considerable time could have been saved if several hex nut drivers (socket wrenches) had been available, and we heartily recommend getting them before starting assembly. One of the screwdrivers that will hold a screw would also have been a big help, as would a wire-stripping tool. And just any old soldering iron won't do, because some of the spots where one has to solder are a little crowded. We used a 60-watt iron with a ¼-inch tip, and the tip was pulled out slightly to aid in getting in those tight places. Right here is a good spot to advise anyone who starts in electrical work by building the DX-100 to get a little soldering practice before he starts. The instruction manual calls for wiring the VFO first thing, and one without soldering experience might end up with a couple of "cold" joints in this all-important section of the transmitter. Once the VFO is assembled and installed, it isn't an easy matter to work on it, and it is well worth while to follow the instruction book to the letter. Even when it calls for a step like "Recheck all the wiring and soldering" you do it — it may pay off later on.

To the list of tools mentioned above you might add a clear place to work, good light, and no color blindness. An elaborate preformed cable is used to simplify much of the control-circuit wiring, and mixing up the colors in poor light might result in some lengthy trouble-shooting later on. The work space shouldn't be a nice piece of furniture such as the dining-room table unless you cover it with a protective sheet of plywood. The transmitter gets to be fairly heavy by the time it's finished (the manual says 100 pounds and we believe it); the sharp corner of a chassis can dig a nice hole in a bit of choice Chippendale.

We're quite convinced that no one should have much trouble building the DX-100 unless, perhaps, he is a color-blind illiterate. The instruction book is well written and one should have no difficulty following it. As in any phase of amateur radio, experience is a nice thing to have but it isn't absolutely essential in this case. We used ours in only a couple of places: We freed the detent a little on the bandswitch, because it seemed a little stiff, and we cleaned a center tap on the 10 – 15-meter grid coil wound with Formex wire. Since all coil leads but this latter come tinned, an inexperienced solderer might end up with no connection at this point.

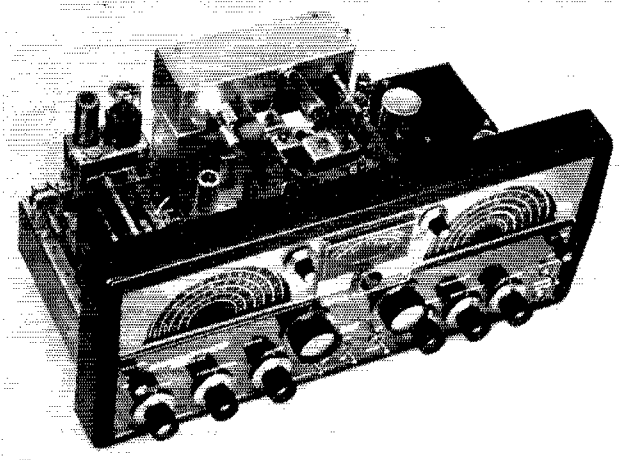
As is true of all of the current Heathkits, the components in the DX-100 are top grade. They are all tailored for the job, and many of the switches and transformers are special. It is reasonable to expect that, properly put together, a DX-100 will be a credit to the station and last a long time.

As for the appearance of the transmitter, a Novice unfamiliar with the rig and its price, said upon seeing the finished DX-100 for the first time, "Boy, that must have cost a pretty penny!"

— *B. G.*

The Hallicrafters SX-100 Receiver

SOME months ago this department reported that the compactness of the SX-96 did not mean that the receiver could be called a "little" one. The same statement is even more applicable to the SX-100. It is small (18½ by 8⅞ by 11 inches deep) and light enough to be readily carted around on Field Day by one of the junior ops, but it features double conversion, a tuning range of 0.54 to 34 Mc., a 100-kc. crystal calibrator, and five degrees of selectivity plus a rejection notch that cuts a narrow slot 50 db. deep in the passband.



The SX-100 removed from its case shows the antenna trimmer (rear left corner) and next to it the 100-kc. crystal calibrator. What appears to be an octal-based glass tube on the calibrator is the housing for the 100-kc. crystal. Next to the calibrator at the rear, the long box with a horizontally-mounted miniature tube is the notch filter.

Perhaps the general arrangement can best be visualized by looking at the block diagram of Fig. 1. The front end, consisting of the 6CB6 r.f. stage, the 6AU6 first mixer (cathode injection) and the 6C4 oscillator, provides for bandset and bandspread tuning through the use of two ganged capacitors. The tuning ranges for the bandset dial, with the bandspread dial set at the minimum capacitance end, are 0.54–1.58 Mc., 1.72–4.9 Mc., 4.6–13 Mc., and 12–34 Mc. On the bandspread dial, the knob revolutions and tuning ranges are 19 for 3.5–4.0 Mc., 9½ for 7.0–7.3, 9⅜ for 14.0–14.35, 3⅛ for 21.0–21.45, and 6½ for 28.0–29.7 Mc. The tuning knobs are counterweighted and drive their respective tuning capacitors through gear mechanisms and, on the bandspread tuning, a metal cable.

The antenna trimmer is across the antenna coil. A built-in 100-kc. crystal calibrator stage permits setting up a two-dial receiver like this "on the button" at any one of the ham-band edges that is a multiple of 100 kc. The crystal is one of the vacuum-sealed jobs, a real beauty that may be missing from this receiver before we get through describing it — it's what we've always wanted.

Following the first mixer, the signal passes to a 6BA6 1650-kc. i.f. stage and then to a 6BA6 second mixer. Here, again, cathode injection is used, but the second oscillator is a 12AT7, of which one section is crystal-controlled at 1600 kc. and the other at 1700 kc. A panel switch marked "Response" controls the selection of one or the other of these oscillators to give selectable-sideband [1] reception.

The second i.f. amplifier is at 50.5 kc. and uses four high-*Q* tuned circuits. The selectivity is varied in approximately the same way that it is in the SX-88, by switching in various coupling capacitors and resistors. The ranges are nominally 0.5, 1, 2, 3 and 5 kc. A selectivity curve in the instruction book shows the 0.5-kc. position to be 500 cycles wide at 6 db. down and 3800 cycles wide at 60 db. down. In c.w. operation this gives quite good "super-selective c.w." performance and no trace of an audio image on the other side of zero beat. The 3-kc. position is shown as 12 kc. wide at 60 db. down, and the 2-kc. position is 10 kc. wide at that attenuation. These two selectivities are the ones most likely to be used by s.s.b. operators and for a.m. reception under bad QRM conditions. As in the SX-88 and SX-96, the bandwidth "grows out" in one direction from the sharpest position, and the operator must understand this condition to explain what will happen to the carrier when switching to a sharper i.f. condition.[2]

Aside from the selectivity offered by the tuned circuits of the 50-kc. i.f. amplifier, a "notch filter" is also included, for rejecting a narrow band of frequencies within or on the edge of the passband. As can be seen in Fig. 2, this is a straight bridged-

[1] McLaughlin, "The Selectable Single-Sideband Receiving System," *QST*, June, 1941. Also, "Exit Heterodyne QRM," *QST*, October, 1947.

[2] As explained in "The SX-88 Receiver," *QST*, June, 1954.

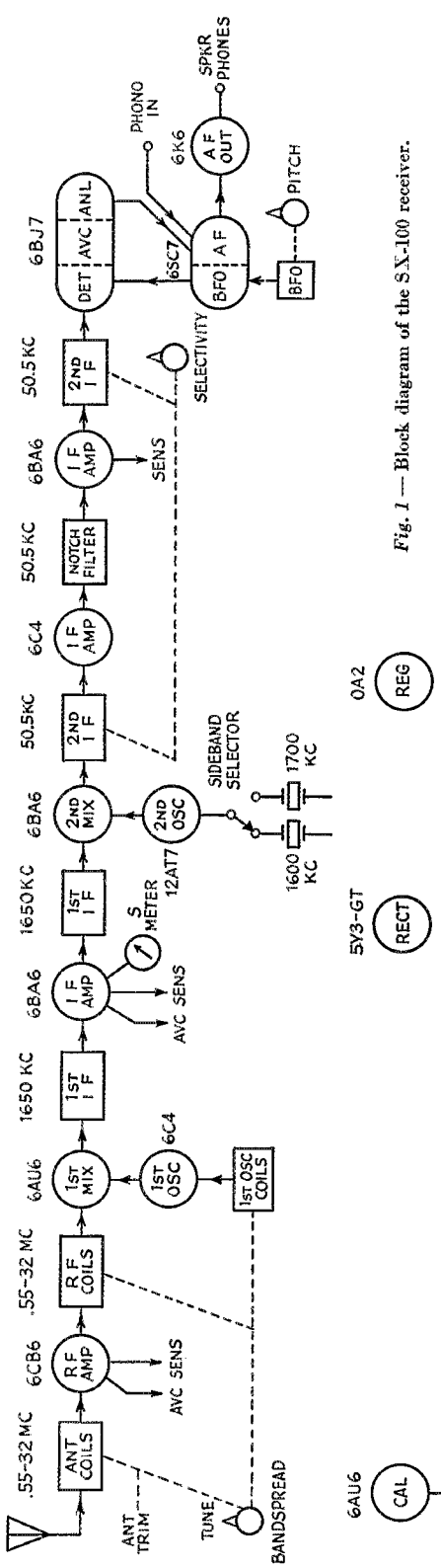


Fig. 1 — Block diagram of the SX-100 receiver.

T filter between the 6C4 and 6BA6 50-kc. i.f. stages. Adjusting the inductance of the filter (a panel control marked "Notch Freq.") changes the frequency at which the notch occurs. Changing the setting of the 5000-ohm resistor (panel control marked "Notch Depth") controls the depth of the notch. At the extreme end of its range it actuates a switch that short-circuits the filter. A 15,000-ohm chassis control affords an initial adjustment for the filter. In operation, the notch filter is easy to use: you swing the notch frequency with its control until an interfering heterodyne is rejected, and you control the amount of rejection with the notch depth control. The notch becomes sharper as its depth is increased, and the tuning therefore becomes more critical. The operation is similar to the *Q* multiplier used in the reject condition, but no *Q* multiplier was considered necessary at 50 kc. because without complexity, the performance is comparable to *Q* multiplication at 500 kc.

A diode detector is used following the 50-kc. i.f. This diode is one of the three diodes in the 6BJ7 tube — the two other diodes are used for a.v.c. and automatic noise-limiter functions. The noise limiter is a modification of the series-type circuit and works on both 'phone and c.w.

One triode of a 6SC7 is used for the b.f.o. and the other triode serves as the first audio stage. The audio output tube is a 6K6, providing speaker or headphone output. A phono jack is available at the rear of the receiver for anyone who might want to play a few records through the audio system.

The front-panel controls, other than the bandset, bandspread, antenna trimmer, and notch frequency and depth already mentioned, are Sen-

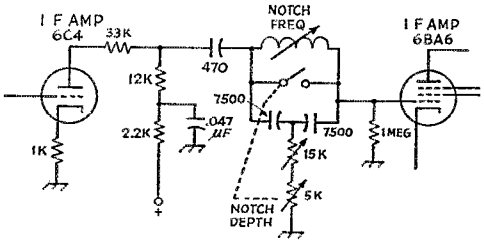


Fig. 2 **— The "bridged-T" filter used in the SX-100 to give a rejection notch adjustable in depth and frequency. The filter is switched out at one end of the notch-depth control.**

sitivity, Volume and Pitch. The rotary switches include Band Selector, Selectivity (and Phono), Response (upper/lower sideband, treble cut, power off) and Calibrate, with toggle switches for AVC, BFO, Noise Limiter and Receiver Standby. The S-meter is calibrated in both μv. (across 300-ohm load at receiver terminals, at 14 Mc.) and in S points and db. above S9 (50 μv.).

The receiver is equipped with the usual 3-terminal antenna connection, but the chassis is punched for a coaxial-cable fitting if the owner wants to modify the input connection for coax

(Continued on page 180)

Happenings of the Month

LEAGUE FILINGS

In two matters currently pending before the Commission relating to amendment of amateur rules, the League has filed comment in accord with instructions of the Executive Committee. In Docket 11487, ARRL requests the Commission to take affirmative action in writing into our rules a provision that a radiotelephone station engaged in code practice may use a tone-generating device to form code characters, so they may be interspersed with voice instruction. In Docket 11488, ARRL finds no objection to the Commission's proposed rules to implement the Conelrad alerting system in the amateur service, but requests that the rules be made voluntary instead of mandatory for the immediate future. The texts follow:

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of Amendment of Part 12, Rules Governing Amateur Radio Service, concerning code practice transmissions.	Docket No. 11487

COMMENTS OF THE
AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 6 of the Notice of Proposed Rule Making in Docket 11487, the American Radio Relay League, Inc. files these comments on behalf of the more than 48,000 licensed amateur radio operators who are members of the League.

1. The League concurs in the proposal to amend Section 12.114(b) to permit the use of radiotelephone tone modulation when code practice is conducted in bands authorized for A-3 emission.

2. For many years the League has sponsored training programs in radiotelegraph code under Section 12.106(d). In many instances the volunteer amateur elects to use radiotelephone emission with a tone-generating device near the microphone. This has never been specifically provided for in the amateur regulations. However, in 1934 at our request, the Federal Radio Commission issued a statement which exempted stations conducting code practice from observing the prohibition against using buzzers or audio oscillators or any form of tone modulation.

3. The absence of this provision from the amateur regulations has caused occasional confusion, particularly with monitoring personnel who may be unfamiliar with this special ruling, resulting in unnecessary correspondence and paper work. Prior to filing this petition the League made a survey of stations conducting code practice and found the number of stations so engaged and the benefits being obtained both more than adequate to merit the inclusion of this provision in our regulations.

4. In summary, the League believes that this rule making is in consonance with established custom and policy and will be of benefit to the Amateur Service.

AMERICAN RADIO RELAY LEAGUE, INC.
By PAUL M. SEGAL
Its General Counsel

A. L. BUDLONG
General Manager
October 3, 1955

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of Amendment to Part 12 of the Commission's Rules and Regulations to Effectuate the Commission's CONELRAD Plan for the Amateur Radio Service	Docket No. 11488

COMMENTS OF THE
AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 3 of the Notice of Proposed Rule Making in Docket 11488, the American Radio Relay League, Inc. files these comments on behalf of the more than 48,000 licensed amateur radio operators who are members of the League.

1. These comments were formulated by the Executive Committee of the League, subsequent to detailed examination both of the proposal itself and of recommendations by the ARRL staff members on the amateur CONELRAD committee established by the Commission.

2. The League finds no objection to the proposed rules. However, it is our request that these rules be held in abeyance until such time as the Commission determines they are specifically required in the national defense, and that meanwhile the amateur service participate in the CONELRAD system on a voluntary basis.

3. The League has carefully examined the proposed rules, particularly as concerns the practical aspect of application to operations in the amateur service. In some fields, such as mobile operation, there are problems to be solved. In general, however, the League believes that the proposed rules are as satisfactory as any which could be drawn up to meet the requirements of CONELRAD, and therefore offers no objection.

4. However, the League does not perceive the need to put the proposed rules into effect at this point. Rather, it is our recommendation that the proposed rules be held in abeyance, with the understanding that the amateur radio service will participate in CONELRAD on a voluntary basis. The League, through its official organ *QST* and headquarters station WIAW, is prepared to coöperate in disseminating information concerning such tests as may be made so that as many amateurs as possible may become acquainted with the system. This will to a considerable extent relieve the hardship which mandatory rules at this point would impose on the amateur radio service, yet permit amateurs to prepare themselves for full compliance when and if the Commission finds the requirements of national defense demand the adoption of the proposed rules.

AMERICAN RADIO RELAY LEAGUE, INC.
By PAUL M. SEGAL
Its General Counsel

A. L. BUDLONG
General Manager
October 3, 1955

S.S.B. RUMORS

In early October an FCC action in the commercial radio field was misinterpreted by some amateurs as applying to us, which caused a flurry of rumors on the 'phone bands that the Commission would shortly permit only single-sideband emission in voice work. The facts: Faced with a continually growing need for frequency space, the Commission believes that one step to alleviate the problem would be a

requirement that all fixed and mobile services using radiotelephone emission discontinue double-sideband a.m. systems and switch to s.s.b. Specifically, the Commission proposes to take such action in the fixed service, allowing as few years as necessary to take care of the obsolescence problem, and serves notice that it will later similarly require single-sideband operation by the mobile service as well.

Although this action does not in any way affect the amateur service, and relates only to the fixed and mobile services, a paragraph from the FCC notice will, we think, be of interest to all amateurs:

Existing Commission rules for the use of amplitude modulation (AM) radiotelephone communication are patterned after the type of radio equipment developed soon after World War I. Conventional AM systems transmit two sidebands, one above the carrier frequency and the other below with the same intelligence being transmitted in each sideband. One sideband is, however, sufficient for satisfactory communication. An objective of the instant proposal is to provide for the emission of one sideband only for each radiotelephone communication, thus freeing the spectrum space now occupied by the other superfluous sideband for new or additional communication facilities.

AIDS TO THE BLIND

Though we have reported these aids as they became available, we do so again so that they may be called to the attention of those interested in working with the blind.

How To Become a Radio Amateur and *The Radio Amateur's License Manual* are available in Grade 2 Braille. Individual copies may be purchased at cost of production, plus postage and insurance. "How" is in two Braille volumes at a price of $4.20 plus 50¢; the LM is in three volumes priced at $6.90 plus 75¢. Charge or C.O.D. orders are not accepted. All orders should be sent to the:

American Printing House for the Blind
1839 Frankfort Avenue
Louisville 6, Kentucky

They are available, on loan, from the following regional libraries.

Library for the Blind, New York State Library, Albany.
Victor H. Kreigshaber Memorial Library for the Blind, Atlanta, Georgia.
Service for the Blind, Texas State Library, Austin, Texas.
Books for the Blind, Chicago Public Library, Chicago, Ill.
Cincinnati Library Society for the Blind, Cincinnati, Ohio.
Cleveland Public Library, Cleveland, Ohio.
Florida Council for the Blind, Talking Book Library, Daytona Beach, Fla.
Books for the Blind, Denver Public Library, Denver 2, Colorado.
Wayne County Library, Dept. for the Blind, Detroit 8, Michigan.
Minnesota Braille & Sight Saving School, Faribault, Minnesota.
Library of Hawaii, Honolulu, Hawaii.
Service for the Blind, Indiana State Library, Indianapolis 4, Indiana.
Ill. School for the Blind, Free Circulating Library, Jacksonville, Ill.
Braille Institute of America, Los Angeles 29, Calif.
Librarian for the Blind, Nebraska Public Library Commission, Lincoln 9, Nebr.
New Orleans Public Library, New Orleans, Louisiana.
Library for the Blind, New York Public Library, New York 1, N. Y.
Oklahoma Library Commission, Oklahoma City 5, Oklahoma.
Books for the Blind, Free Library of Philadelphia, Philadelphia 3, Penna.
Library for the Blind, Carnegie Library of Pittsburgh, Penna.
Work with the Blind, Library Assn. of Portland, Portland 5, Oregon.
Books for the Blind Section, California State Library, Sacramento 9, Calif.
State Library for the Blind, Saginaw, Michigan.
Books for the Blind, Salt Lake City Public Library, Salt Lake City 1, Utah.
Library for the Blind, Seattle Public Library, Seattle 3, Washington.
Work with the Blind, Henry L. Wolfner Memorial Library, St. Louis 8, Missouri.
Division for the Blind, Library of Congress, Washington 25, D. C.
Perkins Institution for the Blind, Watertown 72, Mass

The Division for the Blind, Library of Congress, has a Talking Book, "The Radio Amateur's Novice Examination, Questions and Answers." This work consists of material excerpted from ARRL publications, and code practice material especially written and taped by Hq., and prepared on eight 12-inch record sides. The Book is available in the usual manner, to qualified blind readers, from the 28 regional libraries.

Additionally, The Braille Technical Press, 980 Waring Ave., New York, N. Y., publishes a monthly periodical in Braille that contains reprints from many technical magazines. Not solely amateur in scope, it will provide interesting reading for the technically interested blind person. It sells for 50¢ an issue.

Strays

Polio-victim Richard Lee Phillips, of Louisville, Kentucky, will use the printing press shown above to print cards exchanged by hams among whom are the donors. Dick displays one with his call, W4SKE, as Joseph S. Brownstein, W4JXF, former president of the Louisville Amateur Transmitting Society, who made the presentation in behalf of Louisville amateurs, stands by.

1955 Field Day—Official Results

All-Time High of 10,190 Participants in Annual Test of Emergency-Powered Portables

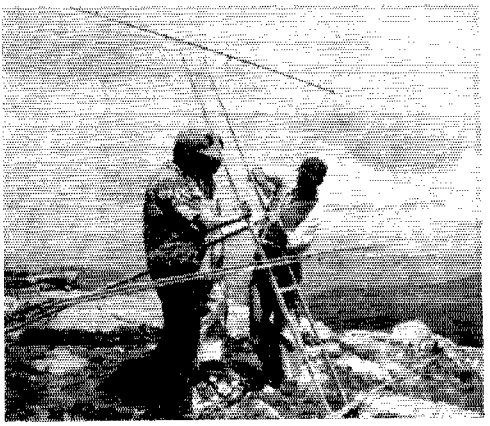
BY PHIL SIMMONS, W1ZDP

THE FIGURE ABOVE is no misprint! Never have so many taken part in an operating activity as turned out for the Nineteenth ARRL Field Day, held June 25th and 26th. In all parts of the U. S., its Possessions and Canada, enthusiastic amateurs sallied forth to mountains and hilltops, to beaches and pastures, to *any* spot — no matter how remote or inaccessible — provided it boasted the hard-to-define qualifications of a "good location." The common purpose: to set up and operate emergency-powered gear and to roll up as many contacts as humanly possible during the 24-hour period, at whatever the cost in elbow grease.

Despite the outing flavor and camaraderie that prevails, Field Day excursions seldom function as smoothly as predicted. Antennas *will* come crashing down; generators *will* run out of fuel; equipment components *will* give up the ghost. And no matter how favorable the weather has been previously, the test often finds Mother Nature at her worst. Rainstorms, high winds, extremities of temperature are almost the Order of the Day. These and the 1001 other challenges that must be met add up to valuable lessons learned. The determination to do the best possible communicating job under all types of conditions has made amateur radio highly respected for its public service value. The League therefore extends congratulations to everyone who contributed in any way to this imposing display of our potential worth in time of emergency.

The 10,190-individual figure, an increase of 21 per cent over 1954, indicates that FD popularity is growing by leaps and bounds both numerically and percentagewise. Most people in the to-do are members of clubs and groups at multitransmitter installations, but interest in the unit-individual and mobile categories also climbs annually. Other new statistical highs registered in 1955: 967 portables and mobiles, 2370 separate receiver-transmitter combinations afield and on the air.

On Mt. Pacifico near Los Angeles, 19 Pacifico Radio Club members under the call K6BAG/6 made a potent 20,184 points, top score of the Field Day. A 10-kw. generator served as the power source for the nine simultaneously-operated rigs, all utilizing 807s, 2E26s and 6146s as final amplifiers. Skyhooks included a Vee beam, a balloon-supported ground plane, and numerous doublets, long wires and multielement arrays. PRC made maximum use of bands, as can be seen from this breakdown of the 2316 stations



Atop picturesque Mt. Spokane (elevation 5800 feet), three of a crew of 17 Spokane Radio Amateurs wrestle with a ten-meter beam installation for W7NBR/7.

worked: 10 QSOs on 160 c.w., 13 on 160 'phone, 214 on 80 c.w., 331 on 75 'phone, 361 on 40 c.w., 282 on 40 'phone, 301 on 20 c.w., 108 on 20 'phone, 22 on 15 c.w., 172 on 15 'phone, 5 on 11 c.w., 8 on 11 'phone, 7 on 10 c.w., 281 on 10 'phone, 3 on 6 c.w., 19 on 6 'phone, 16 on 2 c.w., 163 on 2 'phone.

Tri-County Radio Association of Plainfield, N. J., earned second-place honors for W2LI/2 with 1987 QSOs and a final tally of 18,108. Competing in Class 10A, 30 men set up shop at Mountainside, N. J., with power supplied by a 6-kw. generator and all rigs running 30 watts or less.

Also in the ten-transmitter class, Ohio Valley Amateur Radio Association's W4FU/8, on the

♦

Rough and Ready Island Amateur Radio Club members "take one" for photography prior to launching W6NVP/6 into Class 1A. *L. to r.:* KN6KRI, W6EMX, K6EUY, KN6QLX, K6GDB, an SWL, K6AEK. The umbrella tent, they report, was crowded but adequate.

outskirts of Cincinnati, amassed 1976 contacts and 18,009 points, the third-ranking score among clubs and groups.

Over in Class B, W3EIS/3 paired up with contest maestro W4KFC to pace 117 one- and two-man entries with 493 QSOs, 6993 points. Though hampered by a cold drizzle at Clinton, Md., Don and Vic stuck to their guns (e.g., Command sets) and averaged more than 20 exchanges an hour. Dipoles for 40 and 80 and a 14-Mc. beam comprised their antenna system and a 24-volt 200 ampere-hour battery powered the gear.

Leader of the mobileers was W8HFE/8, one of the renowned Westpark Radiops, with 259 valid

CLASS A CALL AREA LEADERS

W1OC/1	13,905	KH6WO/KH6	2688
W2LI/2	18,108	KL7YG/KL7	858
W3RCN/3	10,764	KP4WW/KP4	2178
W4PLB/4	5922	VE1ND/1	3816
W5SC/5	9189	VE2CB/2	2856
K6BAG/6	20,184	VE3JJ/3	9846
W7DK/7	6246	VE5MA/5	678
W4FU/8	18,009	VE6NQ/6	2262
W9IT/9	15,723	VE7ARV/7	3420
WØCKF/Ø	5715	VO1T/2	936

contacts and a 4914 score. Bob's voluminous quantity of messages received and relayed easily gave him the nod in Class C.

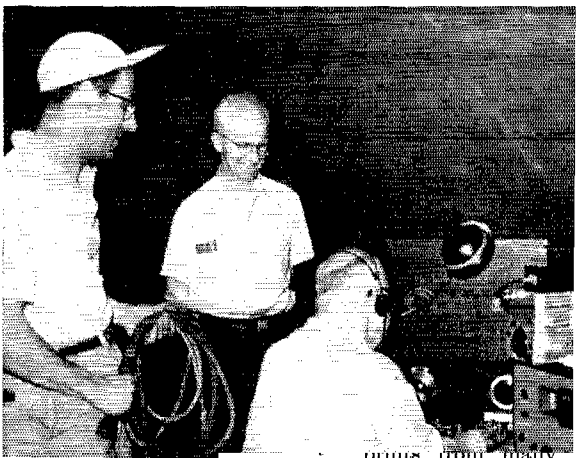
Competition is considered to be among stations using like numbers of simultaneously-operated transmitters, and final scores are tabulated in this manner. Special box listings are also included for those interested in geographical and high-score comparisons. Pace-setters in Classes A through E may be readily determined by reference to the score compilations at the end of this report.

FD Quotes

"Biggest troubles in the order of nuisance value: generator hash, poor voltage regulation, too much unused equipment, not enough General Class hams, and we ran out of chow. But wait 'til next year!" — *Waterbury Amateur Radio Club, W1ILV/1.* . . . "A stray hound wandered in and fell asleep under the operating table. At 4 A.M. he woke up hungry and chewed the coax on the antenna tuner in two. What next!" — *El Paso Amateur Radio Club, W5ES/5.* . . . "While QSOing K2ILS, our last contact one minute before FD's end, the PE-95 ran out of gas." — *Astoria Radio Club, W2BRK/2.* . . . "For six months we planned how to move all equipment with two trucks and a trailer. All food, bedding, cots, etc., went in one trip. We took enough supplies for forty operators to camp out from Friday night through Sunday evening with meals and all the comforts of home. No one had to return to town for even a toothbrush." — *Joliet Amateur Radio Society, W9OFR/9.* . . . "We erected a 50-foot steel tower with little difficulty, and one of the boys was kept busy climbing it so that newspaper photogs could get a good shot of him. We received good coverage in the local papers." *Rio Hondo Radio Club, W6TTN/6.* . . . "A side contest with Calgary Amateur Radio Association, VE6NQ/6, made this FD especially intriguing for GRARA." — *Grand Rapids Amateur Radio Association, W8DC/8.* . . . "Club set new contact record and with fifty Novices, too!" — *Levittown Amateur Radio Club, W2GLO/2.* . . . "Bow-and-arrow and lacing cord were handy for installing halyards high in treetops." — *Aero Amateur Radio Club, W3PGA/3.* . . . "Thanks to the Lexington Signal Depot for loan of two PE-75 power units. W4ODK furnished the food, although W4NCQ had to get more Saturday night. Only casualty was W4KFA who fell through a hole in the cabin steps. W4ROH slept through most of FD, so there was a small 10-'phone score. The only real trouble experienced was interference between the 'phone and c.w. boys working across the room from each other." — *Bluegrass Amateur Radio Club, W4JP/4.* . . . "How about sending free Aerosol bombs along with contest forms in '56!" — *Rutland Radio Club, W1WOA/1.* . . . "Antennas were all mounted atop guyed extension ladders. Forty-'phone worked from tent; others from hayloft in barn. All skywires terminated on top of barn (that's bad). A 15-foot grounded brass screen on generator killed all hash (that's good). Nobody was hurt or hungry and we learned enough to triple our score next year." — *South Eastern Michigan Amateur Radio Association, W8JXX/8.* . . . "For first time we took advantage of the 1000-foot rule and spread out. Each station had its own power unit and tent shelter, and results were fine from the noninterference standpoint. Teams were organized, each carrying full responsibility for furnishing, transporting, setting up and manning its station. A few fell down on the job but most didn't. Some of the best performances came from recently-graduated Novices." — *Pioneer Radio Amateurs, W6ZCJ/6.* . . . "Wouldn't it be nice if all participants would QSL 100 per cent. We have a special card commemorating FD and hope for good returns." — *Sylvania Amateur Radio Club, K6FD/6.* . . . "Excellent results obtained on 7 Mc. with base-loaded 29-foot TV tower, but wet insulators during heavy storm slowed us down." — *Lynchburg Amateur Radio Club, W4FV/4.* . . . "Some 'phones were operating illegally; FCC requires that a portable 'phone station indicate its specific location when signing. Just W2XXX/2 is not enough." — *Ridgewood High School Radio Club, W2YNU/2.* . . . "Four ladder sections were lashed together and guyed with ropes as base for our 2-meter beam and ground plane, height about 40 feet. As usual, the old 'genny' broke down about 2 A.M. A truck trailer site kept rain out better than tents previously used." — *Woodbridge Radio Club, W2HZH/2.* . . . "Our small, compact, well-shielded

TEN HIGH SCORES

Class A		*Class B*	
K6BAG/6	20,184	W3EIS/3	6993
W2LI/2	18,108	W5VRP/5	5751
W4FU/8	18,009	W2FBA/2	5319
W2GSA/2	16,362	K5BLL/5	4955
W9IT/9	15,723	W9ESQ/9	2979
W9AP/9	15,210	W9DSP/9	2778
W6UW/6	13,983	WØAJA/Ø	2592
W1OC/1	13,905	W6MUR/6	2547
W6HS/6	13,743	W6RSU/6	2496
W6CG/6	12,816	W8VWY/8	2444



W3PYF, FD Chairman of the Delaware-Lehigh Amateur Radio Club, hovers over bug-paddling W3OK as Proxy W3CBN looks on. Four rigs and 30 operators brought W3OK/3 6687 points altogether, and W3PYF says the bullwhip was highly effective!

blocked-grid keyed c.w. rigs were especially designed for service in FD and emergencies." — *Piedmont Amateur Radio Club, W4UUB/4.* . . . "At our site on Bonnie Brook Golf Course, food consisted of hamburgers for breakfast, hamburgers for lunch, hamburgers for supper. No one got an ounce of shut-eye but one man who slept all Saturday night and Sunday until 3:30 P.M., except for a two-hour game of golf Sunday morning. What fun!" — *W8URG/8.* . . . "Plenty of r.f. burns, hoarse throats and messy records when loggers went to sleep on the job." — *S. W. Iowa Amateur Radio Association, WØRMG/Ø.* . . . "We discovered our 'conical' was cut the wrong length and wouldn't put out. Moral: Never use an untried experimental antenna unless you're seeking engineering data instead of points!" — *Falmouth Amateur Radio Assn., W1HQH/1.* . . . "Every hour up in Lawson's Tower [Scituate, Mass.] a bell tolled right next to our 144-Mc. rig. It almost scared us out of our wits and also drew many over-the-air comments. One ham reminded us that FCC prohibits transmission of music!" — *Satuit Amateur Radio Club, W1MB/1.* . . . "Lightning hit our antennas but damage was slight. The ladies served a 9 P.M. snack, a 3 A.M. breakfast for those who braved the night, and a fine Sunday lunch." — *Richmond Amateur Radio Club, W4MK/4.* . . . "A 60-foot windmill served as the perfect base for a 3-element rotary and the vertex of a 500-foot-per-leg Vee beam. Ten 'phone was our best band as we averaged 35 contacts per hour Sunday A.M. Conditions were the best we have ever seen. Temperature and humidity were perfect in Minnesota and the mosquito dope was just so much excess baggage." — *Viking Contest Group, WØYDX/Ø.* . . . "We operated from the completely equipped Northeast Philadelphia Civil Defense Control Center, and the week end was decidedly different from past Field Days. The new 3.5-kw. gas-electric unit was a dream, contrasting with the club's balky gas engine. The center, located in a public school, was dry, quiet, well-lighted and equipped with ice water and lavatories. Such luxury!" — *Beacon Radio Amateurs, W3DYL/3.* . . . "Reversible beams for 7 Mc. were our best improvement over 1954. We repaired generator, which failed at 4:45 A.M., by removing head and cleaning carbon off stuck valve. Best FD in five years!" — *W8CEA/8.* . . . "Gas poured into generator oil spout 15 minutes before take-off time provoked a mad dash down a muddy nine miles of road for more oil." — *Tualatin Valley Radio Club, W7OTV/7.* . . . "The rig was set up in a local park and our biggest headache was dampening external generator noise so that near-by residents wouldn't be kept awake. This was accomplished through judicious use of sandbags." — *Lakeshore Field Day Club, VE2CO/2.* . . . "Terrific location got us S9 reports from VK-land this year." — *Santa Monica Mike and Key Club, K6LDA/6.* . . . "More training for log-keepers and definite operating schedules were sorely needed." — *Blossomland Amateur Radio Assn., W8MAI/8.* . . . "A truck broke the mast and took down our long-wire receiving antenna, somebody poured gas in the generator crankcase, the line filter blew, and the wind took one of our ground planes, but it was a FB Field Day!" — *Butte Amateur Radio Club, W7SSF/7.* . . . "Our first experience afield. All three rigs worked fine right up to zero hour, whereupon two promptly ceased functioning. All Sunday the line voltage was down to 80! Nevertheless we had great fun!" — *K2COV/2.* . . . "We appreciated the help we got from our Novices in checking logs and keeping the pressure up on the beer kegs." — *Sioux Amateur Radio Assn., WØFVT/Ø.* . . . "Curious cows visited our camp constantly, two mules had to be routed, and a cold wind practically blew our tent and ops away, making us wish for our 'longjohns.' We were especially proud of the performance of our vertical 15-meter doublet." — *W4TVI/4.* . . . "Wish our loggers would learn to write legibly." — *Knox Warren Amateur Radio Assn., W9VSX/9.* . . . "Learned lots about operating under actual emergency conditions. We are taking the plunge and purchasing our own 650-watt generator. We have an eye on a new 4-kw. job, too." — *Middlesex Amateur Radio Club, W1SAD/1.* . . . "The obstacles were unlimited, but we had a good time, a turn at the bug, and a chance to finish off the copperhead found napping in the shack." — *Coke Center Radio Club, W3UG/3.* . . . "Severe thunderstorm forced us to cease operations Sunday morning. Instead of a makeshift tarp lean-to, we'll provide a durable shelter next year." — *W5OCY/5.* . . . "Auxiliary equipment included antenna tuners, frequency standards, micromatches to keep lines flat and measure power, field-strength meters, a.c. voltmeters and a line-frequency meter. Two generators and ample separation of the two stations held interference to a minimum. We made 50 per cent more contacts than last year." — *W9ERU/9.* . . . "W1PQU's jr. op brought along a portable TV set and we were amazed to find we didn't have TVI. Why does one ARC-5 produce key clicks while another does not?" — *Candlewood Amateur Radio Assn., W1VB/1.* . . . "A tent borrowed from a friendly undertaker provided protection from the elements and reminded us to keep away from the high voltage." — *Middle Tennessee Radio Amateur Assn., W4QAN/4.* . . . "Sand, crabs, sun and wind tormented us but we'll still use the beach QTH next year!" — *Brazoria County Amateur Radio Club, W5UMY/5.* . . . "Our site in the Grover Cleveland Park clubhouse was ideal from the standpoint of mosquitoes, rain, dew, etc. The motor generator in the basement was scarcely audible in the transmitting rooms. We just weren't working 'em, however. Low antennas? High QRN? Who knows? At least we were comfortable! Hi!" — *KBT Radio Club, W2EWT/2.* . . . "Not much of a score but we accomplished our goal of keeping the station operative through the entire 24-hour period and gained needed emergency communications experience." — *Koochiching County AREC Group, WØQNY/Ø.* . . . "We didn't employ our operators in a careful and scheduled manner, a mistake we won't repeat. We're already discussing pros and cons of multiple transmitters and more power with a view toward a bigger and better affair next year." — *W5BTH/5.* . . . "Weather was against us. A wide variety included rain, thunder, lightning, hailstones and very high winds, a veritable *Night on Bald Mountain.*" — *VE2CB/2.* . . . "The club's young squirts decided to have their own set-up and challenged the OTs. The youngsters recruited their fathers to help to the extent that the old timers group was missing some of its most experienced personnel and didn't do very well. The OTs therefore bow

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W2JPD tunes the HRO and W2IBZ logs as W2DED and W2WW grab shut-eye before taking the next 7-Mc. shift at W2KOJ/2. Watchung Valley Radio Club made a fine showing with four transmitters.

♦

QST for

Staff announcer Bob Kerr of Kansas City's WDAF-TV interviews WØOCK, WØTOD and WØKBT during live telecast of WØLII/Ø Class 4A Field Day operations.

to the young squirts as the winners." — *Morris Radio Club, W2FUS/2.* . . . "A 137-foot Windom seemed to work on three bands as well as or better than dipoles for each band. Our portable 1½-kw. generator ran like a fine watch for 26 hours of continuous service." — *Ma Bells Beer Busters, W6FFT/6.* . . . "Our group, with the exception of one parent in charge of the generator, was from 14 to 20 years of age. Meetings were held each week for three weeks preceding FD. This planning spelled success for us as regards fun and experience, if not high score. Our best DX: two KL7 contacts." — *Assn. of Rockford Radio Amateurs, W9WPF/9.* . . . "Better scheduling of shifts and more c.w. ops would have improved our results. Nevertheless we won a steak dinner from the South Eastern Michigan Amateur Radio Assn. for our higher score. Hope to clear 500 QSOs next year." — *Detroit Metropolitan Radio Club, W8RQF/8.* . . . "We found FD a wonderful opportunity for better public relations. We were able to induce about 150 visitors to see us in action. We now have a much better standing in a community where ham activity is new to the people." — *Fairfield High School Amateur Radio Club, KØBPR/Ø.* . . . "All kinds of trouble: burned-out bias pot in rig; a receiver filter condenser popped; our generator quit for an hour; and we forgot the carbon paper." — *Squaw Island Amateur Radio Club, W2EB/2.* . . . "A tube-tester is a handy piece of equipment to take along, not to mention spare tubes!" — *Kishwaukee Radio Club, W9KCM/9.* . . . "Used crystal converter on 144 Mc. feeding two receivers, one tuning high end down, the other tuning low end up. Strangest call worked was KZ5KZ/KZ5. We're contemplating moving from the three- to four-transmitter class next year as we had too many ops with nothing to do!" — *Pompton Valley Radio Club, W2OR/2.* . . . "Best FD ever with ideal weather and no breakdowns, but every year the list of competent c.w. men gets smaller. It is evident that a

Among the ladies taking part in the ruckus was Nikki Boyd, K5ADQ/5. She and hubby W5QVZ did well with their two-man (?) setup at Burnt Mesa, New Mexico, until equipment difficulties forced them to QRT.

planned program to get members in all c.w. contests is a necessity." — *Michiana Amateur Radio Club, W9AB/9.* . . . "CARC operated on Chicago's north side this year, proving that for an emergency an excellent communications center can be set up in the heart of a large city without interference to or from other services." — *Chicago Amateur Radio Club, W9CAF/9.* . . . "One generator stalled from overload on several occasions, maybe because of the refrigerator, hot plate and electric clock, rendering some log times inaccurate. The point-getters, of course, were the dyed-in-wool Field Day operators. Our first year with no radio breakdowns but the generators more than made up for this!" — *Niagara Radio Club, W2QYV/2.* . . . "We operated on the premises of the Upper Thames Valley Conservation Committee with the coöperation of local c.d. authorities, who supplied tents, cots and generators. While there we gave a demonstration of the usefulness of 6-meter portable equipment in connection with river level gauge-checking to show the Conservation Authority what we could do to help in case of flood." — *London Amateur Radio Club, VE3YJ/3.* . . . "Forty c.w. rig's VFO served as the HRO-7 receiver oscillator, mixed with crystal oscillator at the i.f., so that transmitter was always on receiving frequency. The method has some advantages, some disadvantages." — *Du Page Radio Club, W9DUP/9.* . . . "Ten

Dad W4YI adjusts coil on whip as son W4TFP checks loading of Elmac rig in station wagon on beach at Sarasota, Fla. Despite voracious attacks by mosquitoes, W4YI/4 accounted for 258 contacts and third-ranking mobile score. A generator in the trailer helped keep car batteries fully charged.

'phone was unusually good, ARRL operating aids were invaluable; all ops were especially courteous; and we had no snake trouble this year." — *Nav Air Amateur Radio Club, W4NEK/4.* . . . "Balloon-supported vertical worked well on 75 until balloon took off into the Blue Yonder. Vacuum-tube keyers eliminated all key clicks at other positions." — *Scarborough Amateur Radio Club, VE3BXT/3.* . . . "The low-frequency bands were hopeless with our wet antennas but 10 and 2 were crowded enough to keep us busy." — *Brookline Amateur Radio Society, W1VBC/1.* . . . "Always make sure the generator runs and the antennas load before 3:30 P.M.! Our FD on the shores of Lake McAlester, Okla., would have been successful but boat races were held Sunday and guess where the operators went. Hi!" — *Pittsburg County Amateur Radio Club, W5GXH/5.* . . . "Our group, all employees of WTAR-TV, got together the day before the contest and decided to participate. Within hours we had assembled a surprising amount of equipment. After a hurried call to Norfolk's Supt. of Parks we were in business at an ideal spot in Norfolk's City Park along the Lafayette River. Twenty-four hours later a weary bunch of ops and equipment (especially the 1500-watt generator) gave a great sigh of relief as FD ended. Our thanks go to the XYLs of W4LJE and W4SZQ for supplying us with the necessities of life." — *W4LJE/4.* *(Continued on following page)*

Scouts of the Connecticut Wireless Association figured this lodge in Dennis Hill State Park, Norfolk, Conn., for a "hot" site, and it turned out to be just that! Here CWA's W1EIA/1 gathered 641 QSOs and 5994 points, both new records in Class 1A.

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SCORES

CLASS A

Class A stations are clubs and groups in the field. Scores are tabulated according to the number of transmitters operated simultaneously at each station. The figures and letters following each call indicate the number of contacts, the power inputs used, the number of participants at each station and the final score. The "power classification" used in computing the score is indicated by the letters A, B or C after the number of QSOs shown. A indicates power up to and including 30 watts (multiplier of 3); B indicates power over 30, up to and including 100 watts (multiplier of 2); C indicates over 100 watts (multiplier of 1). More than one letter indicates that at times power inputs fell within different classifications.

One Transmitter

W1EIA/1	Connecticut Wireless Assn.	641-	A-14-	5994
W4MK/4	Richmond Amateur Radio Club	558-	A-20-	5247
WØYDX/Ø	Viking Contest Group.	551-	A- 6-	5184
W3DYL/3	Beacon Radio Amateurs	509-	A-10-	4806
W1ICP/1	Laurel Amateur Radio Club	452-	A-22-	4320
W8CEA/8	(nonclub group)	467-	A- 7-	4203
WØDKI/Ø	American Red Cross of St. Paul	406-	A- 8-	3879
W7OTV/7	Tualatin Valley Radio Club	481-	AB-25-	3569
W6PQJ/6	(nonclub group)	359-	A- 8-	3456
W9SDH/9	Lakeshore Amateur Radio Club	339-	A-17-	3294
W8RTR/8	Canton Amateur Radio Club	331-	A-20-	3204
W8FZB/8	Muskingum Amateur Radio Club	498-	B-25-	3138
WØHAM/Ø	Twin City Contest Club	486-	B-11-	3066
KØAXU/Ø	Northwest St. Louis Amateur Radio Club	310-	A-14-	3015
W8NCF/8	Tusco Radio Club	371-	AB- 7-	3006
W1EH/1	South Lyme Beer, Chowder and Propagation Society	467-	AB- 7-	2991
W9UC/9	Fort Wayne Radio Club	279-	A-18-	2736
KH6WO/KH6	Honolulu Amateur Radio Club	423-	B-75-	2688
W9LIT/9	Tri-State Amateur Radio Society	420-	B-15-	2670
W3RVC/3	Allegheny Kiski Amateur Radio Assn.	267-	A-10-	2628
VE3FT/3	Blackheath Propagation Society	265-	A- 3-	2610
W9NEV/9	Blackhawk Amateur Radio Club	288-	A-14-	2592
W3EDO/3	York Amateur Radio Club	287-	A- 6-	2583
W8ODJ/8	Buckeye Short Wave Radio Assn.	424-	B-10-	2544
W8OAJ/8	Mercer County Radio Assn.	255-	A-12-	2529
W8FWQ/8	Brass Pounders Amateur Radio Club	279-	A- 5-	2511
VE2CO/2	Lakeshore Field Day Club	248-	A- 4-	2457
W4ZMR/4	(nonclub group)	407-	B- 3-	2442
K6LDA/6	Santa Monica Mike and Key Club	325-	AB-15-	2397
W3PSH/3	Abington Township Amateur Radio Assn.	240-	A- 7-	2385
W3PQX/3	(nonclub group)	264-	A- 5-	2376
WØWML/Ø	Newton Radio Club	216-	A- 5-	2169
W9APO/9	(nonclub group)	216-	A-10-	2169
W6HGY/6	(nonclub group)	216-	A-13-	2169
K4BNG/4	(nonclub group)	240-	A- 6-	2160
W7SAA/7	Salem Amateur Radio Club	314-	B-12-	2034
W9LDT/9	North Central Indiana Radio Club	311-	B- 6-	2016
VE1DN/1	Dartmouth Amateur Radio Club	192-	A- 7-	1953
W8II/8	(nonclub group)	189-	A-20-	1926
W7VPA/7	Richland Amateur Radio Club	294-	B- 8-	1914
W8DFK/8	(nonclub group)	181-	A- 3-	1854
W1ECV/1	Southington Amateur Radio Assn.	205-	A-14-	1845
W4GSV/4	Albany Amateur Radio Club	280-	B-13-	1830
W6AFP/6	Dot, Dash and Mash Club	170-	A- 6-	1755
W9UPJ/9	Martinsville Amateur Radio Club	266-	B- 6-	1746
W9TBY/9	Neenah-Menasha Amateur Radio Club	167-	A-11-	1728
W5TFU/5	(nonclub group)	257-	B- 5-	1692
KH6BFD/KH6	Windward Amateur Radio Club	255-	AB-12-	1689
W4VJV/4	Owensboro Amateur Radio Club	277-	B-15-	1662
W5NJO/5	(nonclub group)	276-	B- 8-	1656
WØIUY/Ø	Cedar Valley Radio Club	158-	A- 4-	1647
W7RKP/7	Albany Amateur Radio Club	158-	A-10-	1647
W8MAI/8	Blossomland Amateur Radio Assn.	248-	B-15-	1638
W9AIQ/9	Door County Amateur Radio Club	245-	B- 6-	1626
W1MX/1	M.I.T. Radio Society	154-	A- 4-	1611
W2UMI/2	Oswego County Amateur Radio Club	154-	A-10-	1611
W8PZS/8	Ohio University Radio Club	154-	A-13-	1611
W9BMR/9	(nonclub group)	177-	A- 4-	1593
WØIA/Ø	Boulder Radio Club	151-	A- 9-	1584
W3GGV/3	Annapolis Radio Club.	225-	AB- 7-	1563
W7SSF/7	Butte Amateur Radio Club	231-	B-12-	1536
K2COV/2	(nonclub group)	145-	A- 3-	1530
W4EM/4	Mid-South Amateur Radio Assn.	229-	B-18-	1524
W4CMA/4	Cedar Valley Amateur Radio Club	251-	B- 3-	1506
W2CFY/2	Malone Amateur Radio Emergency Corps	222-	B-20-	1482
W9BXM/9	Wisconsin Triumvirate.	220-	B- 3-	1470

Meet the Westpark Radiops, who've sewed up first position in the Club Aggregate Mobile listing for the past three years. In '55, 43 individual mobile units earned a nifty 86,763-point accumulation, their best work to date.

KH6CM/KH6	Happy Hawaiians	218-	B- 9-	1458
WØIQW/Ø	Rochester Radio Amateur Club	213-	B- 7-	1428
K6ADA/6	Drag-Net Amateur Radio Club	155-	A- 9-	1395
WØFVT/Ø	Sioux Amateur Radio Assn	204-	B-15-	1374
WØOOL/Ø	(nonclub group)	200-	B- 4-	1350
W9GHA/9	Central High School Radio Club	192-	B- 4-	1302
VE1JV/1	Pictou County Amateur Radio Club	114-	A- 5-	1287
W7ACY/7	Tillamook Radio Communication Club	187-	B- 5-	1272
W7EGR/7	Rodeo City Radio Club	116-	A-10-	1269
WØMEL/Ø	Boone Mike and Key Club	114-	A- 6-	1269
W5KMF/7	Fort Huachuca Radio Club	211-	B- -	1266
WØFFN/Ø	(nonclub group)	184-	B- 6-	1254
W8TQK/8	Barry Amateur Radio Assn	206-	B-13-	1236
W7QXS/7	Astoria Amateur Radio Club	136-	A-13-	1224
W9HSP/9	Liberty Amateur Radio Club	110-	A- 3-	1215
KØAST/Ø	Central Kansas Radio Club	200-	B-15-	1200
W6NVP/6	Rough and Ready Island Amateur Radio Club	174-	B-10-	1194
W8ECU/8	Ashland Amateur Radio Club	132-	A- 5-	188
VE3RC/3	Ottawa Amateur Radio Club	158-	AB-12-	1185
W6KKP/5	(nonclub group)	106-	A- 4-	1179
W4TVI/4	(nonclub group)	104-	A- 5-	1161
KH6AU/KH6	Hilo Amateur Radio Club	166-	B- 6-	1146
W3JB/3	Ridley Radio Club	183-	B-14-	1098
WØEDA/Ø	Rolla Amateur Radio Assn	182-	B- 9-	1092
K4CAY/4	Leon High Amateur Radio Club	154-	B- 3-	1074
W2TIO/2	(nonclub group)	179-	B- 8-	1074
W1IWY/1	New London Civilian Defense Station	178-	B- 5-	1068
W5WBJ/5	High School Radio Club	177-	B- 4-	1062
W3YZD/3	Mount Lebanon Civil Defense Amateur Radio Assn	175-	B- 4-	1050

CLUB AGGREGATE MOBILE SCORES

Westpark Radiops	86,763
Phil-Mont Mobile Radio Club	14,496
Lakewood Emergency Net	4968
Mobile Amateur Radio Club of South Bend	3972
Philadelphia High-Frequency Radio Club	1161
Connecticut Wireless Assn	621
Waltham Amateur Radio Assn	540
Truro Amateur Radio Club	459
Johnson County Radio Amateurs Club	68
Lakehead Amateur Radio Club	68
Pampa Amateur Radio Club	63
Coffee Dunkers of Detroit	54

K2IJN/2	(nonclub group)	114-	A- 4-	1026
WØIXP/Ø	Ferguson High School Radio Club	88-	A- 4-	1017
VE2QP/2	(nonclub group)	87-	A- 6-	1008
W7QNT/7	Seattle Wireless Assn	111-	A- 4-	999
WØYDE/Ø	(nonclub group)	110-	A- 3-	990
W8VPV/8	(nonclub group)	138-	B-20-	978
W5BPM/5	East Texas Amateur Radio Club	150-	B-19-	970
W1CBW/1	(nonclub group)	161-	B- 3-	966
K6BKT/6	(nonclub group)	80-	A- 3-	945
W2UPT/2	Sidney Amateur Radio Club	105-	A- 5-	945
W8QLY/8	Mahoning Valley Amateur Radio Assn	126-	AB-10-	918
W9VSX/9	Knox-Warren Amateur Radio Assn	125-	AB-12-	912
WØIER/Ø	Redfield Amateur Radio Club	148-	B- -	888
WØRRN/Ø	(nonclub group)	123-	B- 7-	888
K6BU/6	Marin County Amateur Radio Club	73-	A- 7-	882
W7ROX/7	Gallatin Amateur Radio Club	76-	AB-10-	840
WØFX/Ø	(nonclub group)	278-	C- 4-	834
W7UED/7	North Seattle Amateur Radio Club	66-	A- 6-	819
WN8UKR/8	Kalamazoo Novice Group	66-	A- 7-	809
K2HWI/2	Mohawk Valley Amateur Radio Club	134-	B-11-	804
W9PSD/9	Richmond Amateur Radio Assn	132-	B-10-	792
W3ZIB/3	Radiation Laboratory Radio Club	87-	A- 4-	783
W1SAD/1	Middlesex Amateur Radio Club	129-	B- 4-	774

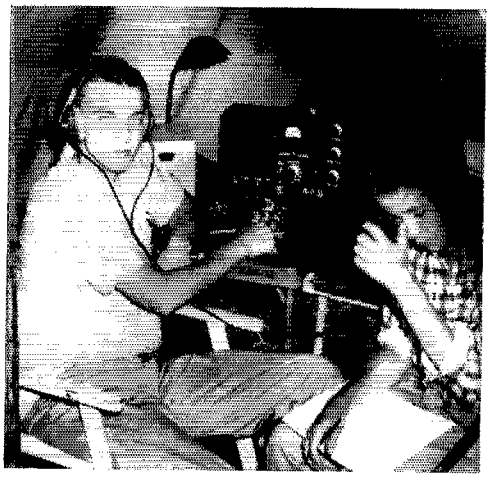
In the Garden State Amateur Radio Association's 75-meter 'phone tent, K2ALO, K2GTX, W2NBE and W2NBP toil away. Such attention to duty paid dividends — W2GSA/2's 16,362 points led Class 11A and placed fourth in the country.

W3KYR/3	St. Marys Amateur Radio Society	85-	A- 4-	765
W5RTH/5	(nonclub group)	102-	B- 4-	762
W7TAT/7	(nonclub group)	101-	B- 3-	756
KL7AIR/KL7	(nonclub group)	96-	B- 3-	726
W1MBR/1	(nonclub group)	95-	B- 5-	720
W5UK/5	Greater New Orleans Amateur Radio Club	90-	B- 8-	690
VE5MA/5	Moose Jaw Amateur Radio Club	88-	B-12-	678
KH6FAA/KH6	Hickam Amateur Radio Club	193-	C- 4-	654
W4HCG/4	Indian River Amateur Radio Club	72-	A- 6-	648
W8LGA/8	University of Detroit Radio Engineering Assn	79-	B- 3-	630
WØIAL/Ø	(nonclub group)	66-	A- 4-	594
WØQVN/Ø	Windsor Amateur Radio Club	65-	A- 3-	585
WØMUO/Ø	(nonclub group)	97-	B- 4-	582
W5JJE/5	Tip O Tex Radio Club	64-	B- 3-	534
W8SJI/3	Hazleton Amateur Radio Club	85-	B- 4-	510
W3UG/3	Coke Center Radio Club	88-	AC- 3-	498
W8PFP/8	Tecumseh Amateur Radio Tribe	141-	AC-10-	498
W7ZNP/7	(nonclub group)	28-	A- 3-	477
W8LWJ/8	(nonclub group)	78-	B- 3-	468
WØQNY/Ø	Koochiching County Amateur Radio Emergency Group	77-	B- 6-	462
W6GGK/6	San Diego Amateur Radio Club	45-	B- 3-	420
W7WKH/7	North Seattle Amateur Radio Club	67-	B- 3-	402
W9NRP/9	(nonclub group)	66-	B- 4-	396
W3QKQ/3	Philadelphia High Frequency Radio Club	36-	A- -	324
W5OCY/5	(nonclub group)	50-	B- 3-	300
W8PHU/8	Mount Pleasant Amateur Radio Club	100-	C- -	300
W3RFX/3	(nonclub group)	22-	B- 5-	282
WN1DIF/1	Pittsfield Radio Club (Novice Group)	28-	A- 6-	252
W7BXL/7	(nonclub group)	26-	A- 3-	234
WN5KRI/5	(nonclub group)	34-	B- 4-	204
VE5JE/5	(nonclub group)	22-	A- 4-	198
W5FIT/5	(nonclub group)	88-	B- 4-	176
K5FCT/5	Harlingen Air Force Base Radio Club	93-	C- 6-	165
WN3BVA/3	Pottstown Amateur Radio Assn. (Novice Group)	11-	A- 6-	99
VE7NA/7	Nanaimo Amateur Radio Assn	10-	A- 8-	90
WN9THT/9	RAMS Amateur Radio Club	10-	A-15-	90
W4LTM/4	Central Virginia Amateur Radio Club (Novice Group)	6-	B-10-	36

Two Transmitters Operated Simultaneously

W3CLC/3	Northeast Radio Club	756-	A- 6-	6804
W9ERU/9	(nonclub group)	657-	A- 7-	6156
W3CWC/3	Antietam Radio Assn	792-	AB-13-	5553

W9NUW/9	Wisconsin Valley Radio Assn.	675-	AB-20-	5529
K5FGJ/5	Keesler Amateur Radio Club	541-	A-10-	5094
W2ZRC/2	Radio Amateurs of Erie County	503-	A-10-	4770
W2ODP/2	Irvington Radio Amateur Club	497-	A-30-	4698
W9UDU/9	Racine Megacycle Club	517-	A-16-	4653
W9HRM/9	Milwaukee Radio Amateurs' Club	489-	A-22-	4626
W1VB/1	Candlewood Amateur Radio Assn.	448-	A-20-	4257
W1OP/1	Providence Radio Assn.	437-	A-21-	4194
W8PLQ/8	Dayton Amateur Radio Assn.	654-	AB- 6-	4188
WØRFU/Ø	Band Hoppers Radio Club	528-	AB- 9-	4017
W2MUM/3	Order of Boiled Owls	420-	A- 4-	4005
W4QAN/4	Middle Tennessee Radio Amateur Assn.	482-	AB-10-	3990
W8ICS/8	Indian Hills Radio Club	410-	A-12-	3915
W4RSS/4	Norfolk Naval Shipyard Amateur Radio Club	471-	AB- 9-	3798
W2IQ/2	(nonclub group)	427-	AB-10-	3687
K6KGK/6	Pleasant Valley Amateur Radio Club	381-	A-15-	3654
W3RV/3	Andrews Electronics Assn.	500-	AB- 9-	3519
W8RYI/8	Kalamazoo Amateur Radio Club	361-	A-14-	3474
W3QVK/3	York Road Radio Club	358-	A- 9-	3447
W5FC/5	Dallas Amateur Radio Club	380-	A-16-	3420
WØTIU/Ø	Central Iowa Radio Club	535-	B-16-	3360
W4NC/4	Winston-Salem Amateur Radio Club	529-	B-17-	3336
W5UMY/5	Brazoria County Amateur Radio Club	449-	AB- 9-	3297
WØSLP/Ø	Hutchinson Amateur Radio Club	341-	A- 6-	3294
W2GVV/2	Nite Owl Net	340-	A-10-	3285
W7LA/7	Twin City Radio Club	521-	B-12-	3276
W3BSO/3	(nonclub group)	518-	B- 8-	3270
W2FMU/2	Walton Ham Group	361-	A- 8-	3249
W3GUR/3	Pottstown Amateur Radio Assn.	357-	A- 7-	3213
W8AW/8	Edison Radio Amateur's Assn.	501-	B-17-	3156
W2EWT/2	KBT Radio Club	469-	AB-27-	3153
W2JC/2	Bloomfield Radio Club	314-	A-13-	3051
W6SF/6	Stockton Amateur Radio Club	313-	A-12-	3042
W5BXX/5	Longview Amateur Radio Club	507-	B-12-	3042
K6FAV/6	McClellan Amateur Radio Society	474-	B-21-	29
W8WV/8	Al Koran Temple Radio Club	324-	A- 9-	2916
K2CGC/2	(nonclub group)	461-	B- 4-	2916
W9ABI/9	Tri-Town Radio Club	484-	B-19-	2904
W8JCU/8	Niles Amateur Radio Club	458-	B- 8-	2898
VE2CB/2	(nonclub group)	450-	B-11-	2856
W2SV/2	Sunrise Radio Club	292-	A-16-	2853
WØBBE/Ø	Des Moines Radio Amateurs Assn.	430-	AB-31-	2799
W8RAC/8	Cleveland Teenage Radio Club	331-	AB- 4-	2763
W4FM/4	Greenville Amateur Radio Club	306-	A-18-	2754
W1SAQ/1	Willimantic Radio Club	323-	AB-12-	2637
W9REG/9	Tippecanoe Amateur Radio Assn.	432-	AB-12-	2622
W4GIT/4	Shaw-Sumter Amateur Radio Club	409-	B-10-	604
WØAJN/Ø	South St. Louis Amateur Radio Club	360-	AB- 6-	2601
W6MLI/6	Coronado Radio Club	285-	A-18-	2565
W2FUS/2	Morris Radio Club	258-	A-10-	2547
WØZWY/Ø	Sioux Falls Amateur Radio Club	392-	B-12-	2502
W6BCY/6	Merced Amateur Radio Club	390-	B- 6-	2490
W4CVY/4	Columbus Amateur Radio Club	409-	B-35-	2454
W7AW/7	West Seattle Amateur Radio Club	244-	A-17-	2439
W9GEY/9	Adams Co. Radio Club	326-	AB- 4-	2424
W6IFZ/6	Richmond Radio Club	378-	B-16-	2418
W4TM/4	Jackson Radio Club	291-	AB-15-	2415
W9TBV/9	(nonclub group)	236-	A-10-	2349
W9OKR/9	Kokomo Amateur Radio Club	389-	B- -	2334
W7TWK/7	(nonclub group)	233-	A- 4-	2331
WØKQU/Ø	Central Kansas Radio Club	358-	B-18-	2298
W3GAG/3	Philadelphia Wireless Assn.	330-	AB- 6-	2289
W6FFT/6	Ma Bells Beer Busters	379-	B-10-	2274
W4HZT/4	Anniston Radio Club	344-	B-12-	2214
W7EKA/7	(nonclub group)	336-	B- 4-	2166
K2HJG/2	Harmonic Hill Radio League	357-	B-25-	2142
W6IAC/6	Escondido Radio Club	241-	AB-10-	2091
W8AOD/8	Scioto Valley Amateur Radio Club	346-	B-12-	2076
W3ORJ/3	Tamaqua Amateur Radio Club	280-	AB-18-	2070
K2OML/2	Raritan Bay Radio Amateurs	198-	A- 6-	2007
W4MN/4	Palmetto Amateur Radio Club	305-	B-19-	1980
W9TBP/9	(nonclub group)	246-	AB-16-	1959
W5HPI/5	Terry County Amateur Radio Club	185-	A- 6-	1926
W1ZLH/1	Middlebury Mike and Key Club	294-	B- 6-	1914
W2HIP/2	Mid-Hudson Radio Club	293-	B- 8-	1908
WØCSW/Ø	Crete Amateur Radio Club	187-	A- 5-	1908
W9WPF/9	Association of Rockford Radio Amateurs	290-	B-12-	1890



Ten A.M. Sunday finds youngsters W8NKI and W8MZA sleepy after a grueling all-night keying stint in the unit-station category. Both lads kept at W8NKI/8 long enough to trade RSTs and QTHs with 215 stations.

W8VVL/8	Queen City Emergency Net	434-	ABC-25-	1886
VE3AIF/3	Stratford Amateur Radio Club	313-	B-10-	1878
VE2APX/2	St. Johns Amateur Radio Club	178-	A- 8-	1836
W1ZYJ/1	(nonclub group)	270-	B- 7-	1770
W4YRI/4	Clarksville Amateur Radio Club	204-	AB-13-	1749
W4KX/4	Rappahannock Valley Radio Club	290-	B-18-	1740
K5FEC/5	Flytaf MARS Group	236-	AB- 4-	1731
W4VHU/4	Middlesboro Amateur Radio Club	288-	B-10-	1728
WØDNN/Ø	(nonclub group)	188-	A- 3-	1692
W5GXH/5	Pittsburgh County Amateur Radio Club	279-	B-10-	1674
KØAKI/Ø	Southern Minnesota Teenage Brass Pounders Assn.	283-	B- 7-	1698
W8GYM/8	Lima Area Radio Club	238-	AB- 8-	1698
WØBXR/Ø	Davenport Radio Amateur Club	253-	B-21-	1668
W8RQF/8	Detroit Metropolitan Radio Club	226-	AB- 8-	1660
W2NAL/2	Radio Amateurs of Greater Syracuse	251-	B-10-	1656
W1EDH/1	Middlesex Radio Assn.	217-	AB-10-	1572
W6MWA/6	(nonclub group)	213-	AB-15-	1545
WØBYC/Ø	(nonclub group)	144-	A- 8-	1521
K4ANW/4	South Miami Radio Club	249-	B- 9-	1494
KH6RS/KH6	Maui Amateur Radio Club	222-	B-23-	1482
W9WDK/9	Menomonie Radio Club	138-	A-14-	1467
WØSXY/Ø	Amateur Radio Club of Central Missouri	239-	B-15-	1428
W9NTI/9	New Castle Amateur Radio Assn.	208-	B-24-	1398
W5ABF/5	Mineral Wells Amateur Radio Club	207-	B-16-	1392
W4LJE/4	(nonclub group)	205-	AB- 6-	1380
W6KOC/6	Fresno Brookside Amateur Radio Club	151-	A- 4-	1377
W9CFO/9	Point Radio Amateurs	152-	A- 8-	1368
W7ETO/7	Apple City Radio Club	201-	B- 9-	1356
W3MKA/3	West Philadelphia Radio Assn.	222-	B-10-	1332
K2EC/2	Eastern Suffolk Radio Club	148-	A-15-	1332
WØJUI/Ø	North Iowa Amateur Radio Club	229-	B-16-	1310
WØVQN/Ø	Tri-City Amateur Radio Club	163-	AB-12-	1284
W9VMW/9	Cass County Radio Club	212-	AB- 5-	1278
W9RNC/9	(nonclub group)	187-	B- 7-	1272
W2OXU/2	Inter-County Amateur Net	212-	B- 5-	1272
W6UCS/6	Monterey Bay Radio Club	176-	AB-10-	1242
W8KAF/8	(nonclub group)	137-	A- 3-	1233
W1VBC/1	Brookline Amateur Radio Society	111-	A-12-	1224

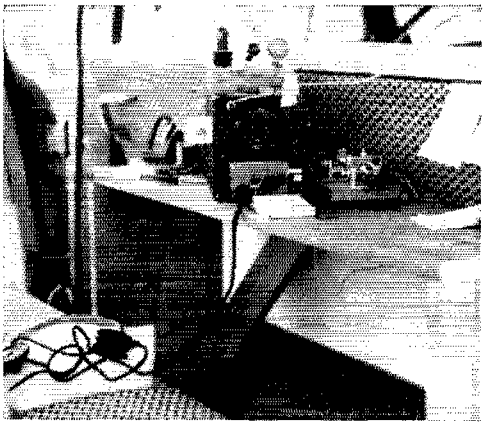
W9MLX/9	Elkhart Amateur Radio Club	150-	AB- 9-	1218
WØOMH/Ø	Hastings Amateur Radio Club	176-	B- 9-	1206
K2ESM/2	(nonclub group)	198-	B- 3-	1188
W7YXG/7	Great Falls Radio Club	168-	B-25-	1158
KØBPR/Ø	Fairfield High School Amateur Radio Club	165-	B-16-	1140
K2KHB/2	Brighton High School Radio-Electronics Club	124-	A- 6-	1116
WØOUI/Ø	Denver Radio Club	185-	B-12-	1110
WØPAH/Ø	Kaw Blue Radio Club	156-	B- 7-	1086
W1NPP/1	Androscoggin Amateur Radio Assn.	173-	AB- 8-	1081
W7VAQ/7	Bremerton High School Amateur Radio Club	118-	A- 4-	1062
W1YFG/1	(nonclub group)	150-	AB- 6-	1050
W7SHA/7	(nonclub group)	175-	B- 5-	1050
W7ANU/7	Central Oregon Radio Amateurs	89-	A- 9-	1026
WØOSD/Ø	Jayhawk Amateur Radio Society	159-	AB-15-	1011
WØTMY/Ø	Iowa-Illinois Amateur Radio Club	167-	AB-23-	1011
W5BDL/5	Bartlesville Amateur Radio Club	393-	AB-15-	1008
W7LAB/7	(nonclub group)	311-	C-39-	1008
W8GIS/8	Catalpa Amateur Radio Society; Cranbrook Radio Club	167-	B-17-	1002
WØQDN/Ø	Huron Amateur Radio Club	166-	B-11-	996
W2EB/2	Squaw Island Amateur Radio Club	109-	AB-11-	993
W9UVI/9	Peoria Area Amateur Radio Club	153-	AB-12-	972
WØRUJ/Ø	Southeastern Nebraska Radio Club	129-	B- 9-	936
W5FHL/5	Santa Fe Radio Club	85-	AB- 3-	879
K2BGQ/2	Schoharie County Amateur Radio Club	89-	AB- 7-	879
W7TCD/7	Snohomish Radio Group	116-	B- 6-	846
WØUTL/Ø	Se Kan Radio Club	113-	B- 7-	840
VE7ASM/7	Fraser Valley Amateur Radio Club	92-	A- 3-	828
W8TAH/8	Westlake Amateur Radio Assn.	115-	AB-14-	759
W1AWQ/1	Oxford County Amateur Radio Assn.	92-	AB-11-	714
W8TTV/8	Fulton County Amateur Radio Club	113-	B-11	678
WØRWC/Ø	Clinton Radio Amateurs Club	307-	B-24-	668
W8LSE/8	Marietta Amateur Radio Club	110-	AB- 8-	660
VE3AJ/3	Lakehead Amateur Radio Club	109-	AB-11-	654
W9DUA/9	Sangamon Valley Radio Club	216-	C-10-	648
VE7SE/7	Thirteen Amateur Radio Club	44-	A- 4-	621
W6GRR/6	Bakersfield Mobile Radio Club	102-	B- 8-	612
K2IAX/2	East Aurora High School Radio Club	76-	B-11-	606
K6EBH/6	Skypilots	67-	A- 3-	603
WN3BOA/3	(nonclub group)	108-	AB- 6-	587
W9UYU/9	(nonclub group)	292-	B- 3-	584
W9NVP/9	(nonclub group)	191-	A- 3-	573
WØEJG/Ø	Arrowhead Amateur Radio Club	64-	B- 8-	534
W8ICN/8	(nonclub group)	83-	AB- 3-	498
W2NRD/2	Rip Van Winkle Radio Society	55-	A- 4-	495
W6CNY/	(nonclub group)	77-	B- 7-	462
K6ICT/6	Old Boys of San Diego.	45-	A- 6-	405
W9ODH/9	Standard Amateur Radio Club	55-	AB-12-	392
W8KQI/8	Mount Clemens Radio Club	199-	B- 9-	398
W7GTO/7	Lakewood Amateur Radio Club	164-	AB- 5-	395
W3WLH/3	Naval Ordnance Lab Amateur Radio Society	112-	AC-10-	390
W2AFU/2	Ocean County Amateur Radio Assn.	59-	AB- 6-	369
WØYVY/Ø	Radio Club of Leavenworth Senior High School	45-	AB- 3-	363
W1WJR/1	(nonclub group)	96-	AB- 3-	338
W9KCM/9	Kishwaukee Radio Club	35-	AB-10-	288
VE3AXH/3	Algoma Amateur Radio Club	40-	B-11-	240
W4IHT/4	(nonclub group)	122	BC- 6-	220
KN2JXH/2	Radio Association of Western New York (Novice Group)	26-	AB-10-	195

VE3BNK/3	Robiin Radio Club	31-	AB- 5-	192
W4RRN/4	Henderson Amateur Radio Society	70-	AB- 6-	172
W7LXY/7	Scottsdale High School Amateur Radio Club	44-	AC-20-	168
W3CTC/3	Delaware Valley Amateur Radio Club	53-	A- 5-	159
W1NBN/1	Merrimack Valley Amateur Radio Club	16-	AB-10-	138

Three Transmitters Operated Simultaneously

W2ARL/2	Somerset Hills Radio Club	961-	A-15-	8874
W8PM/8	Westpark Radiops	852-	A-45-	8649
W2OR/2	Pompton Valley Radio Club	798-	A-35-	7416
W1SKT/1	Narragansett Association of Amateur Radio Operators	883-	AB-18-	6735
W9AB/9	Michiana Amateur Radio Club	705-	A-30-	6570
W3PKV/3	Northeast Radio Club	722-	A-10-	6498
W6IPW/6	(nonclub group)	684-	A- 6-	6381
W6PMI/6	United Radio Amateur Club	650-	A-20-	6075
K2CBB/2	Young Squirts Morris Radio Club	642-	A-10-	6003
W4PLB/4	Orlando Amateur Radio Club	633-	A-25-	5922
K2LSA/2	State Line Radio Club	633-	A-14-	5697
W3GRX/3	(nonclub group)	937-	B- 7-	5622
W2GTD/2	Ridgewood Amateur Radio Club	596-	A-12-	5589
W9ZKW/9	Lake County Amateur Radio Club	708-	AB-45-	5550
W2MO/2	Livingston Amateur Radio Club	711-	AB-25-	5456
W7HZ/7	Valley Amateur Radio Club	564-	A-22-	5301
W2QYV/2	Niagara Radio Club	582-	A- -	5238
W9CAF/9	Chicago Amateur Radio Club	547-	A-28-	5148
W3FRY/3	Frankford Radio Club	828-	B-12-	4992
W5DXD/5	Temple Amateur Radio Club	665-	AB-14-	4881
W2WUX/2	Utica Amateur Radio Club	542-	A-20-	4878
W9TCH/9	Rock River Radio Club	512-	A-20-	4833
W3RQZ/3	Phil-Mont Mobile Radio Club	635-	AB- -	4710
W6BUD/6	Southern California DX Club	496-	A- 6-	4689
W4SKH/4	Oak Ridge Radio Operators Club	579-	AB-45-	4479
W2QW/2	Raritan Valley Radio Club	514-	AB-15-	4461
K6CLZ/6	Aerojet Radio Club	567-	AB-30-	4441
VE3YJ/3	London Amateur Radio Club	522-	AB-22-	4425
W5NW/5	Odessa Amateur Radio Club	703-	B-15-	4368
K6CTO/6	Gardena Civil Defense and Disaster Corps.	481-	A- -	4329
W5MPZ/5	Sandia Base Radio Club	505-	AB-22-	4302
W2ALR/2	Lockport Amateur Radio Assn.	503-	AB-23-	4278
W4FR/4	Amateur Radio Transmitting Society	450-	A-25-	4275
W6WVK/6	North Bay Amateur Radio Assn.	532-	AB-10-	4176
W9KA/9	Chicago Radio Traffic Assn.	438-	A-12-	4167
W8IWB/8	Kanawha Radio Club	662-	B-10-	4122
W5ZDN/5	Central Texas Amateur Radio Club	649-	B-20-	4044
W9DUP/9	DuPage Radio Club	496-	AB-10-	4023
W8MAA/8	Central Michigan Amateur Radio Club	670-	B-12-	4020
W4TL/4	Anderson Radio Club	418-	A-10-	4005
W2UBW/2	Mid-Island Radio Club	441-	A- 8-	3969
W2KFR/2	Penn Jersey Radio Club	656-	B- -	3936
W9VTI/9	(nonclub group)	429-	A- 3-	3861
W8TO/8	Columbus Amateur Radio Assn.	643-	B-15-	3858
W9NZ/9	Swani Amateur Radio Club	402-	A-15-	3843
W1KKS/1	Manchester Radio Club	398-	A-27-	3825
W4NEK/4	Nav Air Amateur Radio Club	623-	AB-17-	3822
W2GLQ/	Nutley Amateur Radio Society	399-	A-18-	3816

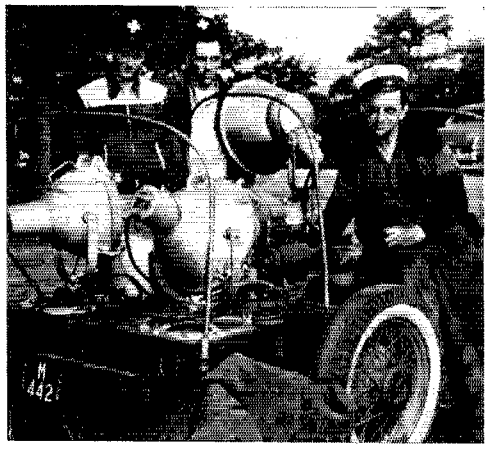
As tension mounts before FD begins, a W9IT/9 maintenance man administers repairs to one of Northwest Amateur Radio Club's ten positions. Apparently a minimum of equipment failures were experienced once the festivities were underway — NARC's 15,723 points paced Nineland, was fifth in Class A.



You don't need a roomful of equipment to enjoy Field Day! W7OUV/7 had his share of fun with the 11-watt 6AQ5 crystal oscillator and ARC-5 receiver shown above.

W7AWD/7	Mid-Columbia Radio Club	603-	B-12-	3768
W9NQY/9	Aurora Radio Mobile Club	412-	A-15-	3708
W7RRJ/7	Central Utah Contest Club	587-	B- 6-	3672
W9GPS/9	Polecats Emergency Corps	604-	B-14-	3624
VE3BXT/3	Scarborough Amateur Radio Club	368-	A-12-	3537
W1TRX/1	Newport County Radio Club	428-	AB-34-	3468
VE7ARV/7	Vancouver Amateur Radio Club	400-	AB-35-	3420
W4YKY/4	Lake Amateur Radio Assn.	347-	A-18-	3348
W2NOO/2	Belleville Amateur Radio Club	346-	A-17-	3339
VE1FO/1	Halifax Amateur Radio Club	334-	A-12-	3339
W6RIG/6	"Q" STeiners Mobile Radio Club	535-	B- 6-	3210
W8UMD/8	Treaty City Amateur Radio Assn.	535-	B- 8-	3210
K2AJD/2	J. P. Net Group	441-	AB-18-	3156
W4SRX/4	Eglin Amateur Radio Society	522-	B-25-	3132
W2QCN/2	Rochester Amateur Radio Assn.	477-	AB-35-	3042
W2ODV/2	Bayonne C.D. Amateur Radio Club	456-	AB- 9-	2958
WØUNT/Ø	Lawrence Amateur Radio Club	489-	B-16-	2934
W1WFB/1	Milford Amateur Radio Club	433-	AB- -	2898
W6AEX/6	Society of Amateur Radio Operators	292-	A-12-	2853
W2PE/2	Radio Association of Western New York	473-	B-50-	2838
W5IV/5	Webster Parish Amateur Radio Club	280-	A-20-	2745
W8BFH/8	Buckeye Shortwave Radio Assn.	439-	B-20-	2724
W2EFU/2	Schenectady Amateur Radio Assn.	419-	B-35-	2676
W9ARM/9	Kankakee County Amateur Radio Club	418-	B-11-	2658
W8AKA/8	(nonclub group)	415-	B-12-	2610
W8KTV/8	Cherryland Radio Club	409-	B-16-	2604
VE2ADX/2	South Shore Amateur Radio Club	409-	B-19-	2604
W4GNF/4	Greensboro Radio Club	572-	AB-40-	2560
W5SWZ/5	(nonclub group)	397-	B- 8-	2532
W2IQO/2	Par-Troy Amateur Radio Assn.	402-	AB-10-	2517
K4CYP/4	Wayne County Amateur Radio Assn.	391-	B-15-	2496
K6EGQ/6	(nonclub group)	250-	A- 3-	2484
VE1LC/1	Loyalist City Amateur Radio Club	378-	B-15-	2418
W5IAS/5	Tulsa Amateur Radio Club	373-	B-10-	2400
VE3AIS/3	Oakville Amateur Radio Club	260-	A-12-	2340
W5ZZZ/5	Copiah Amateur Radio Club	360-	B-10-	2310
VE3BAC/3	Mohawk Amateur Radio Society	228-	A-12-	2295
W2RBK/2	Syracuse VHF Club	261-	A-15-	2257
W3PIE/3	Uniontown Amateur Radio Club	408-	B-10-	2256
W4FV/4	Lynchburg Amateur Radio Club	316-	AB-15-	2241
W2YNU/2	Ridgewood High School Radio Club	373-	B-12-	2238
WØOJY/Ø	Prairie Dog Amateur Radio Club	346-	B-20-	2226
W3FF/3	Penn Central Radio Club	222-	A- 8-	2223
W3ZEK/3	Harrisburg Radio Amateurs Club	318-	AB-14-	2217
W1ORS/1	Stratford Amateur Radio Club	321-	AB-17-	2196
W2FWT/2	Clifton Radio Club	273-	AB-14-	2193
KP4WW/KP4	Ramey Amateur Radio Club	217-	A-12-	2178
W9IAW/9	Twin City Radio Club	337-	B-25-	2172
W7OUE/7	Arizona Amateur Radio Club	270-	AB-17-	2130
W5QA/5	Abilene Amateur Radio Club	323-	B-14-	2124
WØNHO/Ø	Southwest Missouri Amateur Radio Club	341-	B-30-	2046
W1WEF/1	Hampden County Radio Assn.	338-	B-70-	2028
W9PYV/9	North Side Amateur Radio Emergency Assn.	301-	AB- 8-	2019
W8NCM/8	Springfield Amateur Radio Club	310-	B-25-	2010
W2HZH/2	Woodbridge Radio Club	249-	AB- 8-	2007
WØEQU/Ø	Ak-Sar-Ben Radio Club	305-	B-24-	1992
W4CEI/4	Bristol Amateur Radio Club	316-	AB-20-	1956
W8VTD/8	Warren Amateur Radio Assn.	323-	B- 9-	1938
W4UUB/4	Piedmont Amateur Radio Club	277-	AB-12-	1885
W5ZU/5	Pecos Valley Amateur Radio Club	314-	B- 3-	1884
W1AQ/1	Associated Radio Amateurs of Southern New England	206-	A- -	1854
W8URG/8	(nonclub group)	206-	A- 3-	1854
W7LBN/7	Saguaro Amateur Radio Club	180-	A- -	1845
W2NFU/2	Northern Nassau Amateur Radio Club	314-	ABC-25-	1800
W4NSM/4	Central Virginia Amateur Radio Club	300-	B-12-	1800
VE3RCS/3	Royal Canadian School of Signals Amateur Radio Club	299-	B- 7-	1794
W7YYE/7	Oregonian Amateur Radio Society	174-	A- 9-	1791
WØLEF/Ø	(nonclub group)	199-	A- 6-	1791
WØRMG/Ø	S.W. Iowa Amateur Radio Assn.	273-	B-18-	1788
W1HQH/1	Falmouth Amateur Radio Assn.	170-	A- 6-	1755
VE1RC/1	Moncton Amateur Radio Club	170-	A- 3-	1755
W4PAK/4	(nonclub group)	267-	B- 7-	1752
W9CDO/9	Electron Club of Chicago	292-	B-12-	1752
VE1SH/1	Sackville Amateur Radio Club	169-	A- 9-	1746
W1YYI/1	Bedford Amateur Radio Club	194-	A- 8-	1746
W1WHF/1	Hamden Amateur Radio Assn.	251-	AB- -	1719
W5UTB/5	Texoma Amateur Radio Club	277-	AB- -	1683
W2MAR/2	"Insulting Engineers"	209-	AB- 5-	1650
KØFCT/Ø	(nonclub group)	269-	B- 8-	1614
W8SP/8	Mountaineer Amateur Radio Assn.	263-	AB-14-	1602
W8LCY/8	(nonclub group)	251-	AB- 5-	1584
W8WIT/8	Toledo Mobile Radio Assn.; Toledo Amateur Experimenters	265-	AB-12-	1563
W1SBF/1	Meriden Amateur Radio Club	173-	A-12-	1557

(*Continued on page 190*)



Three auxiliary firemen of Saugus, Mass., volunteered their time and this 3-kw. generator, considerably brightening the Class 6A prospects of the North Shore Radio Association, W1GES/1.

An Amateur Wireless Magazine

PRICE 10 CENTS

DE

The American Radio Relay League

FOR THE MONTH OF DECEMBER

NINETEEN HUNDRED AND FIFTEEN

(FORTIETH ANNIVERSARY REPRODUCTION, DECEMBER 1955)

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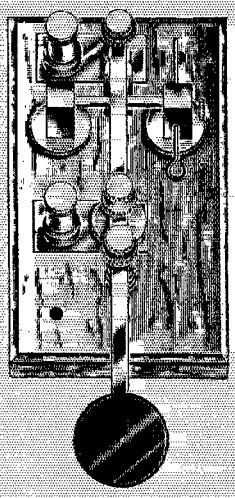

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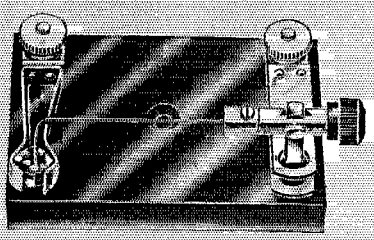

The most perfect of crystal holders.

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A sensitive point of either crystal quickly found, the correct pressure held constantly without moving a single screw or nut.

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SEND FOR OUR NO. 36 WIRELESS CATALOG

J. H. Bunnell & Co., Incorporated

32 Park Place—Broadway Block

New York

DECEMBER, 1915 **Q S T** *NUMBER 1*

CONTENTS.

Issued by Hiram Percy Maxim and Clarence D. Tuska
Hartford, Conn

ANNOUNCEMENT

¶ Q S T is published by and at the expense of Hiram Percy Maxim and Clarence D. Tuska.

¶ Its object is to help maintain the organization of the American Radio Relay League and to keep the Amateur Wireless Operators of the country in constant touch with each other.

¶ Every Amateur will help himself and help his fellows by sending in 25 cents for a three months' trial subscription.

THE PUBLISHERS OF Q S T

December Radio Relay Bulletin

SEASON OPENING.

The cool weather has arrived, "static" is getting better every night, and the owners of relay stations are returning to their instruments. It is time to send out another official QST from headquarters. There is much to tell not only our membership, but also every amateur in the country.

First of all, we are confronted with extremely serious national questions. Our country has never before faced a more serious situation. National defense has become a question which every American realizes concerns him personally. The President is preparing plans and the Army and the Navy are both studying carefully every phase of the problem. One of the most important factors is Radio Communication. The great possibilities of the American Radio Relay League, with its organization of over six hundred relay stations in nearly every state of the Union are bound to attract prominent attention. The directors of the League have anticipated this, as will be noted on another page.

Of equal importance is the matter of RELIABILITY and CELEBRITY, as far as the transmission of messages by the League is concerned. We have had a year's experience and we have learned many things. We have found our membership enthusiastic and willing but we have not been efficient always in getting messages through. The directors have something to say on this point, which the membership should carefully note.

The matter of frequent issue of Bulletins to the membership has been something which has been given thought, and every amateur should think carefully about what the Directors say about this important subject.

NATIONAL DEFENCE.
OUR SERVICES OFFERED TO GOVERNMENT.

When it became evident that our government intended to seriously take up the question of improving our national defense, the following letter was prepared and sent to the Secretary of the Navy:—

Secretary of the Navy,
Washington, D. C.

Sir:—

In connection with your plans for national defense, it may be that the organization of the AMERICAN RADIO RELAY LEAGUE, INC. will be of service. We respectfully present the following information concerning this League.

It has been in operation one year. Its membership consists of over six hundred amateur radio stations in thirty-eight states of the Union. Except for gaps in the southern tier of states, we are able to communicate to all important points at the present time.

A list of our official relay stations is given in the enclosed "LIST OF STATIONS." There are over two hundred additional stations which have been appointed and which are awaiting publication of the third edition of our List.

The development of this League of amateur wireless telegraph stations has been carried on under the full knowledge of the Bureau of Navigation, Department of Commerce. Frequent conferences are held between our Chairman and the Commissioner of Navigation, and his assisting District Radio Inspectors. The League is managed strictly in accordance with a spirit of co-operation with Government authority. Our influence in correcting small technical infractions of the radio laws has already been successfully exercised in several instances.

In order to insure transmission along trunk line routes, the Bureau of Navigation have issued to certain stations indicated by this League, a Special License to use a transmitting wave length of 425 meters. The regular amateur is limited to 200 meters. Several of the Special Licenses have already been issued where the geographical location suggests their value. During the next sixty days, we hope that several new Special Licenses will be issued to stations in the Middle and Far West, which will be of great assistance to us in reaching Pacific Coast points with certainty and despatch.

The American Radio Relay League is purely an amateur organization. The exchange and delivery of messages is absolutely complimentary, and no consideration for transmission of a message is allowed under any circumstances. Regular radio telegraphic methods are employed. A sample of our official message blank is enclosed herewith.

The membership consists of middle-aged men, young men, and boys. There are many men of wealth in the membership, and who make wireless telegraphy a form of recreation. Many of our stations have had no expense spared upon them, and are equipped better than most commercial stations. The management of the League is in the hands of business men. The writer is the founder and chairman.

Some of our stations have already been of public service in establishing communications when floods have prostrated the regular telegraph and telephone lines. Our organization can unquestionably be of value in the event of similar disasters or invasion. A fire which happened to destroy the telephone and telegraph central stations in a city would stall communication. Our organization could fill this interval while repairs were made. Most of our membership is along the Atlantic and the Pacific Coasts. It is not impossible that we might be of value to our fleet standing off our coast in time of war.

We respectfully offer the services of our organization, and its facilities.

Respectfully,

THE AMERICAN RADIO RELAY LEAGUE, INC.

HPM:P HIRAM PERCY MAXIM, Chairman.

In response to this, we received from Secretary Daniel's the following:—

Mr. Hiram Percy Maxim,
Chairman, American Radio Relay League,
Hartford, Connecticut.

Sir:—

I beg to acknowledge your interesting letter of August 7th with inclosures, and to express my appreciation of your patriotic offer of the services of the League in connection with the national defense.

The Department has a plan outlined for the employment of the services of amateur stations in time of war as may best serve the interests of the country and the Office of the Superintendent of the Naval Radio Service is in immediate charge of matters relative to the co-ordination of means of radio communication, so far as the Navy is concerned, in the event that the necessity arise for controlling and using stations other than those under naval jurisdiction.

I should be glad to have you address the Superintendent of Radio Service direct on this matter, stating as fully as possible what facilities in the way of personal and material you may have available and giving in as much detail as is possible the character of the organization, especially as to the method employed for the interior control of the amateur stations constituting the League.

Very respectfully,

JOSEPHUS DANIELS.

Upon receipt of this letter, we sent full information to the Superintendent of the Naval Radio Service, and he now has a list of all of our stations and will no doubt take them into consideration in planning Radio Communication from ships to shore. It is easy to imagine the importance of some of our coast relay stations in the event of anything happening to any of our big naval coastal stations or in the event of a warship wanting to communicate with low power so as not to be "overheard."

A similar letter was written to the Secretary of War as follows:—

Secretary of War,
Washington, D. C.

Sir:—

In connection with your reported prospective program for increased National defense, your attention is respectfully directed to the existing organization of amateur wireless telegraph stations, known as The American Radio Relay League, Inc.

This League has been in working order one year. It has over six hundred actual radio stations in thirty-eight states of the Union. Except for certain gaps in the south, it is at present possible to transmit messages from coast to coast, and from points in Canada to points as far south as Atlanta on the east, and Los Angeles on the west by several routes.

A list of these stations appears in our official "LIST OF STATIONS," copy of second edition of which is enclosed herewith. It may be that a record of these stations and the additional stations, which are awaiting publication in the third edition, may be of value to the War Department in any defensive program.

The building up of this League has been carried on with the full knowledge of the Bureau of Navigation, Department of Commerce. Frequent conferences are held with the Commissioner of Navigation, and his assisting District Radio Inspectors. This has maintained the League on a proper legal and official plane, and insured avoiding interference with Government and Commercial Radio work. In order to insure relay work over long gaps, the Bureau of Navigation have issued Special Licenses to certain stations indicated by this League. This

Special License gives permission to use a wave length of 425 meters when conducting long distance relay work. Already several of these licenses have been issued to the better class of amateur stations, whose geographical location is such as to assist in trunk line relay work. Several new stations in the Middle and Far West, will probably be appointed in the next sixty days and communication with the Pacific Coast will be certain and quick.

This League is a purely amateur organization. The exchange and delivery of messages is purely complimentary. A regular radio telegraphic methods and systems are employed, however. A sample of our official message blank is enclosed.

Many of our stations have already been of service in establishing communication when flood has prostrated the telegraph and telephone lines. We believe we can be of service to the country under many conditions similar to flood, such as fire or the wrecking of the telephone and telegraph central stations in any city or town. Our membership is rapidly growing and we unquestionably will be in touch with a large proportion of most of the states of the Union by this time next year. Many of our stations are owned by men of wealth who have not hesitated at any expense in equipping themselves with the best apparatus obtainable. There are many members who are young men, and a few who are distinctly boys. The management of the League is in the hands of men. The writer is its founder.

If we can be of any service to our country, we shall be glad to serve in any capacity requested. We offer to you our complete organization and facilities.

Respectfully,

THE AMERICAN RADIO RELAY LEAGUE, INC.

HPM:P Chairman.

This brought the following response from the U. S. Signal Corps:—

From: Office Chief Signal Officer.
To: Hiram Percy Maxim, Chairman, American Radio Relay League, Hartford, Conn.
Subject: Radio communication.

1. In reply to your letter of August 7, 1915, addressed to the Secretary of War and which has been referred to this office, you are advised that the Signal Corps is pleased to receive the information contained in your letter, also the list of stations operated by the American Radio Relay League.

2. Should at any time it be found that these stations will be of service to the War Department, you will be further communicated with.

SAMUEL REBER.
Lieut. Col., Signal Corps,
Acting Chief Signal Officer.

From this it is evident that for land or interior service we would come in contact with the Signal Corps if the Government decided to avail itself of our assistance in time of war.

In times of peace we also have confronting us sudden disasters, such as flood, fire or strike. Dayton, Ohio was an example of a disastrous flood, which destroyed telegraphic and telephonic communications, and made it possible for the amateur wireless operator to render invaluable help. A fire which destroyed the central station of the telegraph and telephone Companies in a city, would also place that city in a very dangerous situation. The amateur wireless station would be the first place looked to in such an emergency.

To sum up, the organization of our League, in efficient working form is a work which is of national importance, and we may have the knowledge that it represents a patriotic and a dignified effort.

RELIABILITY AND CELERITY.

The words of the Radio Inspector of the First District, Mr. H. C. Gawler cover this point as well as it can be put. Mr. Gawler said:—"It seems to me your work is pretty well cut out for you and is very clearly defined. The value of this organization would depend entirely on the volume of business which could be handled by your stations in a PRECISE, ORDERLY and EFFICIENT manner. Few realize the amount of work involved in bringing this condition about, and it is my opinion the more local aid you can enlist on your side, the better the results will be. It is not sufficient to have stations which merely could transmit and receive messages over certain distances, but THEY MUST CONTINUALLY DO SO IN ORDER TO ASSURE GOOD COMMUNICATION BETWEEN THESE POINTS WHEN NECESSITY WOULD REQUIRE."

No one realizes the truth of the above better than those of our members who have handled any quantity of messages during the past year. Unless we can have something approaching RELIABILITY and CERTAINTY, all the hard work and money spent in getting our organization together is wasted. We must not let this good work go to waste. The hardest part was done when we got over 600 stations together. It only remains now to perfect some system whereby we can always be fairly sure of getting through. The Directors have given this a lot of hard study ever since last spring. This is what we have finally arrived at, and although it may not be perfect, yet we want every station to follow the spirit of the idea even though they cannot follow it to the letter.

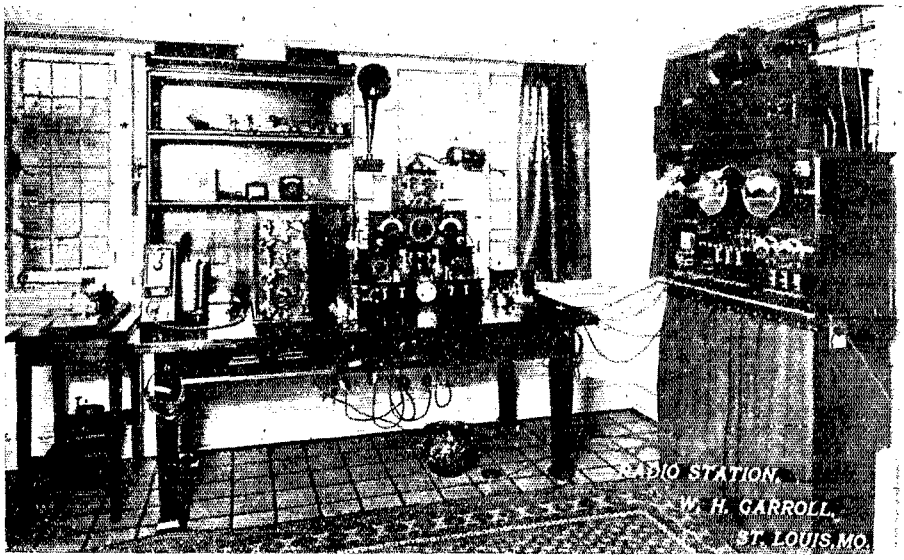
REGULAR HOURS FOR LISTENING.

Our greatest difficulty in getting messages through is because the other fellow is not "on." Most of the stalling of messages is due to this one thing. What we must do is to have regularly established and definite times at which we will be on duty. Then if a man in Northampton has a message going West and he knows just when the station at Buffalo or Waynesfield or Kane, for example, is working he can work with some hope. As it is, he tries at any old hour and unless the other man is a regular night hawk and sits up half the night every night in the week, he misses him.

To make it better, it is suggested that every station send out a QST followed by a QRU with his town or city at a definite hour every evening. This will indicate that this station is ready for anything coming his way.

An example of what the plan is may be taken from the way we have begun to work it at headquarters. Between 8:45 and 9:15 p. m. every night, one of the Hartford stations sends out the following at full power: QST QST QST de IZT —...— QRU Hartford ? QRU Hartford ? QRU Hartford ? de IZT .—.—.—.—

This makes it known that Hartford, Connecticut, is ready to receive any messages for or via it. If all other cities would agree among themselves to carry out this same plan, it would help get messages through without a doubt.



One of the best equipped Stations in the League

THE LIST OF STATIONS BOOK AND THE OFFICAL LEAGUE LICENSE.

Another vitally important factor in securing reliable transmission is the LIST OF STATIONS book. This book must be at hand ready for instant reference at any moment. Over six hundred stations are listed in this book, and it is the one which the Government would use in attempting to work through an amateur station in case help were needed. The book was distributed among a few stations late in the spring. The summer season came before many members had ordered it. EVERY MEMBER OF THE LEAGUE AND EVERY AMATEUR WHO HAS A STATION OR EXPECTS TO HAVE ONE OUGHT TO ORDER THIS BOOK IMMEDIATELY. It gives all the latest call letters of relay stations, their address, the name of the owner and operator, his transmitting power, what kind of a spark gap he has, how far he can send, the number of words per minute he can receive, his usual listening in time, what kind of a license he holds from the Government, and whether or not he has a telephone near at hand for delivering or receiving local messages. The book also contains a lot of extremely interesting letters from amateurs who are operating and covering long distances. The book is sent to any one whether a member of the League or not, upon receipt of fifty cents in stamps or otherwise, which just covers the cost of printing and distributing. Every one reading these lines is not doing his share unless he gets this book. If you have not sent in your order already, you ought to attend to it today.

OFFICIAL LEAGUE LICENSE.

Another important matter which will assist materially is the ordering of the official license certificate for Licensed Relay Stations. This certificate is issued only to members of the American Radio Relay League who have qualified as owning and operating a practical radio relay station. The certificate is similar to the United States Government certificate, and makes a dignified document which any radio operator might well be proud of. It is sent upon paying the license fee of fifty cents, provided of course the applicant is a member of the League. If you have not obtained your License, you ought to order it at once so as to have it framed and hanging up in your operating room when the time comes that you want your station to look well. Send a dollar, and we will send your Book, package of Official Message Blanks and your License all at the same time.

APPLICATION FOR MEMBERSHIP.

Any owner of a wireless station may become a member of the American Radio Relay League by filling in an application blank and sending it in to headquarters for consideration. If the application blank indicates that the operator has a practical working station, and can receive a message, he is made a member. No money is charged, as the League is not a money making scheme in any sense of the word. Its single aim is to organize the different amateur wireless telegraph stations of the United States of America, so that we can relay messages between each other and thus reach any part of the country. The only money that is asked for, is to pay for the List of Stations book, and the License Certificate which are charged at what they cost to print and distribute.

An application blank can be obtained by dropping a postal to Headquarters, American Radio Relay League, Drawer 4, Hartford, Conn. All orders for books or License Certificates should be sent to this address.

SPECIAL LICENSES.

As is well known among most amateurs by this time, we have secured the co-operation of the Government to the extent that where it seems desirable for the purpose of relay work, a Special License will be granted by the Bureau of Navigation, provided the applicant holds a First-Grade Commercial License, and provided he is favorably recommended by the League.

This does not mean that everybody can secure a Special License. Distinctly the reverse is the case. No Special Licenses are issued except where it is very plain that the interests of the American Radio Relay League require it. Therefore, if you have a good station and hold a First Grade Commercial License and are located away from the sea coast, and absolutely require a transmitting wave length of 425 meters in order to be able to handle relay messages, there is a chance that you may secure a Special License. But, unless you can make it very plain that you meet every one of these conditions, it is a waste of time for you to think about a Special License.

The program to follow, where a station is entitled to a Special License, is to write to the Radio Inspector of your District, and secure application blanks for Special License, and after filling these in, to send them to Headquarters for consideration. If it seems desirable that the station be granted a Special License, a favorable endorsement is made upon the application, and it is forwarded to the District Radio Inspector. It is then up to the District Inspector to either favorably or unfavorably endorse after which the application is sent to Washington where the Bureau of Navigation finally passes upon the matter.

First Issue of QST Nr. 1 December, 1915.

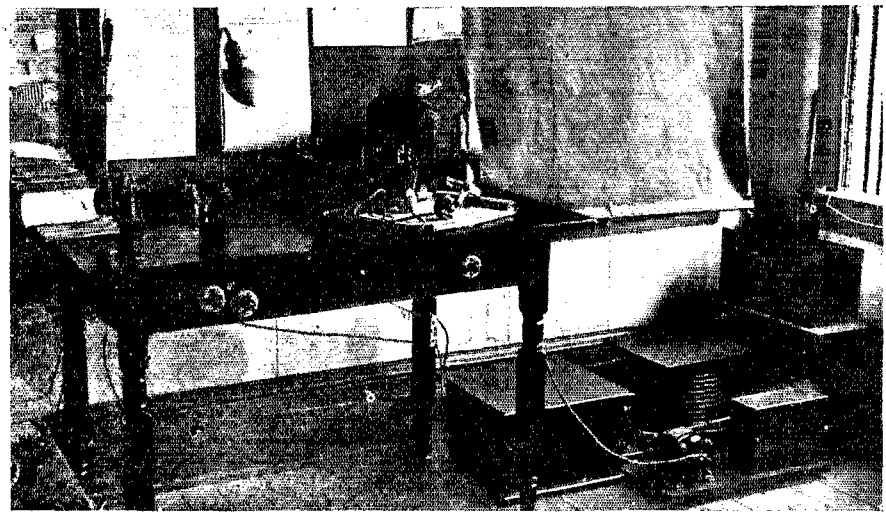
After considering the matter for several months, it has finally been decided to issue regularly some kind of a bulletin to League members. During last winter, the need for this was very apparent. Many stations would have been brought together which never got together, if there had been a regular circular distributed which contained general information. The difficulty has always been how to pay for it. The members did not order the new List of Stations book and License Certificates as fast as they ought to have, and the officers had to go down in their own pockets to pay the printers bill, clerical help, postage, supplies, etc. It did not seem wise to continue to spend money on circulars or bulletins unless the members indicated enough interest to at least get the List of Stations book.

After obtaining the views of several members and thinking it over, the President and Secretary finally decided to risk a few more dollars on a different plan. This new plan was to make the circular or bulletin take the form of a magazine, which the membership would be willing to support. Enough money would have to be put in to distribute three or four issues of the magazine in order that the amateurs throughout the country could get acquainted with it and come to like it well enough to be willing to buy it.

After much hard work, the President and Secretary out of their own pockets have produced QST Nr 1. It constitutes the first bulletin of general information on relay matters, and they hope to follow it each

month with a new one. At the end of three months, the President and Secretary hope that QST will be able to pay for itself, and that the sale of Books and Licenses will have brought in enough money to pay back to the two officers mentioned, the sums which have been advanced to print and distribute the recent list of Stations Books, Message Blanks, License Certificates, etc.

Of course the success of this plan hinges upon whether the membership will send in their dollar right away for the List of Stations book and the License Certificate and also whether they will subscribe to QST. If they do, we are all right, and we have a fine future promised us. If they do not, then the President and Secretary will have lost their money and wasted a lot of hard work.



Relay Station **8 B E** **J. Lippert**

Book Review

The government edition "List of Radio Stations of the United States" for July 1st, 1915, is in the hands of the printer. The date of delivery is uncertain.

The Radio Service Bulletin is issued monthly by The Bureau of Navigation. The bulletin gives all the latest alterations and additions to the List of Radio Stations, and also comments miscellaneous radio matters. Single copies 5c, subscription per year 25c.

The Superintendent of Documents,
Government Printing Office,
Washington, D. C.

This is the first bulletin of the kind the League has published. Errors are sure to creep in, and the editor would consider it a favor to be informed of all errors. Criticisms will help to improve future editions.

The next Book of Radio Telegraphy by R. Stanley is a new book which covers an advanced up to date text, with simple mathematics, and clear explanations.

We are all pleased to see the 1915 edition of the Year Book of Wireless Telegraphy and Telephony in the Market. This is a book most amateurs can not do without. Its list of radio stations of the world is invaluable and its glossary contains very useful wireless data. It can be secured through the book department of the Marconi Publishing Corporation, 450 Fourth Ave., New York City.

All amateurs are requested to send articles on radio matters. Contributions and pictures will help to make the bulletin a success. Send in yours today.

Pictured Electro-Magnetic Waves

By Clarence D. Tuska, Assoc. I. R. E.

Many amateurs are proficient operators, but have only a vague idea of the theory of electro-magnetic waves. For example, you continually transmit Hertzian waves, but have you ever pictured what happens when you send a dash?

To explain the ether waves, let us consider a vertical aerial.

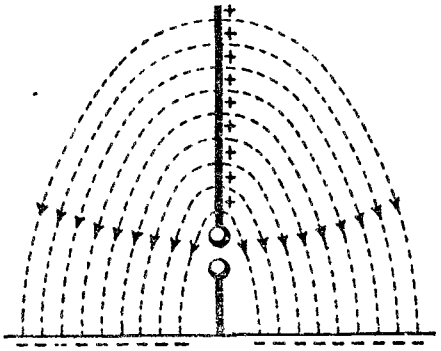


Fig. 1

When the aerial is fully charged, the lines of strain leave the conductor at right angles to its surface. (Fig. 1.) Upon the discharge the upper ends of the strain lines rush down to meet the lower which move comparatively slowly as they pass along the earth. The earth offers more electrical resistance than the ether. When the upper ends of the strain lines reach the bottom of the aerial, the discharging current has reached its maximum, and as it reaches zero, it charges the aerial in the reverse direction as shown in Fig. 2. Therefore the new strains are formed with their feet on the earth. As the new strain reaches its maximum, the looped strain dies out, but loops are set up in the ether beyond. These loops are set up because when the electrical strain dies out, it sets up a magnetic strain. Upon the collapse of a magnetic strain, another electrical strain is set up in the opposite direction to those existing before, as in Fig. 3.

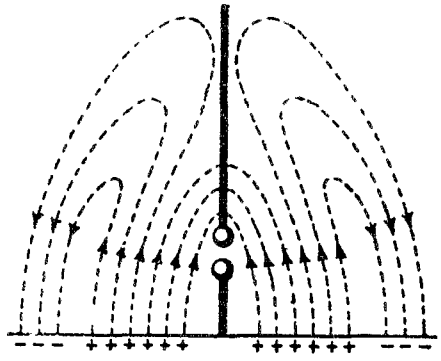


Fig. 2

This action keeps repeating at its tremendous frequency and the waves are propagated at 300,000 kilometers per second.

In practice we do not use the plain vertical aerial. The action being similar to Fig 4. (Figs. 4 and 5 here).

Now we observe that the lead in is about the center of the wave action, showing the electro magnetic field is stronger on the lead in side. This gives us a theory for directive aerials. Upon the start of the waves, the peaks lean toward the aerial, but as the waves are propagated, their feet lag, owing to the resistance or impedence of the earth.

The peaks advance and approach receiving aerial as shown in Fig. 5. Now, if the transmitting aerial is slanting as shown in Fig. 4 with the lead at the higher end, the waves will point even more toward the sending aerial, but will reach the receiving aerial in a nearly vertical position. The nearer vertical, the waves reach the receiving aerial, the more energy they will impart to it.

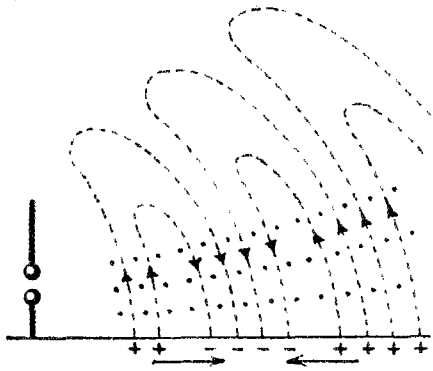


Fig. 3

By studying this important theory, we can see how mountains and oceans affect the waves. In crossing a mountain, the waves must pass over more ground at their feet in comparison with the peaks passing through the ether. This causes more lag than on level ground, and the peaks advance correspondingly. Naturally the waves reach the receiving antenna slanting more than if they had come over level ground and less energy is received. In passing over the water, the waves are propagated in a nearly vertical direction, as the

water is a good conductor. It will be seen from this explanation, that many factors have been omitted, but enough has been given to form the basis of a more elaborate theory.

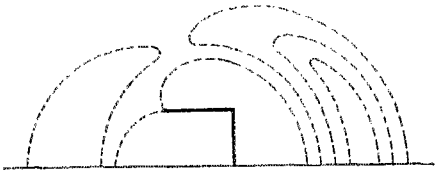


Fig. 4

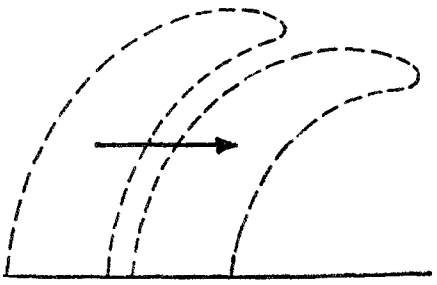
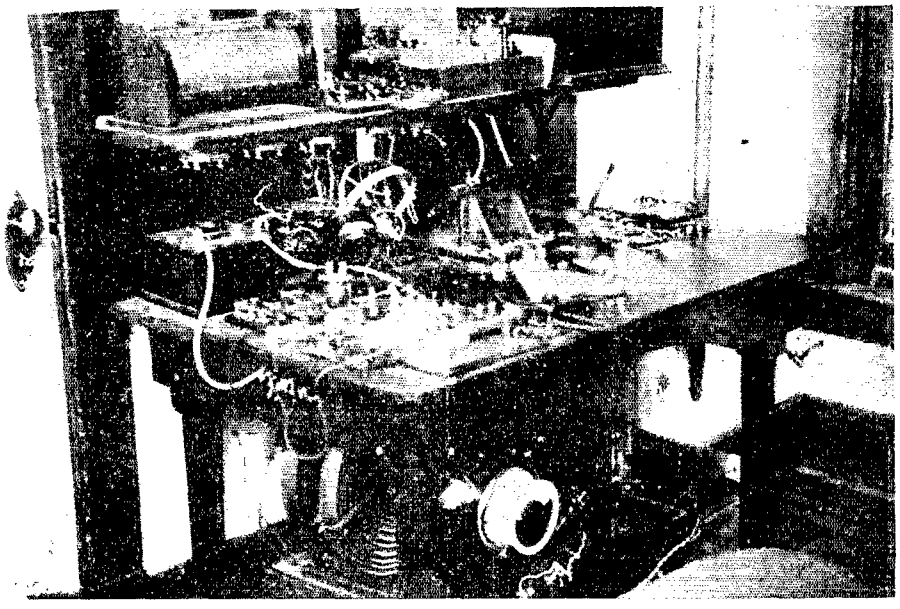


Fig. 5



Radio Station of Roy G. Burr, Norwalk, Ohio A Typical League Station

CUT OFF ON THIS LINE

SUBSCRIPTION BLANK

American Radio Relay League
Hartford, Conn.

Gentlemen:

Enclosed find 25c (stamps, currency, check or money order); kindly send me January, February and March numbers of Q S T.

Name .....

Street and No. .....

Town and State .....

Latest list of Additions to American Radio Relay League List of Stations

ALABAMA			
Huntsville	Robert M. McLain	513 West Clinton St.	5BS
Mobile	Ernest M. Curtis	350 Selma St.	5BR
CALIFORNIA			
Alameda	F. Arnberger, Jr.	3230 Garfield Ave.	6FA
Alhambra	{ Frederick Gilstrap { Charles Linville	715 N. Curtis Ave.	6AAH
Berkeley	J. A. Forsburg	1734 Sonowa Ave.	6JF
Berkeley	Frank Seeley	2615 Etna St.	6TF
Oakland	C. E. Cadwell	Monte Cresta Ave.	6AC
Pasadena	Jerome Miley	585 Bellefontaine St.	6QY
Redlands	Howard Hamilton	1218 Sixth St.	NA
San Bernardino	W. W. Gates	1075 Second St.	RW
San Francisco	Fred Neilsen	136 Caine Ave.	6OR
Sawtelle	Geo. E. Chamberlain	121 N. 6th St.	6QJ
COLORADO			
Denver	W. F. Lapham	1545 Milwaukee St.	CL
D. C.			
Washington	E. F. Ramsey	640 Irving St.	3PR
FLORIDA			
Jacksonville	Thomas R. Dunk	1424 Laura St.	4AZ
Tampa	Patrick H. Wall	258 Plant Ave.	4AW
GEORGIA			
Athens	W. B. Pope	197 Dearing St.	4AA
Savannah	E. W. Steinhauser	223 W. 40th St.	4AD
IDAHO			
Boise	Carl Eichelberger	715 N. 9th St.	7CE
Pocatello	P. C. Samms	415 S. 9th St.	7SP
ILLINOIS			
Carrollton	Stuart W. Pierson	214 Maple Ave.	9PY
Chicago	John A. Goorisich	2316 Clybourn Ave.	9SR
Chicago	Harold H. Shotwell	446 W. 61st Place	9EF
IOWA			
Cresco	Will P. Rathert	316 5th Ave. W.	PR
Dubuque	C. E. Fawkes	503 Hill St.	9FP
KANSAS			
Topeka	Wm. McClintock	1257 Topeka Ave.	BM
Topeka	Edison Pettit	Washburn College Ob.	WZ
MAINE			
Gardiner	H. and J. Cusick	21 Beech St.	HC
Gorham	Lawrence B. Robinson	R. F. D. No. 2	1FE
Portland	R. C. Carles	66 Evans St. S.	1FY
Portland	J. H. Nicholson	119 Washington Ave.	1FU
Sanford	O. W. Brown	12 Kimbal St.	1AC
Westbrook	W. P. Meggison	13 Mechanics St.	1FJ
Westbrook	Rahma W. Pratt	Longfellow St.	1AM
MARYLAND			
Baltimore	C. H. Baxley	1126 W. North Ave.	3SK
Highlandtown	G. L. Talbot	516 14th St.	3OF

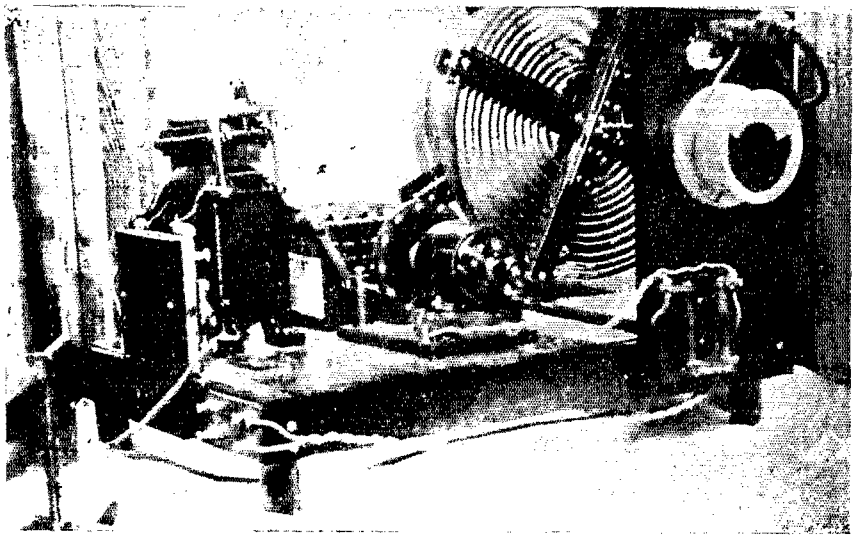
MASSACHUSETTS			
Belmont	Leon C. Runey	49 Fairmont St.	1LS
Boston	Fred F. Flanders	9 Norway St.	1OH
Cambridge	Lane Andonegui	1010 Mass. Ave.	1NA
Cambridge	Harold F. Hill	102 Trowbridge St.	1FV
Cambridge	Stanley Marshall	1 Hobart St.	1NG
Danvers	H. G. Campbell	86 Kenwood St.	1NU
Dorchester	C. V. Purssell	1257 Morton St.	1 MP
Dorchester	L. S. Bennett	2 Lawrence St.	1HY
Everett	D. J. O'Brien	152 Bridge St.	1QJ
Manchester	R. A. Scott	952 Franklin St.	1LT
Melrose Hglds.	R. A. Snow	19 Gage St.	1RT
Needham	M. A. Baylies	111 Grinnell St.	1MC
New Bedford	W. R. Black	32 Jefferson St.	1QK
Newton	H. D. Copeland	42 Huron Ave.	1OS
Taunton	Fred J. Cosgrove	57 Cedar St.	
Wakefield	M. C. Wood	14 Armory St.	1MM
MICHIGAN			
Ann Arbor	O. C. Klager	611 S. Main St.	8RA
Battle Creek	Forrest Phippeny	R. F. D. 4	8CX
Detroit	P. E. Diederich	915 E. Grd Blvd.	8IJ
Detroit	L. M. Ilgenpritz	2 Forest Ave. E.	8ON
Detroit	R. J. Fowler	1209 E. Kearsley St.	8SF
Detroit	H. W. Livinggood	1825 Mich Ave.	8MR
Detroit	S. J. Miner	2253 Jeff. Ave.	8BR
Flint	G. H. Norris	77 Melbourne Ave.	8ID
MISSISSIPPI			
Starkville	L. N. Goodman		5AS
MISSOURI			
Cape Girardeau	Harmon Deal	6 S. Fountain St.	9NN
Kansas City	A. I. Graham	3033 Park Ave.	9MQ
Kansas City	Guy E. Wilson	3922 Flora Ave.	9EP
St. Louis	W. H. Carroll	6334 McPherson Ave.	CW
NEBRASKA			
Omaha	W. C. Reinhardt	3437 Taylor St.	9BW
NEW HAMPSHIRE			
Keene	R. F. Howe	94 School St.	1CR
NEW JERSEY			
Cresskill	J. B. Worth	Madison Ave.	2IW
Great Notch	Chas. Murray		2SK
Irvington	A. L. Pfieil	242 Cottage St.	2NZ
Jersey City	W. N. Baker	881 Montgomery St.	2LO
Midland Park	Karl G. Krech	316 Godwin Ave.	2BR
Newark	D. N. Corson	51 Berkeley Ave.	2AQ
Newark	V. F. Pennell	15 Baldwin St.	2AAZ
Ocean City	E. R. Bourgeois	901 Central Ave.	3SN
Westfield	H. B. Day	555 Mountain Ave.	2KK
NEW YORK			
Brooklyn	Samuel S. Barriette	311 Macon St.	2PC
Brooklyn	P. B. Collison	172 Maple St.	2KN
Brooklyn	Charles Hallenbeck	1150 54th St.	2MA
Brooklyn	George Kirch, Jr.	364 75th St.	2BL
Catskill	E. C. Hocmer, Jr.	74 Spring St.	2AFK
Garden City	W. L. Hoyt	44 Hilton Ave.	2UE
Mt. Vernon	G. H. Scharrenbeck	126 W. 1st St.	
New York City	George T. Droste	1309 Pugsley Ave.	2EU
New York City	George Holmes	164 West 146th St.	2AFO
New York City	J. E. Johnston	1379 Clay Ave.	2SO
New York City	G. C. Meder	990 First Ave.	2NV
New York City	J. T. Smith	126 E. 114th St.	2DU

New York City	John Vegessy	437 6th St.	2GT
Roselyn Heights	R. G. B. Lee		2TU
White Plains	H. E. Dickenson	91 Greenridge Ave.	2TC
NORTH DAKOTA			
Pembina	C. D. Curtis		9GN
OHIO			
Cincinnati	Henry M. Rubel, Jr.	920 Burton Ave.	8ZF
Cincinnati	J. M. Schaaf	322 East St.	8PO
Cincinnati	Carl P. Goetz, Jr.	1518 Knowlton Ave.	8RY
Cincinnati	G. H. Kroeger	1837 Clarion Ave.	8BI
Cincinnati	Fred W. Stern	835 Glenwood Ave.	8OL
Bucyrus	A. C. Wiesemann	933 Bank St.	8UE
Cleveland	John P. Lippert	4 Stanwood Rd. E.	8BE
Cleveland	Myron R. Pesek	3288 Fulton Road	8SG
Cleveland	Robert G. Sidnell	1268 W. 115th St.	8KS
Euclid	Edward R. Williams	Stop 133½ Shore Line	8KE
Hamilton	Doron Bros. Elec. Co.	329 N. C. St.	8CU
Lakewood	George E. Grostick	1605 Wagar Ave.	8QR
Lakewood	Grant D. Rogers	2065 McKinkey Ave.	8DT
North Fairfield	Hoyt S. Scott		8LE
Oberlin	Ross Gunn	369 W. Lorain St.	8JA
Springfield	Wm. Haynes	102 Florence St.	8FH
Waynesfield	James M. Day, M. D.		8PI
Youngstown	T. J. Bray, Jr.	Wick Ave.	8ADB
OREGON			
Portland	George C. Henny	530 Heights Terrace	7GC
PENNSYLVANIA			
Easton	Paul F. Miller	38 S. 5th St.	3AGN
Edgewood Park	Harold Knapp	224 Elm St.	8RB
Greensburg	Frank G. Beck	122 N. Maple Ave.	8NS
Meadville	Walter Baird	674 E. Arch St.	WB
Ogontz	David B. Fell	19 Park Ave.	3TR
Philadelphia	W. N. Deerham	4618 Spruce St.	3VA
Philadelphia	J. C. Van Horn	5127 Arch St.	3CM
Philadelphia	Emil J. Meyer, Jr.	1919 Green St.	3PD
Philadelphia	Ernani Rancetelli	1435 S. Broad St.	3VC
Pittsburg	Jack O. Kleber	1135 Murray Hill	8GV
Pittsburg	Ralph C. Powell, Jr.	5236 Westminster Pl.	8QP
Pittsburg	J. Lauer Stauft	347 Oakland Ave.	8LH
Pottsville	Cotesworth M. Jackson	State Police	8JK
Wayne	C. Walton Hale	107 Aberdeen Ave.	3AIG
York	Harry G. Miller	1526 2nd Ave.	3TD
RHODE ISLAND			
Newport	Francis Horgan	239 Broadway	1TI
SOUTH CAROLINA			
Summerville	Mayrant Simons	Box 175	4BK
TEXAS			
Dallas	Frank M. Corlett	1101 East 8th St.	5BJ
Georgetown	Robert P. Ward	233 Orchard St.	5BU
VIRGINIA			
Portsmouth	Vincent Tabb	26 Court St.	3TH
WEST VIRGINIA			
Martinsburg	W. A. West	617 W. King St.	8ADQ
WASHINGTON			
N. Yakima	Albert Baker	Box 33, R. F. D. No. 2	VT
Seattle	Howard S. Pyle	3376 York Road	7NG
Seattle	Chas. E. Williams	8326 13th Ave. N. W.	7BW
WISCONSIN			
Sheboygan	Chas. T. Schrage	517 Wash. Ct.	9SS
Sheboygan	Palmer Leberman	Upper Falls Road	9LX
CANADA			
Moosomin, Sask.	John Wells	P. O. Box 488	JW

List of Abbreviations used by Amateurs

Abbreviation	Question	Answer or Notice
QRA	What ship or coast station is that?	This is .....
QRK	How do you receive me?	I am receiving well.
QRL	Are you receiving badly? Shall I send 20?	I am receiving badly. Please send 20.
QRM	Are you being interfered with?	I am being interfered with.
QRN	Are the atmospherics strong?	Atmospherics are very strong.
QRO	Shall I increase power?	Increase power.
QRP	Shall I decrease power?	Decrease power.
QRQ	Shall I send faster?	Send faster.
QRS	Shall I send slower?	Send slower.
QRT	Shall I stop sending?	Stop sending.
QRU	Have you anything for me?	I have nothing for you.
QRV	Are you ready?	I am ready. All right now.
QRW	Are you busy?	I am busy (or: I am busy with.....) Please do not interfere.
QRX	Shall I stand by?	Stand by. I will call you when required.
QRY	When will be my turn?	Your turn will be No. .....
QRZ	Are my signals weak?	Your signals are weak.
QSA	Are my signals strong?	Your signals are strong.
QSR	Is my tone bad?	The tone is bad.
QSC	Is my spacing bad?	Your spacing is bad.
QSD	What is your time?	My time is.....
QSP	Shall I inform.....that you are calling him?	Inform.....that I am calling him.
QSQ	Is.....calling me?	You are being called by .....
QSR	Will you forward the radiogram?	I will forward the radiogram.
QST	Have you received the general call?	General call to all stations.
QSU	Please call me when you have finished (or: at.....o'clock)?	Will call when I have finished.
QSZ	.....	Send each word twice. I have difficulty in receiving you.
QTA	.....	Repeat the last radiogram.

When an abbreviation is followed by a mark of interrogation, it refers to the question indicated for that interrogation.



Detail of Roy C. Burr's Sending Set

APPLICATION BLANK

American Radio Relay League

Incorporated

Hartford, Connecticut

Your Name ..... Address .....
(Street, City and State.)

Your Age ..... Your Station Call Letters .....

Are you a member of any Radio or Wireless Club, and if so give its name and address:

.....

Length of your Aerial ..... Height above ground .....

Number of wires in Aerial and space between .....

SENDING EQUIPMENT

Do you obtain your power from Batteries or City Current? .....

Do you use a Spark Coil or a Transformer? .....

What is your Power Input? .....

Is your Spark Gap Rotary, Fixed or Quenched? .....

What Tone has your Spark? ..... Approximate Wave Length .....

Give names and addresses of the FIVE most distant stations you communicate with:

State distance in miles .....

.....

.....

.....

.....

.....

(OVER)

RECEIVING EQUIPMENT

Describe your Receiving Set .....

.....

.....

.....

.....

.....

Do you use an Audion Detector? .....

What is your approximate receiving range in miles? .....

Are you troubled by interference? .....

What are your usual listening hours and how many evenings a week do you average at your instrument? .....

.....

Have you telephone connection in your house, or convenient? .....

Do you keep your station practically constantly in running order? .....

.....

Can you copy Press News? .....

About how many words per minute can you receive with certainty? .....

What is the nearest Commercial or Government Station to you? .....

Have you a Government license, and if so what Grade and No. .....

.....

Please make any remarks or comments which you think will be of help in perfecting a chain of Amateur Radio Relay Stations throughout the country. The object of the League is strictly confined to facilitating the relaying of radio messages among amateurs.

.....

.....

.....

.....

.....

I HEREBY OFFER TO RELAY OR DELIVER ANY AMATEUR RADIO MESSAGES THAT ARE SENT TO ME

Signature ..... *Date* .....

Arlington Notes.

Shortly after the 10:00 p. m. time signals, NAA sends weather bulletins in code letters and figures to express weather conditions along the eastern coast of the United States and the Great Lakes.

In case you have lost the key letters used they are given below:—

U. S. W. B.	United States Weather Bureau
S	Sydney
T	Nantucket
DB	Delaware Breakwater
H	Hatteras
C	Charleston
K	Key West
P	Pensacola
B	Bermuda
Du	Duluth
M	Marquette
U	Sault Ste. Marie
G	Green Bay
Ch	Chicago
L	Alpena
D	Detroit
V	Cleveland
F	Buffalo

The first three figures denote the barometric pressure in inches as (001—30.01) or 959—29.59). The fourth figure represents the direction of the wind:

1	North	5	South
2	Northeast	6	Southwest
3	East	7	West
4	Southeast	8	Northwest
	0 Calm.		

The last figure gives the force of the wind on the Beaufort Scale.

Beaufort Scale of Wind Force.

Number and designation.	Miles per hour.
0 Calm	0 — 3
1 Light air	8
2 Light breeze	13
3 Gentle breeze	18

Examples of Code:—

U. S. W. B. S 00355 T 93472 United States Weather Bureau Sydney, 30.03, south, fresh breeze, 28 miles per hour; Nantucket, 29.34, west, light breeze, 13 miles per hour.

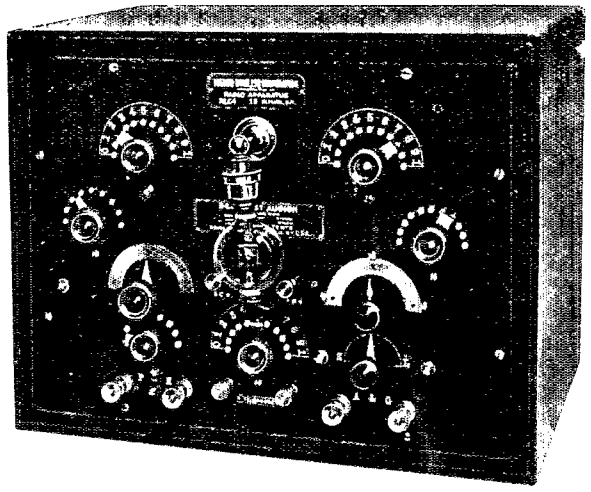
4	Moderate breeze	23
5	Fresh breeze	28
6	Strong breeze	34
7	Moderate gale	40
8	Fresh gale	48
9	Strong gale	56
10	Whole gale	65
11	Storm	75
12	Hurricane	90 and over

Wind force greater than 9 is given by a word instead of figures.

"Mignon System"

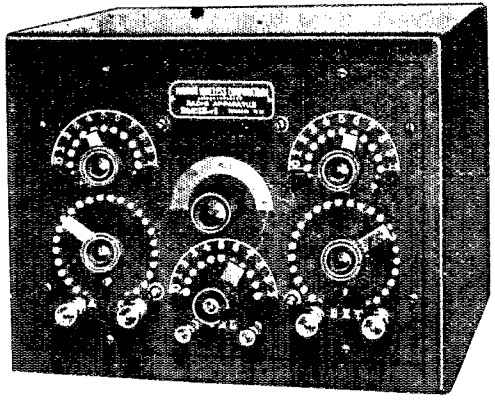
SUPERIOR
MIGNON SYSTEM
RADIO
APPARATUS

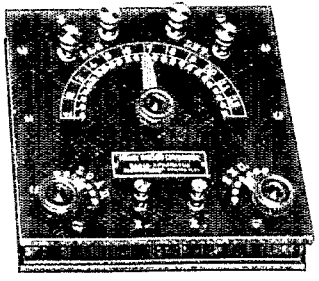
The Last Word in Radio Apparatus

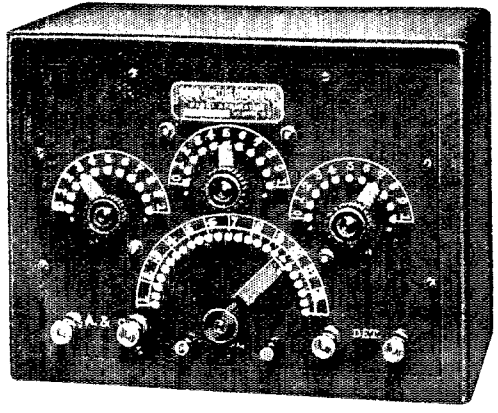


ATTENTION! The "MIGNON" apparatus are of absolutely original design and construction, the only kind of its type on the market, manufactured exclusively by us. Many of our satisfied patrons are delighted in being able to hear Sayville and Tuckerton over their "MIGNON" apparatus.

The "MARVEL" in sensitiveness Selectivity and efficiency.







Write for Literature

Mignon Wireless Corp.

Elmira, N. Y.

Multi-Audi-Phone

New wonder in the wireless world. Increases the audibility 1,500 times

Are You from Missouri? Then Read These Letters

F. B. Chambers & Co., Wireless Engineers, 2046 Arch St., Philadelphia, Pa., write: "On Tuesday evening we gave a demonstration of the Multi-Audi-Fone, to about 300 men; Technical and experimenters.

The hall in which the demonstration was held is about 75 by 150 feet, and the signals from all stations—working at the time, could be heard all over the hall; and the louder ones could be heard in another room—back of the main hall. Even the Amateurs came in "howling," and the aerial used was only 3 wires, and about 40 feet high.

Everyone was more than surprised at the results, and before us when we say—that it surely was some amplifying; and there is nothing that can anywhere near touch the Multi-Audi-Fone."

Jeffries-Young Antenna Co., of Atlantic City, N. J., write: "The Amplifier and Multum in Parvo Set received from you are giving wonderful results, and come to the mark on every claim made. The Arlington Signals before audible with the Phones 12 inches away, can now be copied in nearly every room in our house, on St. Charles Place, where our winter station is located."

W. O. Horner, of Cleveland, Tennessee, says: "I have been trying your Multi-Audi-Fone out as an Amplifier. . . I was more than surprised at its sensitiveness. . . . It is certainly wonderful."

Again he writes: "Yours of the 28th at hand. I use a Triple Valve Station of highest class and thought I had the best on the market, but when I hooked your Multi-Audi-Fone to the third Audion I was astonished at its Amplification.

"I laid your Phones on the table and walked one hundred and twenty-five feet to the rear of my store and copied Arlington and Key West at 9:30 P. M. Many 600 Meter stations I also copied at this same distance. **I also hooked your Multi-Audi-Fone to a single Audion and signals were much louder than all three of my Amplifiers."**

S. Kruse, of Halstead, Kansas, writes: "Multum in Parvo is a wonder."

M. B. Schwartz, of Brooklyn, N. Y., writes: "With regard to results obtained on connecting the Multi-Audi-Fone in my Radio receiving set as an Amplifier, I am glad to say that I was astonished by the roaring and whistling of myriads of stations, near and far, many of which I never heard before; the small amateur stations coming in so loud that they were heard all over the room—it was like opening up a new region, fertile with activity and life, heretofore unknown. It may also probably be of interest to you to know that I heard the SS Brazos every evening from the time she left San Juan, P. R., Oct. 20th, until she reached N. Y., during the run she came in with remarkable audibility.

"The above is precisely what happened after including the Multi-Audi-Fone. Signals were heard all over the house for a distance of from 50 to 100 feet from Phones."

F. S. Hammond, of St. Marys, Pa., writes: "With Amplifier, my Tuner Galena and small horn attached to one of your Phones, Arlington can exactly be read in any part of room. Substituting Audion for Galena nearly doubles strength of signals, making them readable in hall downstairs."

Glenn Sabin & Co., Wireless Engineers, of Northampton, Mass., write: "We have demonstrated your Multi-Audi-Fone, to a number of experimenters and the results were surprisingly satisfactory.

"We have picked up stations with a single Multi-Audi-Fone, coupled to a single Audion, which we have been unable to get with a double Audion."

"For getting Arlington time there is nothing that can touch it.

"On our aerial we can pick up fellows fifty and sixty miles away operating on half and three-quarter inch spark coils, which is excellent work to say the least and proves without a doubt that the Multi-Audi-Fone is an Amplifier that cannot be beaten."

We guarantee the Multi-Audi-Phone for three years. With fair treatment it ought to last one hundred years

REMEMBER THESE FACTS: That the Multi-Audi-Fone works equally well with damped and undamped circuits and will work equally well with any Detector or Receiving Set, and that it will cost you more for batteries than ..... TEN CENTS A MONTH

Our regular orders have already increased to such an extent that we are now compelled to withdraw our ten-day trial offer. Everybody will EVENTUALLY buy a Multi-Audi-Fone. Why don't you buy yours now and GET THE PLEASURE OUT OF IT?

Multum in Parvo Receiver, including Crystaloi Detector and Buzzer	$20.00
If you prefer to use your own Detector and not buy the Crystaloi and Buzzer	15.00
Multi-Audi-Fone, including our specially wound Head Set	30.00
OUR COMPLETE WIRELESS SET	$45.00 or $50.00

The Christmas present of ALL Christmas presents, our complete Wireless Set, $45.00 or $50.00

Send for circular today. Ask your dealer tomorrow

Multi-Audi-Phone 275 Morris Avenue **Elizabeth, N. J.**

The Next Issue

The next issue of "Q S T" will be a wonder. There will be an article on the Oscillating Audion, and it will be written in language which no one can misunderstand. Construction, operation, what stations can be heard with one, and theory will be covered in a brief and crisp manner. The amateur will understand this newest radio development when he reads this article. Nauen and Hanover, Germany, are read easily here on a fifty-foot high aerial, using an oscillating audion.

Another feature of the next issue worth watching for will be on the matter of a Volunteer Radio Corps. It is being suggested by the officers of the League and the chances are that the better amateur radio stations of the country will be recognized by the Government. Big things are certainly coming for the up-to-date amateur. Be sure and arrange so that you will not overlook the next issue.

A system of testing among amateurs, will be described also in the next number. We all know how difficult it is sometimes to pick up a distant amateur station which we really should be able to easily work. In the next issue a plan is suggested which will help us all.

Miscellaneous

Everybody please note that we are always glad to welcome contributions from any amateur on a wireless subject. Send us your ideas or photographs or long distance record or anything in the freak line you have noticed. Never mind if you cannot express yourself to your satisfaction. Write it out any old way, and we will do the dressing up if it should need any.

Remember, everybody, that we will print free of charge for sale and want ads. for second hand apparatus up to any reasonable number of words. Practically the entire amateur wireless contingent of the country will see Q S T and there is always some one who wants what you have to sell or exchange.

AGENTS FOR Q S T SUBSCRIPTIONS. We will have a lot of people who want to buy Q S T but who have not the necessary personal snap to arrange for a regular subscription unless some one makes it easy for them. The agent has a good opportunity here. We will send one extra copy whenever an agent sends in subscription for four. If an agent sells eight, he receives ten from us. He can sell these and get his commission.

The Secretary of the American Radio Relay League Offers a Reward!

He wants an Answer to One of the Many Curious Letters He has Received

The American Radio Relay League has grown very famous and, as this fame has extended all over the wireless world, it is not unusual that many curious letters are received by the Secretary. The following letter is so interesting that it seems certain the readers of Q S T would like to read it and suggest an answer. The Secretary has decided to pay $5.00 for the best answer. The answers must be received by Dec. 30th, and will be judged from either their funny side or technical value.

Hynacus, Japan

To Honorable Mr. Radio Secretary Tuska,
Honorable Relay League, America

I ask to know. When condenser made separators of glass we know dialectrics much pressed by electricity. This much sure, why, tests made show it. Honorable writers of English make tests and demonstration that metal can be vanished and all the same when new metal comes to condenser, yet discharge comes too the same. Why thus we see plain that dialectric heart of condenser.

Then now. I ask to know if air I use no glass for important dialectric does it obtain pressed? Like glass? Honorable American teachers tell me yes. Air—glass—mica all same without difference among them.

Then now again how? Suppose I have air variable condenser and I the air vanish blowing by breath. Goes away quickly the air. How goes my electricity charge? Goes it too? I think me not. Then how charge gets back?

Explanation me Honorable Radio Secretary for which accept my assurances most distinguished consideration.

KATHIS KATHKAN,
Japanese Radio Student,
P. O. Box 1155, Hynacus, Japan

S. P. Why this write typewriter, you Japanese write mostly not know. K. K.

Notice to All League Relay Stations

Headquarters, Hartford,
Oct. 20, 1915

At a meeting of the Directors of the American Radio Relay League held at Headquarters, Oct. 20, it was voted to supply for the remainder of the year the List of Stations Book, one pad of Message Blanks and 1915 Station Appointment Certificate to all Relay Stations in good standing who send in their station dues of 50 cents before Dec. 6.

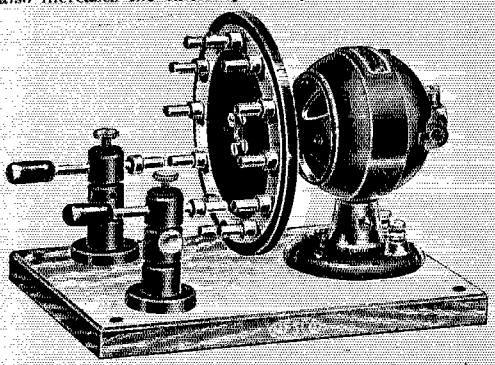
Members who have not yet secured their List of Stations book, message blanks and station appointment certificate should take advantage of this opportunity and get their orders in immediately.

Clarence D. Tuska, Secretary

New Mesco Radio Apparatus

ROTARY SPARK GAP

A **Rotary Spark Gap** is required in every transmitting station by the Federal authorities, for the reason that this type of gap produces a pure wave of low damping decrement. It also increases the efficiency of any transmitting station from 20 to 30 per cent.



This Rotary Spark Gap emits a high musical note, more audible to the human ear, can be heard at greater distances than the note from the stationary type, and cannot be mistaken for static or other atmospheric disturbances, a fault common with the stationary gap due to its low frequency note.

The rotating member has twelve sparking points mounted on a hard rubber disk and is carried on the motor shaft.

Also fitted with two stationary electrodes with special adjusting devices.

The Gap can be successfully used on any of our spark coils or transformers up to and including 1 K. W. capacity.

Our standard Globe Motor is used, which will operate on 110 A. C. or D. C. circuits and attains a speed of 4,500 R.P.M. Also made with our Globe Battery Motor, which can be operated on a six-volt circuit.

List. No.		Price
222	Mesco Rotary Spark Gap, 6 volt	$12.00
223	Mesco Rotary Spark Gap, 110 v., A. C. or D. C.	13.00
216	Rotary Unit only, with two Stationary Electrodes, 4 3/16 in. shaft	5.00

UNIVERSAL DETECTOR STAND

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A hole for the introduction of different size wires extends through the arm. A set screw in the side of the arm binds the wire.

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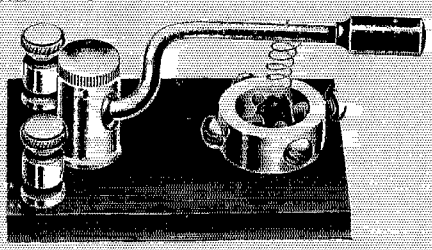

List. No.		Price
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YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

CHRISTMAS is a time when we think especially of children. If you have youngsters of your own, you well know what a busy, wonderful season it is with all the extra festivities. You're probably a bit hard-pressed for the time you normally devote to hamming — right? Assuming you have five or fewer harmonics to contend with, consider the situation of three of our YLs who have eight or more! The holiday season seems to be an appropriate time to introduce these three YLs whom, we think, deserve gold stars for the year 'round devotion to their families and to their hobby.

Alice Kinnear, W1TUD, of Millis, Massachusetts, has eight children — five boys and three girls. She is the XYL of W1DWO and has been licensed since 1951. She is especially excited about QSOs with stations in the First and Second call areas, for she feels she then has some hope of meeting fairly local operators in person. And more often than not the Kinnears have visiting hams partaking of Alice's good cooking. Alice uses several bands, fixed and mobile, and the pet frequency is 3803 kc.

Eleanor Wechter, W1ZEF, of Stratford, Connecticut, has nine children — six boys and three girls — ranging in age from seventeen to almost two. Eleanor became interested in amateur radio the day the license came for her OM, W1YQR, a professor at the University of Bridgeport. She received her Novice license in September, '53, and her General Class the following April. Two of her children have had Novice calls — WN1s ZHK, Nancy, and ZEE, Mike. Now pursuing a vocation as a fashion artist, Eleanor likes c.w. and operates mainly on 80 and 2 meters.

By the time this appears in print, Myrtle Johnson, W4WYY, of Baxter, Kentucky, will have had her eleventh child. Six brothers and three sisters can care for the new arrival when mother resumes hamming. (A premature boy was lost over a year ago.) Myrtle's goal is to spend two to three hours a day working c.w. with her 300-watt home-built rig. Her OM is W4TDD.

We know what you are wondering about at this point. How do these girls find time to be active hams? W1TUD perhaps speaks for Eleanor and Myrtle, too, when she says that she simply "makes" the time to spend on amateur radio. You weigh the things that must be done and the

» Myrtle Johnson, W4WYY

Alice Kinnear, W1TUD

« Eleanor Wechter, W1ZEF

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

REMEMBER . . .

the YLRL Sixteenth Anniversary Party: December 7th and 8th, 'phone section; December 14th and 15th, c.w. section. Rules were published in last month's department.

things you would like to do and come out with a little time for yourself each day.

Alice does not even wait to get through the chores that must be done for a family of ten before she starts to ham, though. With speakers in each bedroom, bathroom, and in the kitchen and basement, she monitors the bands while working about. Even when engaged in a QSO she can cook, sew, wash and iron between transmissions. Alice sums it up in saying, "It's all in what you really want to do."

More on Field Day

The October department carried what we thought was the full story of YL participation in Field Day. Delayed word has just come from the KL7 girls of their doings. Their report prompts renewing the subject. Besides, consider this an early prod to start thinking about plans for *your* '56 FD activities.

The picture tells part of the story. Dungarees and flannel shirts were the fashion — sleeping bags and pots and pans were practical accessories for 12 of the 28 members of the YL Club of Anchorage. Site of operation was the Anchorage Civil Defense Control Center, a heatless plumbing-free Quonset hut, six miles from the city. Antennas were raised courtesy of experienced OMs, who swiftly departed, leaving the girls to cope with their own hook-ups and breakdowns. Anchorage town fathers recommended a male chaperone — OM WL7BDG mustered up courage to accept the girls' invitation.

It rained hard, band conditions on 10, 20 and 80 were not too good, and contacts were not numerous. The girls were particularly disappointed about the scarcity of calls from W stations. OMs of all members were duly worked — "under orders" writes KL7YG, Marge. KL7ANG, Nancy, and WL7BKQ, Pat, were chief cooks. KL7ALZ, Jerry, dropped by to take a turn for an hour and stayed all night, leaving OM KL7MZ to tend their four small harmonics at home.

With less than three hours' sleep apiece, the girls were a weary crew when operations were over. But, before disbanding, they enthusiastically planned for a year ahead. Next time all OM assistance will be gratefully declined — they want to be completely on their own. (See full FD report elsewhere in this issue.)

YLs You May Have Worked

WØVGE, Rebecca Jain, of Colby, Kansas, is sixteen and a high school junior. Licensed only two years ago, she is a member of the Kansas 75-meter net and the Colorado Hi Noon net. Becky's dad is WØLOW.

W3TSC, Camille Hedges, of Washington, D. C., can be found on 7046 kc. each night between eleven and twelve o'clock. Daytime, Camille is employed as head of the Conference Reporting Section for the Secretary of Defense. Her OM is W3BKE.

ORS WØKJZ, Lydia Johnson, operates "99% c.w." Manager of the Minnesota Jr. Net and an NCS of the Minnesota State Net, she holds a Code Proficiency Certificate for 25 w.p.m. Lydia is chairman for the Sixth YL Midwest Convention to take place in St. Paul next May. Her OM is WØURQ.

Technician K6IHD, Gwen Rudolph, of Los Angeles, California, is on two meters as often as possible. Gwen scarcely looks like a grandmother, but she is. Her son is K6BQD, her OM is not licensed.

Rebecca L. Jain, WØVGE

Camille Hedges, W3TSC

YL Field Day participants, left to right, were: WL7BJD, Mary Olendorff; WL7BKS, Marge Reich; KL7AYA, Doris Staley; KL7YG, Marge Sappah; KL7AZI, June Welling; and WL7BKS, Mary Tresidder.

Keeping Up with the Girls

YLRL Secretary W3VLX, Lolly, requests that applications for membership in the YLRL and dues be sent to YLRL Treasurer, Marie Ellis, WØMMT, 531 Cowan Street, Fort Collins, Colorado. Dues for the year January 1 to December 31, 1956, are due and payable during December, 1955. YLs who attended a breakfast during the All-Alaska Hamfest at Anchorage in July were W7WYM; KL7s ANG, AYA, AZI, BOH, CY, YG, ZR; WL7s BFL, BJD, BKQ, BKS and BLL. . . . OMs W1OPZ and W2NIY have made the YLCC, the latter using c.w. only. . . . W1HUH, Sister Emiliana, operates her school station, W1SHR, on 40 c.w. and 75 'phone as much as her teaching duties permit. . . . W7FWR and OM W7FWD celebrated their 51st wedding anniversary in September. Mary Ann has managed the QSL bureau for the Seventh Area for several years. . . . As NCS of the New York Civil Defense Net, W2KEB, Georgie, operates on the net frequency, 3993 kc., twice daily. . . . OM VS1CZ joins VP8AQ and FO8AD as DX stations who have earned the Los Angeles YLRC Lads 'N Lassies Certificate. . . . W3CDQ is President of the Washington, D. C., Radio Club again this year. Liz has held the same office several times since 1922. . . . W6UHA, Maxine, reports that she and K6CPX, Marian, and W6QOG, Helene, enjoyed recent QSOs with South Seas traveler W6NZP, Evelyn, who operated with a special visitor's permit from Samoa and Fiji. . . . The 31 YLs who attended the initial meeting of the Women Radio Operators of New England in Boston, October 15th, became charter members of the first YL club of New England. An executive committee, consisting of W1TRE, chairman, W1SVN, secretary, and members W1RYJ, W1VOS, and W1QON was elected. All New England YLs are invited to membership. . . . Trying 15 meters for the first time, W1YNI, Betty, was happy to work CT1LV. . . . With the confirmation of 17 new countries, W1RYJ's DXCC is up to

Lydia Johnson, WØKJZ

Gwen Rudolph, KN6IDII

117. Esther thought her recent CR7AD contact was a good one on 10 'phone, considering conditions. KJ6FAA is another of Esther's newest conquests — on 20 'phone. . . . W9YBC, Gloria, has her WAS award. . . . KN5s BKR, Patti, BKS, Francine, and BNB, Lee, are three new Novices in Grand Prairie, Texas. . . . W1BBS, Kay, and K2JYZ, Lillian, have shed the "N" in their calls. . . . W5s BDB, RYX, SYL, WXY, YAJ and YKE were on hand for Amateur Radio Day at the Texas State Fair in Dallas.

♦

W5WXY

W5SYL

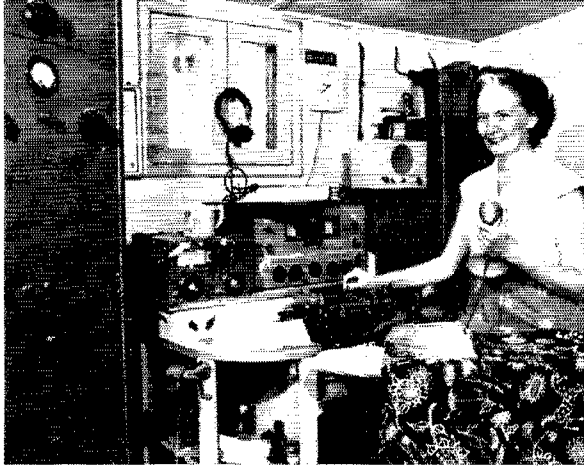
The girls in Texas have their own net story to tell, too. A year ago W5SYL and W5WXY invited all W5 YLs who could hear them to join them. The Texas YL Round-Up Net has grown steadily since then. There are 32 members, with an average of 23 checking in each Thursday on 3880 kc. at 9:00 A.M. CST, fall to spring, 8:30 A.M. CST in the summer. The purpose of the net, stated in the constitution, is to foster and advance amateur radio among women amateurs. Shown in the photo are the net officers: Pres. W5WXY, Bernice; Vice-Pres. W5SYL, Iva; Sec-Treas. W5LGY, Helen; and Publicity Chairman, W5ZPD, Cindy.

W5LGY

W5ZPD

♦

Officers of the Los Angeles Young Ladies Radio Club for the current term are, left to right: K6EXV, Lucille Harmon, corresponding secretary; W6AKE, Lorraine Freeberg, vice-president; W6QOG, Helene Leonard, president; W6DXI, Gladys Eastman, treasurer; and K6GMX, Jayne Dynes, recording secretary. A YLRL unit, the club consists of more than sixty members, making it the largest local club of licensed YLs.



W6PJF, Rosemary Robin

Double Duty

Switch on the filaments and plug in the iron, the laundry iron, that is. That's just what "modern" YLs are doing on busy weekdays. A group of W6 girls thought the combination a natural for a morning net — result: the Ironing Board Net.

NCS W6PJF, Rosemary Robin, tells about it: "In 1950 weekly skeds on 75 'phone between W6FEA and W6PJF developed into a pleasant YL round table. As morning hours are working hours, it was decided to combine work and play — hence our Ironing Board Net, at 9:00 A.M. on 3915 kc. Five years have passed, and the regular roll call is now 30 stations. Check-ins reach as far south as W6TCN, 12 miles from the Mexican border, to W7GLK in Ashland, Oregon. Stations on the extreme ends are unable to hear each other; nevertheless, during the one- to two-hour session, they patiently iron away, with no unnecessary breaking. Members are appreciative of the consideration of many OMs who often stand by and just listen to their accomplishment of doing three things at the same time — enjoying meeting each other, enjoying their hobby, and keeping the clothes basket empty."

Hints and Kinks For the Experimenter

SIMPLIFYING THE "HIDDEN GEM"

THE "HIDDEN GEM" described in *QST* for March, 1955, is one of those simple but valuable gadgets that will interest all mobileers. Perhaps some of the gang who have not yet started construction of the *QST* model will be interested in a simplified version that I used while touring the U. S. A. as VE7ASL/W.

My installation consisted of a 0–1 milliammeter, a crystal diode, a pair of shielded leads and a small r.f. pick-up coil. The meter was mounted on the side of the converter by means of angle brackets and the crystal was supported by a meter terminal. The shielded wires traveled via an out-of-sight route to the trunk of the car and there terminated at a pick-up coil. Fig. 1 is a circuit diagram of the set-up.

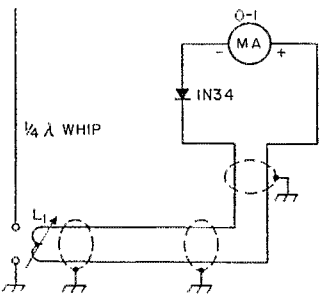


Fig. 1 — Circuit diagram of the simple field-strength meter used by VE7ASL/KH6.

The r.f. pick-up coil, L_1 of Fig. 1, should be made with a few turns of stiff wire so that it will be self-supporting. The amount of r.f. picked up by the coil may be adjusted by altering the proximity of the coil with relation to the base of the whip, or by spreading the turns physically. In any event, the adjustment should be one providing about ½-scale reading on the meter when the carrier is unmodulated. A ½-scale reading without modulation allows the meter to deflect still further without pinning when modulation is applied.

— *Chas. H. Freeman, VE7ASL/KH6*

HOMEMADE PERFORATED ALUMINUM

PERFORATED ALUMINUM for shielding is not always readily available and it most certainly isn't the least expensive item that one can find. However, anyone can make his own perforated stock with aluminum sheet, graph paper, center punch, hammer, drill and *patience*. Graph paper is available in many different sizes and makes an ideal template for the job. The size and the number of holes to be drilled can be left to the individual requirements. Personally, I prefer a series of No. 36 holes.

Aside from ending up with perforated stock at the price of plain sheet aluminum, the idea offers two other advantages. First, existing shielding may be perforated by applying the method to bottom plates, top covers, etc Second, a neat solid margin may be left at the edges of a sheet, thus providing a finished appearance and a solid surface for fastening purposes.

— *Shepard Title, K2GGR*

A REMOTE STAND-BY CONTROL FOR THE HEATHKIT AT-1 TRANSMITTER

IT is possible to connect a relay in parallel with the stand-by switch (S_2) of the AT-1 transmitter. This modification is not difficult to make and will not affect the normal operation of the stand-by switch in any manner.

The relay used here at W6MTM is a surplus job intended for antenna switching, but almost any normally open s.p.s.t. relay will serve the purpose. In the installation instructions to follow, Heathkit identifications (see pictorial No. 2 of the instruction book for the AT-1) for various points in the circuit will be used.

First, connect a wire between C_7 (Pin 7 of the 5U4G) and Pin 8 of the modulator plug. Now, run a lead from Pin 7 of the modulator plug to the nearest ground lug (EC_4). The relay contacts should be connected to Pins 7 and 8 of the modulator plug. A s.p.s.t. toggle type switch, located at the operating position, is used to control the relay.

The relay here is housed in a fruit-cake box. The box measures about 3 by 3 by 5 inches, is made of tin, and has an airtight cover. Many of the local chain stores sell this type of container. I fastened the relay to the bottom of the box. A rubber grommet at one end of the box passes a 115-volt cord for the relay coil and a pair of feed-through insulators at the opposite end handle the leads for the relay contacts.

When power is applied to the relay, it will activate the transmitter and any equipment that receives power through the power receptacle at the rear of the transmitter chassis. For instance, the AT-1 and a companion VFO (VF-1) may be turned on and off simultaneously by the remote control switch and relay.

— *James Mitchell, W6MTM*

USING ICE TRAYS AS CHASSIS

NEXT TIME you have need of a small chassis for a converter, frequency standard, etc., you might well check over any discarded ice trays

that happen to be available. Most metal trays are constructed of aluminum and are decorated with rounded edges and sloping sides to which stock chassis have no claim. Before you discard the crisscrossed cube separators, be sure they will not be handy for shielding purposes. Many of these lattice-like affairs can be dissected, thereby providing shielding material or parts mounting space just where it is needed.

— *Steve Grossman, W2YGA*

CONTROL SHAFT FOR SURPLUS-TYPE APC CAPACITORS

MOST of the surplus APC type variable capacitors have short shafts intended for screwdriver adjustment. Fig. 2 shows how a small homemade aluminum bracket and a panel-

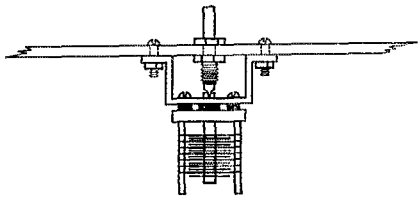


Fig. 2 — Drawing of the bracket-bearing assembly that permits knob control of short-shaft variable capacitors.

bearing assembly can be combined to permit using a knob with these capacitors.

The panel-bearing assembly may be a standard manufactured component or it may be a makeshift affair obtained by salvaging parts from an old potentiometer or rheostat. The section of the shaft that protrudes from the rear of the panel bushing must be filed flat to mate with the slot in the shaft of the capacitor.

— *Herman W. Gross, W9ITT*

HANDY SOURCE OF POWER FOR D.C. RELAYS

DISCARDED pinball machines, old juke boxes and ARC-5 gear are just several sources of excellent d.c. relays. All too often, though, this type of relay is passed over by amateurs because of the d.c. power requirements. However, it is *not* necessary to provide a special d.c. pack for this type of relay and the following explains how relay power is obtained by several of us fellows up here in W8-land.

Here at W8NOH, we connect the d.c. relays in series with the center tap of a low-voltage plate supply. Not only does this method of connection provide relay power, but it provides a source of negative voltage that may be filtered and used as fixed bias for a keyed c.w. stage. Approximately 18 volts was developed across one of the relays so connected and about -35 volts was obtained across the windings of a pair of relays connected in series. In each case, adequate filtering was provided by an 8-μf. capacitor. Naturally, the relays contacts may be employed for a variety of switching operations such as the control of other supplies, receiver muting, antenna changeover, shorting of a modulation transformer, etc.

W8PUV has a d.c. relay connected in the grid-circuit return of his final amplifier. With the relay contacts controlling the screen and the plate supplies for the stage, it is impossible to apply power without first having excitation available.

W8GJS uses a d.c. relay in the negative return of his plate supply to control a red *warning* light.

Of course, with the relay connected in series with the center tap of the supply, the voltage developed across the solenoid must be subtracted from the original effective value of plate voltage. In other words, if you pick up -18 or -20 volts of bias, you lose that amount at the positive output terminal of the supply.

— *Louis A. Gerbert, W8NOH*

[EDITOR'S NOTE: When using this system, it is advisable to study the current handling capability of the relay winding, remembering that the solenoid must pass the full-load current of the supply. Furthermore, this method of developing bias should be installed only when the supply load is reasonably constant. Serious fluctuations in bias voltage would result if, for instance, a relay was so installed in a supply delivering power for a Class B audio stage.]

USING 1N34s TO PREVENT RECEIVER OVERLOAD

AFTER installing a kilowatt final amplifier, I was troubled by very slow recovery of the receiver in going from transmit to receiver after the send-receive switch was thrown. It took as long as three seconds for the receiver to return to normal, especially when using sharp crystal selectivity. Putting a neon bulb across the antenna terminals did protect the antenna coil on the receiver, but had no effect on receiver overloading. Attempts to time the relays weren't too successful, since getting the relays to open in the proper sequence would result in the wrong closure sequence.

Installation of two germanium diodes (1N34 crystals) across the antenna terminals of the receiver completely eliminated the slow recovery and effectively prevented receiver overload regardless of relay timing. Apparently, the crystals begin conduction at a fraction of a volt, and bypass anything above this level so that it does not enter the receiver. No effect on the strength of received signals was noted, and there was no TVI as might be possible from the use of nonlinear elements in the antenna circuit.

The crystals were installed directly across the antenna terminals of the HRO-5, with the polarities of the crystals such that one was opposite in polarity to the other. The same system was tried on a BC-779 receiver with equally gratifying results.

The author hopes that this novel idea may be of help to someone who is bothered by slow receiver recovery caused by transmitter energy feeding back through the antenna relay to the receiver.

— *Sidney L. Gerber, W9TAI*

(Continued on page 206)

Correspondence From Members-

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

THE FORGOTTEN ELEMENT

4607 Convent Lane
Philadelphia 14, Pa.

Editor, *QST:*

I believe there should be an additional examination element in the amateur exams. This element should be on courtesy. Courtesy seems to be all but forgotten on the 'phone bands and is gradually disappearing on the c.w. bands.

All amateur frequencies are for the use of all amateurs, true, and the same goes for the open road. However, on the highway if two individuals argue about the same place at the same time, a serious accident can occur. In amateur radio, the same thing occurs except no one is hurt physically. It is a pretty low character who must operate on a net frequency during net operations. Nets, I realize, have no authority to monopolize a frequency nor do they represent all types of amateurs, but a net does represent 30 to 40 amateurs, all active, operating on a single frequency. This is much more efficient use of a single frequency than any individual QSO. I realize this could be carried to extremes but there must be some solution. Any ideas?

— *G. S. Van Dyke, jr., W3ELI*

SIDEBAND STANDARD

670 Buena Vista Circle
Winston-Salem, N. C.

Editor, *QST:*

. . . Now would be a good time to review which sideband should be standard on each band. Heretofore lower sideband on 75 and upper on 20 has been used. I cannot help but feel that the pre-10A exciters had much to do with this. If the old type phasing-exciters' sideband selector is left alone, you would come out with the aforementioned sidebands.

Now that it is official on how close to the edge we can work, would it not be logical to use the sideband furthest from the edge?

This would mean that on 75 all s.s.b. stations would use lower sideband above 3900 kc. and upper sideband below 3900 kc. thus permitting operation up to a few hundred cycles of band edge. On 20 the dividing line would be 14,250 kc.; all stations above this frequency, U. S. or DX, operate lower sideband, and all stations below use upper sideband. The foreign stations would have to get on board as there is nothing more confusing than trying to tune a band after a CQ or a stand-by and have stations using different sidebands calling. By the same token the dividing line on 40 would be 7250 kc. and on 15, 21,350 kc.

I realize that this idea, like many others, comes up against radio hams' RC constant (Resistance to Change) but it seems that eventually we'll wind up doing this so why not now.

— *Nick Stavrou, W4MXL*

OO SPEAKS

63-20 Woodhaven Blvd.
Rego Park 74, N. Y.

Editor, *QST:*

I have been an Official Observer for several years, and have greatly enjoyed the work. Recently, however, I have received several replies to the coöperative reports which I sent out, a few of which were quite uncomplimentary and resentful. I believe that those who were offended by the reports were so because they didn't understand what OOs are, and what we're trying to do.

I don't know how many times I've heard a fellow ham exclaim upon receipt of an FCC notice, "I always got good signal reports. Nobody ever told me I had chirps or clicks." I'm sure you've often heard a T9 report given on a signal that was, in all honesty, only T3 or 4.

Official Observers are your fellow hams who voluntarily give up a part of their operating time to assist you in maintaining a high standard of operating technique and efficiency. The coöperative report is sent out to assist you, not to criticize your operating in any way. An OO sends you an honest, experienced evaluation of your signal. In many cases he also takes the time to make suggestions as to the possible cause of the trouble based on experience, related experience, or otherwise acquired knowledge. These reports and suggestions are made in the true spirit of the hobby, that of fraternalism and sincere helpfulness.

. . . An FCC notice is often times the badge of a careless and indifferent operator, and in a great many cases such a citation could have been avoided, had the proper attention been given the report of an Official Observer.

— *Bernhard Hinrichsen, W2NTB*

Q SIGNAL USAGE

1507 Central Avenue
Kansas City, Kansas

Editor, *QST:*

In reference to W9JGL's letter in October 1955 *QST:* One bad point of using Q signals on 'phone is that the users, and also newcomers listening, have the tendency to think of the Q signal as meaning only one word. Therefore, when they want to give the actual meaning they have to add additional wording to bring it back up to the original meaning. On 'phone and c.w. we hear such as "What is your QTH?", using QTH as meaning "location." The meaning of "QTH?" alone is "What is your location?" When Q signals are so misused by saying "My QTH is . . .", "Can you QSP," etc., it negates the true purpose of the Q signals which is to give a short way of expressing a thought on c.w. as well as allowing operators of different languages to communicate. If the Q signal meant only one word, there would be no purpose in creating them. You can speak the word as fast on 'phone, or send an abbreviation of the word as fast (or faster) on c.w.

BCI, TVI, VFO, etc., are not so misused in the *Handbook.* They are standard abbreviations. They are not given a "bob-tailed" meaning and then additional wording added to bring them back up to the original meaning. The text of the *Handbook* does not say such as "The Variable VFO Oscillator will not cause BCI Interference or Television TVI."

— *Merton T. Meade, WØKXL/NIY*

CASE FOR GROUNDS

P.O. Box 252
Winfield, Ala.

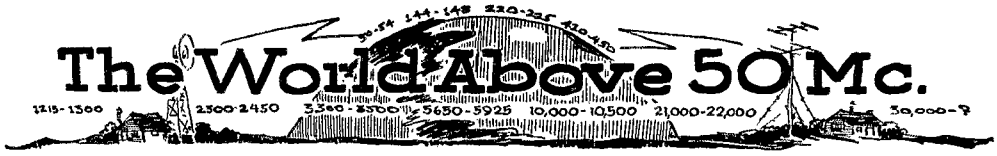
Editor, *QST:*

I would like to pass along to all who might be concerned the details of a freak accident of which my rig was the victim.

My station is on the opposite side of the house from any water pipes for grounding purposes and since the telephone company had conveniently installed their ground rod just beneath the window through which my transmission line passed, I attached the station ground to their rod.

On Sept. 16th, at 3:45 P.M., I was making a transmission on 75 'phone when I was almost blinded by a flash coming from the transmitter followed almost instantly by another, then the power went off. Upon investigating, I found a truck, with a bulldozer on the back, had broken a telephone wire about two blocks from the house and the telephone wire flew up into a 7200 volt circuit from which the current traveled over the telephone line to the ground rod outside my shack, thence up my ground wire through the transmitter and the house service entrance switch to the power-company grounded neutral. A 15-amp. fuse blew in the

(Continued on page 204)



CONDUCTED BY EDWARD P. TILTON, W1HDQ

THAT "It's an ill wind that blows nobody any good" was probably never better demonstrated, literally, than in the 1955 hurricane season. Every one of those terrifying tropical storms sweeping up the Atlantic Seaboard, or across the Gulf of Mexico, pushed ahead of it weather patterns that blew plenty of good for v.h.f. enthusiasts. They may have blown down our antennas and all but destroyed some of our cities with their flooding rain aftermaths, but from July through October they brought us some of the finest tropospheric DX ever experienced.

Probably many of the beneficiaries are so far from the storm areas that the connection might never occur to them, but if we look back over the major tropospheric DX sessions of this and other years we will find that nearly all of them burst on the v.h.f. scene just about the time that the Miami Weather Bureau Office was beginning to broadcast warnings of a new hurricane developing somewhere near the West Indies. Your present correspondent does not profess to understand the mechanism involved, but he does not doubt that there is one.

Those well-publicized bearers of death and destruction, Connie and Diane, were preceded by some fine v.h.f. weather. Ione stirred up the superb propagation that made the September V.H.F. Party something to relate to our grandchildren. A late-comer, sneaking up on the weatherman without the formality of being named, brought more disastrous floods and violent winds in October, but not before most of the eastern half of the United States and Canada had enjoyed some of the best 2-meter DX on record. The weather forecasts didn't give us much warning on this one, but if we had operated on the basis of v.h.f. experience alone we should have been preparing for something, after what happened on 144 Mc., October 9th through 12th. It seems certain now that the DX reported briefly below was a natural prelude to the hurricane winds and rainfall of nearly a foot that struck the Northeast on the 14th, 15th and 16th.

It all started with tropospheric openings on 144 Mc. along the Mississippi and in adjacent territory the night of Oct. 9th. This appears to have extended no farther east than Illinois or Indiana, at first. W4HHK, Collierville, Tenn., arrived home from work at 0300 on the 10th, to find W4UDQ (Mrs. W4HHK) still up and working W9s and Øs. Paul then took over and continued to work the DX, not only that morning, but again the night of the 10th, when W8s NSH BLN WMH JSW KAY, W4VLB/8, WØBKV and W9WOK were worked. A morning contact with W9QXP was made crossband to 40 meters, with the W4HHK 2-meter signal rebroadcast back from Chicago for Paul to monitor on 40. After midnight of the 10th, the band remained open, permitting contacts with W4MKJ, Louisville, W8s KAY and LPD, VE3DIR and others. With a short time out for sleep, W4HHK was back at 0600, working W3RUE, W2ORI and several nearer stations. DX continued moving

2-METER STANDINGS

Call	States	Areas	Miles
W1RFU	19	7	1150
W1HDQ	19	6	1020
W1REZ	18	5	710
W1ULZ	17	6	680
W1CCH	17	5	670
W1IZY	16	6	750
W1KCS	16	5	600
W1CLH	16	5	565
W1IEO	16	5	475
W1AJR	15	5	600
W1AZK	14	5	650
W1MNF	14	5	600
W1BCN	14	5	650
W1DJK	13	5	520
W1MMN	12	5	520
W2ORI	26	8	1000
W2NLY	23	7	1050
W2AZL	21	7	1050
W2BLV	21	7	1020
W2UTH	19	7	880
W2AZP	19	7	650
W2OPQ	19	6	—
W2DWJ	18	6	630
W2AOC	18	6	660
W2AMJ	17	5	550
K2CFH	16	7	910
W2PAU	16	6	740
W2PCQ	16	5	650
W2LHL	16	5	550
W2CFT	15	5	525
W2BRV	15	5	590
W2FHJ	15	5	435
W2LBX	15	5	—
W2DFV	15	5	—
W3RGT	28	8	740
W3RUE	25	8	950
W3KCA	21	7	—
W3KWL	19	7	740
W3NKM	19	7	660
W3IBH	19	7	650
W3GKP	19	6	800
W3TDF	19	6	720
W3BNC	18	7	750
W3FPH	18	7	—
W3LNA	16	7	720
W4HHK	28	9	1280
W4AO	23	7	950
W4MKJ	20	8	725
W4PCT	20	8	—
W4JFV	18	7	830
W4VLA	17	7	825
W4TLV	16	7	1000
W4UMF	16	6	600
W4OLK	15	6	720
W4CLY	15	5	720
W4OXC	14	5	500
W4JHC	14	5	720
W4WCB	14	5	740
W4TCR	14	5	720
W4UBY	14	5	435
W4IKZ	13	6	720
W4JFU	13	5	720
W4UDQ	11	5	850
W4HJQ	11	5	500
W4WNH	10	5	500
W4MDA	10	4	680
W5RCI	21	7	925
W5JTI	19	7	1000
W5AJG	13	5	1260
W5HEH	11	5	850
W5ABN	11	3	780
W5QNL	10	5	1400
W5CVW	10	5	1180
W5MWW	9	4	570
W5ML	9	3	700
W5ERD	8	3	570
W5FEK	8	2	580
W5VX	7	4	—
W5VY	7	3	1200
W5ONS	7	2	950
W5FSC	7	2	500
W6WSQ	5	3	1380
W6DNG	4	2	350
W6ZL	3	2	1400
W6BAZ	3	2	320
W6NLZ	3	2	360
W6MMU	3	2	240
W7VMP	6	4	1280
W7LEE	5	3	1020
W7JU	4	2	353
W7YZU	3	2	240
W7JUO	3	2	140
W8WXV	28	8	1200
W8RMH	24	8	800
W8SRW	23	8	850
W8SFG	23	8	850
W8LPD	23	8	—
W8SVI	22	8	725
W8DX	22	7	675
W8WRN	20	8	670
W8BAX	20	8	685
W8JWV	19	8	710
W8EP	18	7	800
W8ZCV	17	7	970
W8RWW	17	7	630
W8WSE	16	7	800
W8EGR	16	6	680
W9EHX	24	7	725
W9FVJ	23	8	850
W9BPV	23	7	1000
W9KLR	23	7	820
W9ZHL	23	7	690
W9WOK	22	8	860
W9EQC	22	8	820
W9UCH	21	7	750
W9KPS	19	7	660
W9MUD	19	7	640
W9REM	19	6	—
W9LF	19	6	—
W9ALU	18	7	800
W9GAB	18	7	750
W9JGA	18	6	720
W9MBI	16	7	660
W9BOV	15	6	—
W9LEE	15	6	780
W9DSP	15	6	760
W9DDG	14	6	700
W9FAN	14	7	680
W9QKM	14	6	620
WØEMS	27	8	1175
WØGUD	25	7	1065
WØLHD	24	5	870
WØUOP	18	6	—
WØONQ	17	6	1000
WØINI	15	5	830
WØOAC	14	5	725
WØTJF	13	4	—
VE3DIR	26	8	895
VE3AIB	22	8	890
VE3DER	15	7	800
VE3BQN	15	7	790
VE3BPB	13	6	715
VE2AOK	12	5	550
VE3AQG	11	7	800
VE1QY	11	4	900
VE7FJ	2	1	365

to the east, and the night of the 11th Paul worked VE3AIB, VE3DER, W2ALR and W8RMH, between 1700 and 1935. Back again at 2200, and QSOs with K2s CEH and IXJ, W2s ORI and WFB, and W3s KWL and BGT. Rain finally brought an almost welcome end to the continuous DX session the morning of the 12th.

The magnitude of this work can only be appreciated when we look at a topographical map, and try to visualize the terrain that lies over quite a bit of the 900-mile distance between W4HHK and W2WFB, Ithaca, N. Y. Anyone would have said that such contacts were impossible on 144 Mc. a few years ago.

A distance of 900 miles seemed to be the standard thing for the better-equipped stations. W5RCI, Marks, Miss., covered the same distance, over a slightly different course, in working 47 stations in 18 states during the three-day binge. His best was VE3DIR and VE3AIB, Toronto. Of the 47, 26 were making their first Mississippi contacts on 144 Mc.

Arkansas, represented by W5HEH, West Memphis, was a major objective for hundreds of statoins and it is believed that "firsts" between the states and provinces involved are represented by W5HEH's 2-meter contacts with W9EGH, Indiana, W8RMH, Michigan, W2ORI, New York, W3BGT, Pennsylvania, and VE3DIR, Ontario. An 800-mile hop and another interstate first were made by W9KLR, Rensselaer, Ind., in working W5HEZ, Baton Rouge, La., later followed by W5GIX of the same city.

W4TLV, Demopolis, Alabama, was another new one that many of the W8s, 9s, 2s and 3s were after. W2ORI, Lockport, N. Y., worked him for the first New York to Alabama contact we know of on 144 Mc. With his "first" made by working W5HEH, and previous contacts with W5JTI and W4HHK, W2ORI now has four first contacts to his credit.

What does it take to work such stuff? Many of the stations involved are running high power, with 4-125As or 826s serving in the final stages of most of the rigs handling 500 watts or more. Big antennas are the watchword, and 32-element jobs seem to be almost standard equipment. Everyone uses a low-noise converter; triode r.f. stages and crystal-controlled conversion are musts. And c.w. was a big factor. Many operators report that never was so much c.w. heard on a v.h.f. band previously, and even with narrowband techniques the QRM was terrific, especially on the well-known surplus-rock frequencies like 144.13. There is an obvious need to spread out more, and particularly to shift the frequency of those surplus crystals a bit, as the QRM is noticeably bunched around the common available crystal frequencies.

Not everyone was running high power and a tremendous array. W5HEH had only 100 watts and a 5-over-5 beam, and there were plenty of other 829B rigs giving good accounts of themselves. Needed, as reported by several observers: more attention to keying methods and proper filtering. With the congestion we now encounter in major band openings, there is no room for key clicks, bad chirps and broad buzz-saw notes.

And, according to many of the gang there is no room for voice operation in the first 200 kc. of the band. The clamor for a 200-kc. exclusive c.w. assignment at the low edge keeps building up. With a 4000-kc. band there is little reason for voice and c.w. to bother one another. C.w., being a narrowband and primarily DX technique, would seem to have logical first call on the low edge of the band. We could handle all this quite readily by gentlemen's agreement, doing away with any necessity for legislation of a restrictive nature. How about moving the voice work above 144.2? It would help everyone to work more stuff, and make better use of a valuable piece of the v.h.f. spectrum.

Here and There on the V.H.F. Bands

The first Cuba-to-Florida 2-meter contacts, made by CO2CT, with CE3QG at the key, were reported briefly last month. CO2CT is now on daily morning and evening, looking for DX. His schedule is as follows: 0600 to 0630 — alternate listening and transmitting for five minutes each, beamed on Miami; 0630 to 0700 — same with beam on Wilmington, N. C., which should do for Atlantic Seaboard cities farther north, also. This arrangement is repeated evenings with the beam on Miami 2000 to 2030, and on Wilmington 2030 to 2100 EST. Whenever time permits he will be listening in other directions after 2100. Note that he is listening during the first 5-minute period, transmitting in the second, etc. CO2CT runs a pair of 4-125As on c.w., on 144.98 Mc. His receiver is a low-noise converter ahead of an Eddystone Model 750, a double-conversion job with a high-selectivity i.f. system. The beam is a 16-element horizontal.

And if you're looking for some *real* DX on 144 Mc., G2ADZ would like to have a shot at crossing the Atlantic. He's even willing to try it on 420 Mc.! He has an exceptional location, 600 feet above sea level, with a clear shot in the direction of this country. His normal operating frequency is 145.38 Mc., though he can use 144.31. Interested parties write H. W. Parker, Penguins, Pool Lane, Woolacombe, N. Devon.

W6LIT, Loma Linda, Cal., sends details of an expedition by W6WSQ, K6HHO and him to Santa Rosa Mountain, an 6050-foot elevation 129 miles east of Los Angeles. They had aimed for Mt. Brianhead in Utah, but were stopped by an early snowstorm. (On Oct. 8th and 9th!) The rig was a 100-watt c.w. job on the low edge of the band, feeding a 5-element Yagi that could be raised 50 feet above ground. The best DX, W7FGG, Tucson, Ariz., was worked at 1900 PST on the 8th, a distance of 340 miles over the mountains. Signals peaked at S7 at this time, much stronger than when he was worked again two hours later. The following morning he was S8 to 9. W7UPF, Tucson, was also contacted Sunday morning, as were W7LEE, Parker, Ariz., and W7JU, Boulder City, Nev. Of course, many Southern California stations were worked throughout the stay.

Don has a home rig that will run about 500 watts, c.w., under construction, feeding a 20-element horizontal array. He reports that, to his knowledge, the only horizontally-polarized stations in Southern California are W6WSQ, W6KQO, W6DNG and W6LIT.

For several years during the last sunspot cycle, there were periods when stations in Mexico and farther south were able to work into several South American countries on 50 Mc. This was a spring and fall phenomenon, with the band opening usually in late afternoon. It is of special interest to 50-Mc. DX enthusiasts to note that contacts between Mexico and Argentina are once again taking place. XE1GE found evidence of 50-Mc. openings to the south during the spring, and on October 12th he worked LUs 8AE 4DT 2EW 6DO and 8DJI. Should the current solar cycle follow the trend of the previous one, we should be seeing high m.u.f. over most of this country by another fall. By the way the 21- and 28-Mc. bands have come alive recently, 50 Mc. should bear watching before long.

The growth of v.h.f. interest in various parts of Tennessee

WØZJB.....48	W4FNR.....39	W8OJN.....43
WØBJV.....48	W4IUJ.....38	W8LPD.....42
WØCJS.....48	W4BEN.....35	W8YLS.....41
W5AJG.....48		
W9ZHL.....48	W5VY.....48	
W9OCA.....48	W5SFW.....47	W9ZHB.....48
W6OB.....48	W5GNQ.....46	W9QUV.....48
WØINI.....48	W5ONS.....45	W9HGE.....47
W1HDQ.....48	W5JTI.....44	W9PK.....47
W5MJD.....48	W5ML.....44	W9VZP.....47
W2IDZ.....48	W5FSC.....44	W9RQM.....47
W1LLL.....48	W5JLY.....43	W9ALU.....47
WØDZM.....48	W5JME.....43	W9QKM.....47
WØHVW.....48	W5VV.....42	W9UIA.....45
	W5FAL.....41	W9UNS.....45
W1GJO.....47	W5HEZ.....41	W9MFH.....40
W1CLS.....46	W5HLD.....40	
W1CGY.....46	W5FXN.....38	WØQIN.....47
W1LSN.....45	W5LIU.....37	WØNFM.....47
W1DJ.....41	W5NSJ.....24	WØTKX.....47
W1RFU.....41		WØKYF.....47
W1FOS.....32	W6WNN.....48	WØWKB.....47
W1WAS.....23	W6ANN.....45	WØJOI.....46
	W6TMI.....45	WØMVG.....46
W2MEU.....47	W6IW8.....41	WØTJF.....44
W2AMJ.....46	W6ABN.....35	WØURQ.....44
W2BYM.....46	W6GCG.....35	WØJHS.....43
W2RLV.....45	W6BWG.....33	WØPKD.....43
W2FHJ.....45		WØIPI.....41
W2GYV.....40	W7HEA.....47	WØORE.....37
W2QVH.....38	W7ERA.....47	WØUSQ.....36
W2ZUW.....36	W7BQX.....47	WØFKY.....32
W2ORA.....33	W7FDJ.....46	
K2AWQ.....32	W7DYD.....45	VE3AET.....44
	W7JRG.....44	VE3AIB.....35
W3OJU.....46	W7ACD.....43	VE1QZ.....34
W3TIF.....42	W7BOC.....42	VE1QY.....32
W3NKM.....41	W7JPA.....42	VE3DER.....31
W3MQU.....41	W7FIV.....41	VE1EF.....28
W3OTC.....40	W7CAM.....40	XE1GE.....25
W3KMV.....39		CO6WW.....21
W3RUE.....38	W8NS8.....46	
W3MXW.....38	W8CMS.....46	
W3LFC.....37	W8NQD.....45	
W3FPH.....35	W8UZ.....45	
	W8RFW.....45	
W4FBH.....46	W8SQU.....43	
W4EQM.....44		
W4QN.....44		
W4FLW.....43		
W4CPZ.....42		
W4OXC.....41		
W4MS.....40		

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

continues apace. W4ZZ, Knoxville, writes that he has worked W4LNB, Chattanooga, 100 miles, on both 6 and 2, W4RFR, Nashville, 160 miles, on 6, and W4ZD and W4FBH in the Atlanta area, 160 miles, on 6. All these are "firsts" from the Knoxville area. Tests with W4HHK, at the opposite end of the state, have so far not succeeded, but the aim of a statewide v.h.f. net for Tennessee seems well on the way to becoming an accomplishment.

North Carolina has been the end of the line for 2-meter operators of the East who were looking for new states from the South. Now South Carolina has entered the states scramble, with the appearance of W4CPZ, Gaffney, S. C., on 144.35 Mc. On the night of Oct. 4th the band was open up the Atlantic Seaboard and many W2s and 3s got their coveted South Carolina contacts. So far only one W1 has entered the charmed circle, W1REZ, Fairfield, Conn., having worked W4CPZ by staying with him until 0405 EST on the 5th. W4CPZ has been on the receiving end of the big rush before — he turned the same trick years ago for South Carolina-hungry 50-Mc. operators.

The crowding at the low edge of the 50-Mc. band comes in for plenty of discussion after every contest or widespread band opening. There is probably little need to use a lot of the band in many areas under ordinary conditions, but when signals are being heard over hundreds or even thousands of miles it is nothing short of ridiculous for us to suffer from pile-ups in a band four megacycles wide!

W3KMV suggests, and we heartily commend the idea, that the problem is not unlike the situation in working rare DX: The wanted station is in the driver's seat. He can force the hunters to spread out — if he will. If you are in a "rare" state or section you don't have to put up with layers of QRM. The boys own crystals for other points in the band than the low edge. They will break them out and put them into service if it will get them a contact. You can't really blame fellows for operating at the low edge if they see that the stations they want to work are tuning from the low end every time they stand by. It would serve everyone well if we all tuned the higher parts of the band at least some of the time *and* announced that we are so doing. Congestion during v.h.f. contests and band openings has reached the point in many areas where announcements of "tuning from 51 Mc. upward", "tuning from the high end down" and other similar procedures are musts, if we are to reduce the needless QRM that so frequently plagues us.

OES Notes

W2UTH, Victor, N. Y. — Only two weeks of skeds with W3BNC, Hagerstown, Md., needed to make contact for new state on 144 Mc. — and during the September V.H.F. Party, at that. Conditions on both 6 and 2 extremely good during contest, and for two days preceding.

W4IKK, Rome, Ga. — Experimenting with pentode r.f. amplifiers at 144 Mc. showed 6CB6 somewhat better than 6AK5 in several respects. The former was easier to stabilize, and seemed to provide better isolation, both as to reaction on tunable oscillator and in amount of oscillator voltage appearing at the antenna terminals. The 6AK5 had to be completely shielded to prevent TVI in nearby receiver, while 6CB6 in same general layout could be run with back cover off without causing interference.

Input circuit of 6BC6 was slug tuned, with primary winding over cold end of coil. Started with four turns (for 50-ohm coax input) but found stage unnecessarily broad. With three turns the bandwidth was still about 6 Mc., but gain was up slightly. Going to two turns increased gain further and reduced bandwidth to about 3 Mc. Noise figure remained constant with 2, 3 or 4 turns. With one turn the stage became regenerative, and noise figure suffered.

W4CUO, Langdale, Ala. — Nightly sked with W4EW, Montgomery, shows that 100-mile circuit can be covered reliably on 144 Mc. Weekly 2-meter session in Atlanta area each Monday at 2000 EST.

W5NSJ, Albuquerque, N. Mex. — Making crossband contacts with W5KWP, Santa Fe, 432 to 50 Mc. Signals on 432 S9-plus over 60-mile mountainous path. W5FAG also does well on this circuit since he tilted his array upward 5 degrees.

W7JRG, Billings, Mont. — New 2-meter converter finally debugged. Uses 6AN4-6AN4-6AK5 r.f. stages and 6AK5 mixer, with 4 coaxial circuits. Spurious responses lower than with any previous converter, and noise figure also very good. Only lower two megacycles of the band can be covered with the high-*Q* circuits.

What Is OES?

The Official Experimental Station Appointment is open to any ARRL member who has a genuine interest in work on the frequencies above 50 Mc. Monthly reports are made by OES appointees to their Section Communications Managers, and these reports are, in turn, forwarded to ARRL Hq. for possible use in this space each month in *QST*. As an OES you increase your opportunities for making contributions to the art, and through monthly reporting you keep in close touch with the ARRL Field Organization and Headquarters. In return, you receive the OES Bulletin which is produced several times each year, and you are on the mailing list for any special notices of tests or events that have v.h.f. significance.

What to put in your OES report? Anything that will be news to other v.h.f. workers is OES material. Results of experiments like W4IKK's work with pentode r.f. amplifiers, in this issue, are especially helpful. Don't fail to report any v.h.f. skeds you keep regularly, including time, frequency, beam direction, polarization, and any other information that might be helpful to fellows who want to try to hear or work you.

But please don't waste your time and ours by listing details of work on lower frequencies. OES is a v.h.f. appointment; if you are not active on 50 Mc. or higher regularly you should not hold OES. Unless your operation on lower bands has some direct bearing on your v.h.f. work it should not be reported on OES forms.

If you are a v.h.f. enthusiast and expect to remain one, OES should be your link with the ARRL Field Organization and Headquarters. Your SCM (see page 6 of any *QST*) can tell you more about it.

September V.H.F. Party Results

Superb Conditions Permit Record Scores

On occasion we have been accused of deliberately picking our v.h.f. contest dates so as to include the worst possible weather and propagation conditions. Not so the week end of September 17th and 18th, however. In the eastern half of the country, at least, all hands agreed that a v.h.f. party was never held under more auspicious circumstances.

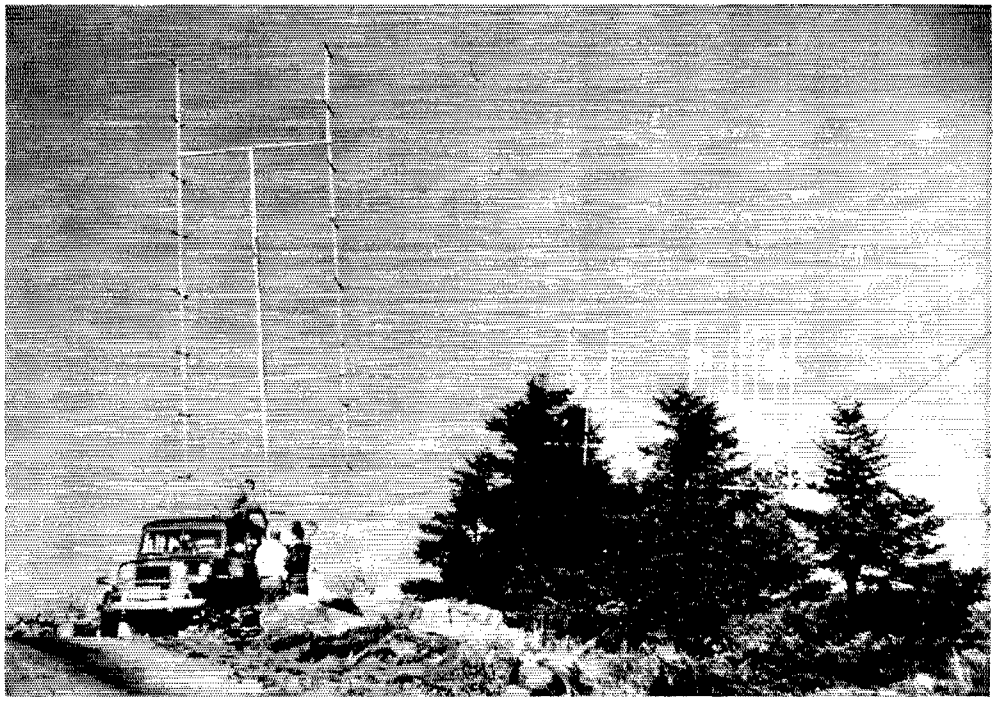
Hurricane Ione, then just picking up steam in the West Indies, spread a stable inversion over a good half of the country, beginning a day or two before the contest and holding for most of that area until after the party was over. We expect favorable tropospheric propagation in September, but somehow we've never hit it right on the nose before. This time we had a chance to see what a widespread tropospheric opening could do for a v.h.f. contest — and it was plenty!

From the opening gun Saturday afternoon, contacts on 144 Mc. were made over distances up to 400 miles or so, even with the low power and small antennas used by most stations operating in the field. Such conditions in midafternoon were almost unheard of heretofore, and by evening things were still better. The 50-Mc. band, normally by no means so responsive to weather effects as the higher frequencies, was jumping with tropospheric DX. Contacts were made almost 200 miles beyond what had been considered by old hands at the 6-meter game to be the practical limit of weather-caused DX.

The weather was fine, so the turnout of portable stations was tremendous. It was hard to find an accessible hilltop that did not have at least one contest station, and some had several. Hogback Mountain, Vermont, must have set a record in this respect, having been host to at least five different portables and mobiles!

The portables were not necessarily low-powered rigs with small arrays. The Waltham Amateur Radio Association crew, having developed v.h.f. contest leadership to a fine art over the years, put forth an effort in the September fray that is likely to stand for some time as a record. Making use of W1FZJ's high-powered rig and 64-element beam (see photograph) on 144 Mc., W1MHL/1, Pack Monadnock Mountain, Peterboro, N. H., worked 334 stations in 21 ARRL sections on 2 meters alone. This would have been the country's highest 144-Mc. score by a wide margin, but to this they added 159 contacts in 16 sections on 50 Mc.; also the nationwide high for that band, plus 19 contacts in 8

Some reasons for the record score made by W1MHL/1 in the September V.H.F. Party. W1FZJ, atop station wagon, sets up the 64-element 2-meter array. At right are the 16-element 220-Mc. beam and the 432-Mc. array, 32 driven elements with screen reflector.



sections on 220 Mc., and 10 in 7 sections on 420 Mc. This grand total of 522 contacts and a multiplier of 52 netted 28,652 points, almost twice that of the next highest score!

W1MHL/1 had no monopoly on records, however. W3KX/3, the Electric City Radio Club, turned in a new high in section multipliers, 55. With 238 contacts on 4 bands, they hit the Number 2 spot in the country with 14,190 points. The third highest score was turned in by W2BVU/1 — and he did it single-handed. Whereas other high-scoring field stations were manned by teams, W2BVU/1 was a one-man operation from start to finish. Operating on Mt. Mohawk, a 1700-foot elevation in Western Connecticut, John made 43 contacts in 16 sections on 50 Mc., 146 in 20 on 144 Mc., 19 in 11 on 220 Mc. (a record) and 8 in 5 on 420 Mc. These 216 contacts and multiplier of 52 resulted in 12,636 points, an all-time high for a single-operator station. This was a prodigious effort by one man, including as it did the setting up of rotatable beams for four bands, the gassing of a 700-watt portable generator, driving to and from the site *and* the operating!

Operation in the field is looming ever larger in these spring and fall parties. Some 56 portable stations reported, and many more were active. One of the outstanding performances was turned in by the San Bernardino Microwave Society. Though they missed the top scoring brackets, because of the inevitable handicap of the large ARRL sections in the West, the crew of K6OEE/6 made the second spot in number of contacts, 421, working 50, 144, 220, 420, 1215, 2400 and 3400 Mc., for 5785 points.

Several expeditions made the big try but missed the upper scoring levels. W6PIV/7 on Mount Rose, Nevada, a 10,200-foot elevation, was all set for big things until a raging snowstorm caused them to beat a hasty retreat. The gear was abandoned in tents, and could not be recovered for several days.

Possibly the highest ham station ever to be operated from a ground location, and surely a record for the United States, was KØCIQ/Ø, atop Mt. Evans, Colo., 14,260 feet above sea level. Operating from the cosmic-ray shack of Denver University, Ken, formerly W2ZGP, had high-altitude trouble, both physical and electrical, but he did manage to work over the mountains into Grand Junction, providing the 2-meter men of that Western Colorado city with their first 2-meter contacts outside of local; some unidentified weak signals were heard as well. With this first workout for experience, KØCIQ will be at it again come next June. He joins the California high-mountain enthusiasts in pleading for a midsummer v.h.f. contest, when weather conditions might be more favorable for hitting the country's highest peaks.

Not all the portables were on mountain tops, however. W8OSI/8 worked in an alfalfa field north of the Detroit area. The express purpose of this expedition was to demonstrate to a group of low-frequency hams the joys of working on 144 Mc. The 15-watt rig, working distances of

W2BVU ready for the drive to Mt. Mohawk, Goshen, Conn., where he made the highest score ever recorded by a one-operator station in v.h.f. party history. Antennas included 3-element beams for 50 and 144 Mc., a 12-element collinear for 220, and a 16-element for 432 Mc. Separate rigs ran about 20 watts on each band, with crystal-controlled converters for each. Power came from a 700-watt generator.

200 miles or so, in a QRM-free band, made a definitely favorable impression, we're told.

Probably the most uncomfortable operation position was the site of KN9BBK/9, in the bell tower of 100-year-old University Hall on the Northwestern campus at Evanston, Ill. Ascent to this vantage point included nine flights, the last four being ladders. Floor space in the loft was four feet on a side, with a 2-by-2-foot area taken up by the access hole. In these confined and dusty quarters, KN9BBK and wife held forth for a 12-hour stretch, making a total of 74 contacts in 4 sections.

The Two Meter and Down Club of Los Angeles made good use of the V.H.F. Party week end with their International V.H.F. Relay effort. With many portable stations in the field for the contest, there was little trouble in running a message from K6AM, Chula Vista, Calif., to VE7FJ, Westminster, B. C., on 144 Mc., in an elapsed time of 10 hours and 27 minutes. Due to a delay in the Los Angeles area, the southbound message from VE7JG, Duncan, Vancouver Island, took 24 hours to reach K6AM, but it went the route on 144 Mc.

The contest saw plenty of good work by fixed stations. W3IBH, Philadelphia, made the highest home-station 2-meter score, with 260 contacts in 19 sections, for 4940 points. W1KCS, Providence, R. I., made a fixed-station record with 224 contacts on 4 bands with a multiplier of 43, for 9632 points. W1ZWL, Leicester, Mass., set a 50-Mc. mark for Technicians to shoot at, with 120 contacts in 15 sections, for 1800 points. W2PRF, Butler, N. J., had 275 contacts on 50 and 144 Mc., to lead the country in number of stations worked by a single operator. This was Bob's first try in a v.h.f. contest!

A record for tropospheric DX on 50 Mc. was made by W3OJU, Washington, D. C., work-

ing W1HDQ/1 on Cadillac Mountain, Bar Harbor, Maine, nearly 600 miles, the first Maine-to-Maryland 50-Mc. contact by tropospheric propagation. W4UMF made the first Virginia-to-Connecticut 220-Mc. QSO with W2BVU/1, and 220-Mc. firsts between the states of Maryland and Connecticut and Rhode Island were established by W3UJG in working W2BVU/1 and W1KCS.

In the summary to follow, will be found 407 entries from 55 ARRL sections, a record high for September contests. Unless otherwise indicated, the first station in each section is the award winner.

SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc ; B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 1215 Mc. Multiple-operator stations, with calls of participating operators, are shown at the end of each section tabulation.

ATLANTIC DIVISION

E. Pennsylvania

W3TDF....8547-259-33-AB
W3ARW...7654-165-43-ABCD
W3IBH....4940-260-19-B
W3DGI....3828-132-29-AB
W3UKI....1206- 67-18-AB
W3BNU...1065- 71-15-B
WN3DEX[1]. 684- 57-12-B
W3SAO.... 560- 56-10-B
W3PNC.... 340- 34-10-B
WN3CLQ.. 329- 47- 7-B
W3UQJ[2]... 204- 29- 6-AC
W3BGI.... 147- 21- 7-A
W3GFZ.... 138- 23- 6-B
W3AID.... 76- 18- 4-AC
WN3ZWE.. 72- 24- 3-B
W3YRB.... 60- 15- 4-A
W3WED... 54- 27- 2-B
W3AXC.... 39- 13- 3-A
W3KX/3[3]...(W3s LZD LCK LCM OST PMG DXT QGE NNH LKL, WN3BJU)
14,190-238-55-ABCD
W3EDU/3 (W3s MMV ZPT RAF COI MYK)
6496-244-29-AB
W3UCA/3 (W3s UCA VUF TF RVU HPD YNG DGG RVU) 5626-194-29-AB
W3LXM/3 (W3s BYF LXM HPL TEF)
2304-144-16-B
W3IVM (W3s IVM BHC)
2242-118-19-B

Maryland-Delaware-D. C.

W3TOM...4239-157-27-AB
W3CGV....3808-128-28-ABCD
W3UJG....2418- 84-26-ABC
W3GKP...1547- 91-17-B
W3OJU....1264- 79-16-A
W3BNC...1024- 63-16-BC
W3ONP.... 792- 66-12-B
W3OTC.... 728- 52-14-A
WN3BBG/W3BBG
660- 55-12-AB
W3KMV... 636- 53-12-AB
WN3AEP[1]. 440- 44-10-B
W3YQD[2]... 360- 35- 9-AC
WN3CIK.. 235- 47- 5-B
W3NEH.... 217- 31- 7-B
W3CYV.... 120- 24- 5-A
W3IEI.... 5- 5- 1-B
W3LZZ (W3s LZZ UYJ)
2465-145-17-B
W3BGF (W3s BGF PZK)
90- 18- 5-A

S. New Jersey

W2BLV....4536-210-12-BD
W2REB....5222-179-18-B
K2DCF....2898-161-18-B
W2ORA....2760-120-23-AB
W2BLX....1080- 60-18-B
K2PDR.... 976- 61-16-AB
K2ITQ.... 544- 68- 8-B
W2EWN... 480- 48-10-B
WN2NEF... 84- 28- 3-B
W2FCC/2 (W2s YJC FCC, K2s GBV BNK)
910- 65-14-B

Western New York

W2UTH...3381-147-23-AB
K2IXJ.....1573-121-13-B
W2ALR....1386-126-11-B
K2HBL....1184-148- 8-B
W2WFB...1170- 90-13-B
W2CCR.... 992-124- 8-B
W2ZOC.... 904-113- 8-B
W2ORI.... 900-100- 9-B
W2RXG... 832- 64-13-B
W2VCI... 812-116- 7-B
K2CVX/2.. 684- 57-12-AB
W2BLN/2.. 350- 35-10-B
W2PST... 256- 32- 8-AB
KN2MNB[1]. 250- 50- 5-B
KN2KMJ.. 230- 46- 5-B
K2ERQ.... 182- 26- 7-A
W2UXS.... 176- 44- 4-B
W2QY..... 150- 50- 3-B
K2DYA.... 144- 36- 4-B
W2UYS.... 120- 24- 5-B
W2ZHB.... 90- 30- 3-B
KN2LVR.. 87- 29- 3-B
W2EQO.... 80- 16- 5-B
K2HRB[1]... 57- 19- 3-A
W2CTA.... 52- 29- 2-B
K2ALZ.... 26- 13- 2-A
K2DYC.... 20- 10- 2-A
K2GEI.... 20- 20- 1-A
W2UMS... 16- 8- 2-B
W2GBN... 2- 2- 1-B
W2JGJ/2[3] (W2s JGJ UPT MTA) 5406-159-34-AB
W2UFI (W2s UFI RHQ)
4225-169-25-AB
W2UWD/2 (W2s UWD ACJ JHS) 2975-175-17-B

W. Pennsylvania

W3BGT...2737-161-17-B
W3KWH (W3s RXT ZDW SHT SVJ ZUZ MPK)
1616-101-16-AB

CENTRAL DIVISION

Illinois

W9QKM...1240-124-10-AB
W9DRN... 918- 98- 9-ABCD
W9USI.... 504- 56- 9-AB
W9VNW... 490- 98- 5-B
WN9ORH[1]. 395- 79- 5-B
W9KLD... 357- 51- 7-B
W9TTI.... 356- 89- 4-B
W9ULF.... 320- 64- 5-AB
KN9BBK/9 296- 74- 4-B
W9ALR.... 280- 70- 4-B
W9EGB.... 260- 65- 4-B
KN9AEC... 244- 61- 4-B
W9GLR.... 224- 28- 8-B
W9PMN... 140- 28- 5-B
W9CT..... 138- 46- 3-B
W9TGN.... 108- 27- 4- AB
W9RPH... 86- 43- 2-B
W9OEV.... 51- 17- 3-B
W9UZK.... 50- 25- 2-AB
W9KCM... 45- 15- 3-B
W9MHL (W9MHL, WN9NBN
252- 63- 4-B

Indiana

W9KLR... 738- 82- 9-B
W9JIY.... 301- 43- 7-B
W9BYR... 246- 41- 6-B
W9BUM... 54- 18- 3-B
W9MHP... 54- 18- 3-AB
KN9AUW/9 24- 6- 4-B

Wisconsin

W9TQ.... 440- 54- 8-ABD
W9NVK... 255- 51- 5-B
W9JFF[2].... 161- 23- 7-A
W9JCI.... 75- 15- 5-A
WN9MQW. 68- 34- 2-B
W9ZVE.... 56- 14- 4-A
W9RNI.... 32- 16- 2-A

DAKOTA DIVISION

Minnesota

WØDXY... 48- 16- 3-B
WØJHS.... 24- 8- 3-B
WØHGH... 2- 1- 1-D
WØORZ/Ø.. 2- 1- 1-D

DELTA DIVISION

Arkansas

W5HEH... 40- 10- 4-B

Mississippi

W5RCI.... 264- 21-11-ABC

Tennessee

W4HHK... 264- 22-12-B

GREAT LAKES DIVISION

Kentucky

W4VLA.... 360- 60- 6-B

(Continued on page 184)

W4MKJ/4. 234- 39- 6-B
W4WNH... 70- 14- 5-B

Michigan

W8RMH...2338-164-14-ABCD
W8DX.....1521-112-13-ABCD
W8NSH....1008-112- 9-B
W8GNN....952-119- 8-B
W8JXU.... 432- 72- 6-B
W8GTK.... 400- 80- 5-B
VE3ANY/8 350- 50- 7-AB
W8OKT... 340- 68- 5-B
W8BGY... 318- 53- 6-AB
W8GYU... 318- 53- 6-AB
W8CVQ.... 210- 30- 7-AB
W8ZND... 180- 45- 4-B
W8DDO... 120- 30- 4-B
WN8TTK.. 75- 25- 3-B
W8NOH... 72- 18- 4-B
W8IPS..... 2- 1- 1-C
W9QXP/8 (W9s YOI SEK QXP, K9AFC)
1800-120-15-AB
W8OSI/8 (W8s LOX ELR CRY VRH JXU IPS OSD)
240- 48- 5-B

Ohio

W8SRW...2856-168-17-AB
W8LPD....1872-139-13-ABC
W8LAH....1430-110-13-AB
W8IJG.....897- 60-13-AC
W8CEQ.... 710- 71- 10-B
W8BAX.... 616- 76- 8-BC
W8HUX.... 608-101- 6-B
W8SVI..... 603- 61-9-BC
W8SDJ..... 546- 91- 6-AB
W8KDW... 476- 68- 7-B
W8NHW... 474- 79- 6-B
W8JSW.... 462- 77- 6-AB
W8IFX.... 426- 71- 6-B
W8UGH... 390- 78- 5-B
W8LCV.... 384- 64- 6-B
W8BMO... 380- 79- 5-ABC
W8NAF.... 375- 75- 5-B
WN8UMF[1]. 315- 63- 5-B
W8PKS.... 282- 47- 6-AB
W8KJT.... 248- 62- 4-B
W8MVA... 225- 45- 5-AB
W8PLQ.... 177- 59- 3-B
WN8TXQ.. 168- 42- 4-B
W8SGQ.... 164- 41- 4-B
W8IFZ..... 156- 39- 4-AB
W8LOF.... 155- 31- 5-B
WN8BUJ.. 148- 37- 4-B
WN8USM . 111- 37- 3-B
W8INQ.... 108- 24- 4-AC
W8 HSY.... 105- 35- 3-B
W8TCO.... 18- 9- 2-B

HUDSON DIVISION

Eastern New York

K2HPN/2 .2700-150-18-B
K2GCH....2356-123-19-BD
W2HBC...1908-101-18-ABC
W2PHX...1740-116-15-B
KN2LIP[1].. 680- 68-10-B
W2MHE... 648- 53-12-B
W2LWI.... 611- 47-13-B
K2GSF.... 504- 63- 8-B
KN2KET.. 384- 48- 8-B
K2GIA.... 200- 25- 8-B
KN2OAX.. 100- 20- 5-B

N. Y. C.-L. I.

W2FHJ....5760-180-32-AB
W2KIR....2916-162-18-B
W2LID....2040-136-15-B
K2BWJ....1926-107-18-B
W2AOD...1504- 93-16-BD
K2POA....1241- 73-17-B
KN2MYS[1]. 756- 63- 12-B
W2JBQ.... 600- 40-15-B
K2KTT.... 540- 45-12-B
WN1GJI/2. 490- 49-10-B
K2AZT.... 320- 32-10-A
KN2OIL... 87- 29- 3-B
W2TUK.... 7- 7- 1-B
K2CCX.... 6- 6- 1-A

W1QMN operating the 220- and 432-Mc. rigs of W1MHL/1, atop Pack Monadnock Mountain, Peterboro, N. H. Note right front seat reversed for the operator's comfort and convenience!

DXCC Century Club

The following list contains the call letters and countries totals of all holders of the Postwar DX Century Club award as of October 15, 1955. The calls of new members as well as those receiving endorsement credit during the period September 15 through October 15, 1955, are included in this listing.

261
W1FH

257
W6VFR

255
W6AM

253
PY2CK

252
W3BES

251
W6ENV
W6SYG
W8HGW

250
W6MX
W8NBK
WØYXO

249
W3GHD
W6SN

248
W2AGW
W3JTC
G2PL

247
W2BXA
W3KT

246
W5MIS
W6MEK
W7AMX
W8BRA
W9NDA

245
W5ASG
W6TT
G6Z0

244
W3EVW

243
W2HUQ

242
W2WZ

241
W3JNN
W4BPD
W6CUQ
W8KIA
G6RH
ZL2GX

240
W3GAU
W6DZZ
LU6DJX
PAØUN

239
W6TS

238
W1TW
W1ME
ZL1HY

237
W1CLX
KV4AA

236
W2QKS

235
W3CPV
W8DMD
ZS6BW

234
W9RBI
CE3AG

233
W6RW

232
W6ADP

231
W3EPV

230
W6EBG
W6VE
W9FID
G4CP

229
W2QHH
W6GRL
W6QJU
WØDAE

228
F8BS

227
W2DS
SM5LL

226
WØELA

225
W5KC
W8BKP

223
W4TM
W6SAI

222
W1HX
W3DPA
W9FKC
W9KOK
ZS6DW

221
W2JT
W6ZCY
W8JIN
WØAIW
SM5KP

220
W1BIH
W1ENE
W2NSZ
W3OCU
W5ENE
W5FNA
W6AMA
W6TI
W7GUV
W8DAW
W8SYC
W9LNM
FA8IH

ON4AU
PY1GJ
VK2ACX
VK2DI

219
W2GT
W5JUF
W6GFE
HB9X
PY1AJ

218
4X4RE

217
HB9J

216
W1ADM

215
W5ADZ
W8JBI

214
W2YW
W5BGP
W5FFW
W6DI
W9YFV
PY1DH

213
W4OM
W4TM
G8IG

212
W6MHB
W8BTI
II2TG

211
W3OP
W5LXY
W6SAI
WØPNQ
ZS2X

210
W1HA
W2AGO
W5EGK
W5JC
W6HX
W9HUZ
CE3DZ
DL7AA
GM3DHD
KH6IJ
PY4IE
VE3QD

209
W1GKK
WØNUC
G6YQ
VE7HC

208
W1AXA
K2CPR
W4AIT

207
W2AQW
W3DKT
G3FNN
G4ZU
PY1AHL

206
W3KDP
W4NNN
G2MI

204
W2CTO
W2HHF
W3IYE
W4MR
W7HXG
ZS6FN

203
W3GRF
W6LW
W6NTR
W8CDT
W9IU

202
W6NNV
W7DL
CX1FY

201
W1JYH
W2HMJ
W4KFC
W4LVV
W5GEL
W6PQT
W6UHA
W8WZ
WØUOX
CM9AA
G3DO
KH6BA
VE7ZM

200
W1BLF
W2CNT
W2TQC
W2TXB
W3DRD
W3JTK
W4BRB
W5ALA
W5MPG
W6EPZ
W6GAL
W6GPB
W6IBD
W6MJB
W6MVQ
W6PB
W6RBQ
W8DX
W8MPW
W8UAS
CN8MM
G3HLS
G3YF
G5RV
G6QB
HB9EU
KP4KD
LU7CD
ON4QF
ZL1BY

199
W2IYO
W6ANN
VK2NS

198
W2CYS
G8KP

197
W1CH

196
W1ZL

195
W2PRN
W2TXB
W5EFC

194
W7PGS

KZ5CP
PAØGN

193
W4HA
W6LDJ
LA7Y

192
W1AB
W2BJ
W2DSB
W2EMW
W2RWE
W3CGS
W4PN
W6BPD
W7HIA
W8HFE
KP4CC

191
W2ALO
W1AEW
W4CYY
W4LZF
W6TZD
I1KN
OH2RY
OQ5RA
SM5CO

190
W2DKF
W2HZY
W2IOP
W3JKO
W4RBQ
W5KUJ
W6KYG
W6LDD
W6OMC
W6UCX
W7GBW
W9ABA
W9GRV
ET2AB
KH6CD
VO6EP

189
SM5ARP

188
W2CWE
W9IOD

187
W6BZE
W9AND
KV4BB

186
W1IAS
W6EHV

185
W1RY
CP5EK

184
W2GFW
W7GUI
W8ACE
W9MXX

183
W1LOP
W3IMV
W8LKH
CN8MI
F8PQ
KL7PI

182
W2IWM
W4NNH

W5CKY
W6SRU
W7AH
EA2CA
HB9CX

181
W2MLO
W2UFT
W3KQF
W8UDR
WØAZT
G6BS
GM3CSM
ON4NC
PY2OE
VE2WW

180
W2IMU
W2BRV
W2GVZ
W3ALB
W3ALX
W3ECR
W3LPF
W5CEW
W5NMA
W6EAY
W6EYR
W6RM
W8CVU
W8KPL
WØEYR
WØTKX
G2EC
G3BKF
ON4FQ
ON4JW
VE3AAZ
VE7VO

179
W1FTX
W2CSO
W2GWE
OZ7PH
SM5WI

178
W2COK
W5LHP
G2WW
VK3BZ
ZS1BK

177
W1WK
W3GHS
W4CYU
KG4AF

176
W2GUM
W3QJV
W4JDR
W6CYI
W8VLK
W9AEH

175
W2JVU
W3NOH
KH6QH

174
W8RDZ
W9BQE
W9TJ
EI4X
HOJ
KH6VP
MF2AA

173
W4DHZ
W6BUD
KZ5WZ
OK1FF

172
W6WO
G3DCU

PAØNU
PAØVB
SM7QY
VE3IJ
VK4FJ
ZS2AT

171
W2LJR
W2PWP
W2RGV
W4DKA
W5EB
W5FXN
W5MET
W6BVM
W6JK
W6VDG
W8FJN
I1XK
LA6U
OZ3FL
PY1HX

170
W1ATE
W1DQH
W1KFV
W1LZE
W1MB
W2REF
W2ZVS
W3LVF
W4VE
W5BNQ
W5DMR
W5LGS
W6CTL
W6KUT
W7ENW
W7KTN
W8EWS
W8SDR
W8TJM
W9TQL
WØAIH
G5VT
ON4PA
PAØLB
PY7WS
ZL4GA
ZS6A

169
W1TX
W2PUD
W5BZT
W8YIN

168
W2UWD
W3JYS
W6LRU
I1AY

167
HB9FU

166
W3HRD
W6MEL
W6PCS

165
W2WC
W3LBG
W9FJB

164
W9VND
I1AMU
KH6LG
ON4AZ

163
W3AXT
W5OLG
W6TXL
W8AJW
WØLRI
DL7BA
ON4GU

162
W1BFT
A1HRI
W2LSX
W2OST
WØDXE
G2AJ
SM3AKM
YV5AE
ZL3CC
ZS2AG

161
W1ZW
W2LV
W2RDK
W3AFW
W4HVQ
W6BYB
W6GHU
W6NGA
W6WKU
W8EYE
W8LAV
W8TMA
DL1QT
G2IO
GI4RY
GM3AVA
HB9DO
HB9MQ
OK1LM
OQ5LL
PAØRC
ZL3GU

160
W1JNV
W3WU
W4ZD
W5DML
W5NW
W6ATO
W6CIS
W6LVN
W7DET
W8ZZU
W9FDX
W9LI
WØNLY
WØQVZ
G2FSR
G3DQG
HP1BR
I1AIV
IS1AHK
OZ7BG
PY1ADA
SM6HU
VE8AW

159
W1DX
W2AEB
W4JFE
W6PZ
W7ADS
CT1JS
G6LX
GW3ZV
I1IR
OK1HI
OK1VW
SM3ARE
VK5RX
VQ2GW

158
K2BU
W9QLH

157
W2ITD
W4JXM
W4ML
W6NIG
WØTJ
ON4FL
PY4RJ

156
W2SAI
W6KEV
WØLLN
W9QIY
EA4CR

EI5F
G3CBN
OH2QQ
SM5WJ

155
W8MFB
W9KA
FA8DA
G3FKM
G6GN

154
W1CUX
W1ZD
W2QCP
W6BUO
W7AJS
W8GLK
GM6MD
PY2NX
VP9G

153
W1BLO
W1DEP
W1QF
W2BYP
W2GTP
W4EPA
W6DBP
W6YY
W7KVU
W8WWU
W9ABB
W9AMU
CE3AE
OH2NB
VE3ZW

152
W1MUN
W1TYQ
W2MYY
W3MFW
W4AAW
W6JZP
W6LMZ
W8YHO
W9RQM
CR6BX
DL1AU
I8EJ
G3COJ
ON4MS
SM7MS

151
W2GTL
W2HSZ
W3FLH
W4AZK
W5CC
W6VOE
W7AC
W8CLR
W8HUD
W8UPN
W9PGW
W9YNB
WØANF
CR6AI
CX1BZ
EA3CY
G2AJF
G3AAE
G3EMD
GW3FSP
OH2TM
ON4TA
PY2AJ
PY7LJ
SM3EP
SM5ARL
SM5DZ
VE2BV
VK3JE
VK6SA
ZL3BJ

150
W1BGA
W1BGW
W1BIL
W1BOD
W1VG

K2GFQ
W2ADP
W2AZS
W2DOD
W2PJM
W2SAW
W3ADZ
W3AYS
W3JNM
W3LVJ
W3MDE
W3MLW
W4QCW
W4TP
W6BJU
W6DE
W6EAK
W6ID
W6PBI
W7HQC
W7RT
W9CIA
W9NZZ
W9VIN
G2VD
G6GH
G6RC
GM3CIX
HB9AO
HB9ET
HK3CK
IICJW
IIIT
KH6MI
OE1FF
OK1MB
ON4GC
OZ7EU
VE1HG
VK4EL
ZC4XP
ZL1AH
ZL3GQ
9S4AX

149
W2UEI
W4FVR
W8DEN
W9LI
PAØIF
ZL2QM

148
W7FZA
W8BWC
G8KC
HB9CE

147
W1AH
W5KBU
W8DFQ

146
W1DSF
W3FYS
W3RCQ
W6LV
W8EKK
G5LP
G6RB

145
W2FXE
W3FGB
G3BI
JA2KG
PAØTAU

144
W6CAE
W8EV
W9ERU
W9JIP
W9VP
F8CW
F9RM

143
W2ICO
W5ACL
W7BE
W9PSR
F3MS
LU3DH

NY4CM
OZ3Y
VK3YL
4X4BX

142
W1JOJ
W1NW
K2BZT
W4HQN
W4GMA
W4LYY
W5LVD
W8CKX
W9AHP
W9MQK
DL1YA
EI4Q
G2YS
G4JZ
G8GB
KZ5IP
VP5FR
VP7NM
ZS5CU
4X4DK

141
W1AZY
W1IKE
W2ABM
W3GNQ
W3HER
W3VKD
W5AWT
W5LV
W6NZ
W7AYJ
W8MWL
W9GDI
W9UIG
W9HZS
WØCH
DL1DX
F3FA
G5LH
I1UA
SM5AQW
TA3GVU
VS6AE

140
W1AH
W1QXQ
W1RAN
W2IRV
W2OCI
W20MS
W2YTH
W2ZA
W3AFU
W3IXN
W4IWO
W4IZR
W5HDS
W5IGJ
W5LGG
W5UX
W6BIL
W6DUB
W6WWQ
W6YK
W8CXN
W8DUS
W9EU
W8FJL
WØGKS
WØQUH
DL1BO
DL1KB
DL3RK
F9AH
G2AKQ
G3AKU
G5YV
G8KU
IS1FIC
KH6PM
PAØLR
PY4AJD
PY5UG
VE5QZ
VE7VC
YV5BZ
ZS2CR
ZS3K

139
W2CWK
W2GUR
W2QKJ
W3AZG
W3FUF
K6CU
DL1YQ
G3AWP
G5FA
G6QX
HB9MU
LA5S
OK1CX
OZ7CC

138
W6ETJ
W6FSJ
ZL3AB
ZL3LR

137
W1PKW
W6ALQ
EA3CY

136
W1QPN
W2BUY
W2GVP
W4CKB
W4IUO
W6MUF
W8IB
W9ZPT
WØNTA
G3AH
G3RB

135
W1BAV
W2BXY
W2ZGB
W3LXE
W5RX
W6CGQ
F8SK
G5OO
G6XA
LA5Q
SM5PA

134
W1JMT
W2ESO
W2IJU
W3LNE
W4CYC
W5CPI
G2BXP
G3LP
G5VQ
PAØGT
SM6ACO
SM7AKG
ZE2JN
ZS5YF

133
W1CJK
W1KWD
W1PKL
W2AW
W2MEL
W5PZL
W6QDE
W6SWG
W9CYT
W9CYU
F8WK
G3AIM
G5SR
KV4AQ
LA2B
OZ7SN
OZ8SS
ZL2HP

132
W2PBG
W2TJF
W3KZQ
W3LMM
W4AIS
W6CEM
W6KEK
W6RRG
W8ZJM
CR7BC
CT3AN
G2FYT
G6UT
GM2DBX
HA4SA
SM5AQV
VK5KO

131
W2AFO
W2CDP
W2DSU
W2KMZ
W2TWC
W3MNG
W4BQY
W4EV
W6FOZ
W6FUF
W6MHH
W6RLQ
W7GPP
W9KXK
W9WFS
WØDGH
G8ON
G8PL
I1IZ
KH6PY
PAØZL
SM5VW
ZL4BO

130
W1APA
W1JDE
W1LQ
W1MIJ
W1NLM
W1ODW
W2ABS
W2ATE
W2BBK
W2CZO
W2EQS
W2LTP
W3ARK
W3HOX
W3MZE
W3ZQ
W4GHP
W4HYW
W4IYT
W4OSU
W4THZ
W5KTD
W6APH
W6LER
W6OBD
W6WJX
W7NKW
W8CED
W8HMI
W8NGO
W8NJC
W9ALI
W9EXY
W9NN
W9UXO
WØFNN
EA4BH
EA9AI
F2FA
F9IL
F9QU
G2BQC
G8FW
G8UG
I1FO
I1LT
I1UB
I1VS
KP4JE
OH2PK
OH4NF
PAØDA
VE3ADM
VE3SR
VE5JV
VK3YD
VO3X
VO2DH
VQ8AD
ZL1QW
ZS6CZ
ZS6EU
ZS6QV

129
W1ODU
W1OJM
W3RNQ
W4BGO
W8OCA
W8ZMC
OK1SV
PAØSPR
VQ4SGC
YV5AK
ZL1MR

128
W3NCF
W7CSW
G6BB
G8VB
PAØJQ
PY2DV
VK4RF

127
W1RWS
W1RZD
W3CTJ
W4FIJ
W6YX
W9FKH
G5PP
I1AOF
I1RC
PY1ANR
ZS1FD

126
W1BDS
W5GZ
W6RDR
W7AHX
WØMKF
EI3R
FF8AG
G3BNC
G6VQ
VE1PQ
VP6CDI
ZC1CL
ZE3JP
ZS6LW

125
W1AWE
W1JEL
W2BLS
W2LPE
W3EYF
W4NBV
CN2AO
I1BEY
OK1WX
PY1HQ
VK3PG

124
W1KXU
W3KQU
W3KVB
W4QT
W6BAM
W6CEO
W6KYT
W8AE
CE7AA
DL1JW
G5VU
OK1SK
PAØXE
ZS6BJ

123
W1EOB
W1KKP
W4AAU
W4ITR
W5JBD
W6UZX
W9GWK
W9UX
DL3JV
PAØMZ
PY6DU
SM6AKC
SM7VX
VE1EX
VE2WA
ZS6GI

122
W1DIT
W1QV
W2FBA
W2NOY
W2PZM
W3AS
W4EEO
W6EAE
W6IFW
CT1SQ
DL4TL
G2AJB
G5IV
HZ1HZ
I1ALU
JA6AD
LU9CK
VE1EK
VE1PA

121
W2AFU
W2QCF
W3DGM
W4FFV
W6KYV
W6OXS
W6ZBY
W7KWC
W7PEY
W9BRD
WØDU
CN8EJ
F9DN
G3BXN
KG6AI
OH3NY
OZ5PA
PAØCP
PAØHP
PAØNOL
SM5FA
SM5KX
VE3ADV
VE3HB
YU3EU
ZS2U

120
W1APU
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K2EDL
W2CGJ
W2CR
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W2FJH
W2RQH
W2WPJ
W3AOO
W3DYU
W3EEB
W3EVT/1
W3KDF
W3MNO
W4DCW
W4DPE
W4LQN
W4UXI
W5ABY
W5UUK
W5WI
W6YZU
W8HEV
W8OGV
W9DGA
W9HQF
W9JUV
W9RKP
WØDST
WØGUV
CE4AD
DL1HA
DL3TP
EA8BC
F8VK
FQ8AP
G2HNO
G3BQ
G3ESY
G3TK
G5PQ
G6XX
HB9FE
JA1AA
KL7IT
LU3EB
OK1AW
OK1RW
OZ7KV
PAØCB
SM6DA
SM7ANB
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VE3ES
VE3TB
VE7YR
VK3NC
YV5FK
ZL1MB

119
W3WDC
W4OG
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WØYZO
DL7AB
F9DW
G8DR
HB9IM
HB9P
I1BLF
KG6ABI
KG6DI
SM6ID
SV1RX
VE7KC
4X4DE

118
W2ROM
W6PH
W8RVU
DL3GZ
G6VC
PAØHJK
VE4XO

117
W2PQJ
W3PGB
W4GOG
W6LS
W6SR
W9NRB
CX4CZ
DL1EE
F9DZ
G5JU
OZ7SM
SM7AVA
VE7ZZ
VK5LC
ZS2EC

116
WIKQF
W1LQO
W2AGU
W2AUH
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W5UCQ
W7BD
W7PZ
W8ZWX
W9UKC
EA3GF
GI3DQE
OZ2PA
PAØRLF

115
W2CKY
W2NFR
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W9ESQ
W9LNH
DL6MK
ET3S
F8LF
LU6AX
VE2CK
ZS2IW

114
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W6SQP
W6WVU
W8PCS
W9ELA
W9LVR
WØVIP
CT1DJ
DL1FE
DL7BK
EA3CK
G3AJP
OH1PW
VK4RC
ZS6HO

113
W1EFQ
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CN8EG
F8TM
G8OJ
GM3CMB
ON4SS
OX3MG
PY7AN
TF3EA
VE3ACS
VQ3HJP
ZS5BS
ZS5LA
ZS6J
4X4CJ
4X4DF

112
W1AJO
W1MX
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W3BEN
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W4PHJ
W6AUT
W6JTB
WØCDP
WØQBA
DL1CS
DL1HH
F9KQ
G2CDI
G2CNW
G4FN
GI6TK
GM3CFS
HB9IL
I1BVP
VE3XY
VK5FM
ZS6WJ
4X4CR

111
W1AWX
W1CDX
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W2MA
W2SUC
W2UAT
W3HUV
W3KEW
W3VRJ
W3ZN
W4JUJ
W4LIM
W4TFB
W7BDW
W7JVZ
W7KWO
W8AAI
W8HRC
W8PNT
W8TTS
W9DUR
W9HUV
W9TMU
WØCAW
WØSBE
DL4UZ
DL4ZC
DL7AQ
EA1AB
F3SM
G2FFO
G2IM
G3CEG
G3VA
G4AR
G4AU
HP1LA
I1PG
OH2VF
PAØRL
SM2OS
SM7AOO
VQ2AB
VU2JP

110
W1AW
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W2OKM
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W2WDP
W3VZD
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W4PVD
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W5VIR
W5VSS
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W6AOD
W6AX
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W6ZUI
W7BTH
W7WH
W7FB
W8DLZ
W8ERA
W8FGX
W8ILG
W9HLR
W9IHN
W9IOP
W9MXP
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WØDIB
WØGBJ
WØIDI
WØRIA
WØSRX
DL1VU
DL6HJ
F5CT
G2DPY
G2HKU
G3APN
G3CCO
G3CDG
G3CMB/A
G3CUG
G3GFG
G4QK
G5CW
G8IL
HB9AT
HB9FI
HB9GJ
I1ADW
KP4TF
LA4KD
ON4JD
PAØFAB
YV5FL
ZL4CK
ZS1M

109
W1ORP
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W9WKU
WØMCF/C1
CO6AJ
DL6IC
EA3FL
EI5C
F9ER
FA3JY
FA8CF
FA9VE
G2DC
G2DHR
G3AMM
G8GP
G8IH
HB9BN
HB9EI
HB9KO
HB9KU
HZ1AB
I1NT
LU8EN
PAØPN
VS1DZ
VS7NX
ZS6KK
ZL2CU
4X4BR

108
W1EZ
W2AOX
W2BOK
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W4GCW
W6LGD
W6LN
W6PUZ
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F7SHP
F9FY
FA9OW
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G6KS
KZ5KS
OE5PP
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OK2DD
PAØOK
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VQ4EI
ZD6BX
ZD9AA
ZL1LZ
ZL4JA

107
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W3EFZ
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PJ2AA
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VE1ZZ
YI2AM
ZL3OA
4X4CW

106
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DL4EA
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F9FS
F9JZ
F9RS
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G2HFO
G2ZF
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G3DDK
G3DMG
G3ETU
G3QD
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I1RY
KG4AP
KH6DQ
OK1CG
OK3SP
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OZ3RO
SM5TQ
SM5UH
SM6DN
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ZC4IP
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ZS5FS
ZS6RI

105
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W4EBO
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W6DFY
W6DOT
W6KPC
W7HUC
W7PGX
W9DUY
WØFID
CR7AF
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DL3BJ
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G3ID
G3JW
G5US
G6CB
G6IC
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GI3AXI
GM6MS
GW3JI
HR1AT
HZ1KE
KZ5DG
LA3DB
MI3ZJ
OE2SP
OH6NZ
OK2OS
OH3NA
OK2XF
PAØALO
PY1MK
SM7BHF
VE3IG
VE3KE
VE6AO
VK2ADE
VK2PV
VK6DX
ZK2AA
ZL1RD
ZS6JZ
ZS6QF
ZS6SB
ZS6XQ

104
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W1NYA
W1OJR
W2BUV
W2RWN
W2TSL
W3IBT
W3OVU
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W4AWS
W4FNQ
W4IPR
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W5OFM
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W6HJ
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KG6GU
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OH3RA
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OK1OP
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SU1AD
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TF3SF
ZL3HC
ZS5U

103
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W6KUR
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W6YRA
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W9TGY
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CM2SW
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DL1GU
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DL7EN
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DM2ADL
DU7SV
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EA9AP
F8DB
FA8RJ
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G2SA
G3DAH
G3EFY
G5JM
G8PP
G8VG
GC4LI
GM3AWW
GM3DZB
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HB9KB
HB9OQ
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I1ARA
I1NU
I1UV
KP4HU
LA3Y
MD1D
MD5KW
OH2MQ
OH5NK
OH5OU
OH6OA
OK2SO
ON4JU
PAØIV
PAØLY
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SM5HH
SM6AOU
SM6AWE
VE1BK
VQ2DC
VQ4HK
YU3AB
ZB1AH
ZE3JO
ZL3IA
ZS1BM
4X4BN

102
W1CEG
W1CNC
W1SU
K2GMO
W2FCQ
W2HQL
W2HY
W2HQB
W2JA
W2JME
W3PA
W3TVB
W4EJH
W4INL
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W5BDI
W5DGV
W5TPC
W6SIA
W6TGH
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W9VW
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WØQGI
WØZDM
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CX6AD
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DL3LM
DL6GP
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EA8BF
EI6G
EI9J
F8DU
FA9RW
G3ABG
G3ATU
G3CFK
G3COL
G3CVG
G3EYN
G3FML
G3FPQ
G3HK
G4JB
G5CI
G6XS
G8FC
G8WF
GM2FHH
GM3EST
GM3RL
GM8CH
GW2CPU
GW3AHN
HB9HZ
I1ATO
I1KZ
KG6GC
KG6GD
KH6ER
KS4AI
KZ5AU
LX1AS
OE1AD
OE1ZZ
OE1SUSA
OH2UD
OH2XK
OH2ZE
OH5OP
OH9NV
OK2EL
OK2MA
OK3AL
OK3DG
OZ2LX
PAØRU
PAØSU
SM3FY
SM5AUP
SM7TQ
SVØWL
TA3FAS
VE1BV
VE1DB
VE3RM
VE6FK
VE7OJ
VK2YC
VP9BM
VR2CG
YI3BZL
YU1CAG
ZL2BH
ZL3CP
ZL4DV
ZS2FH
ZS3S
ZS5IO
ZS6VR
4X4CZ

101
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W1ODY
W1ZDP
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W2EQG
W2FCT
W2JKH
W2IYG
W2KXK
W2LWI
W2TNA
W2UVE
W3COK
W3EIS
W3EOB
W3IL
W3KAT
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W3REW
W3RFA
W3SWV
W3TXQ
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W4GD
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W6CG
W6IPH
W6JFJ
W6POZ
W6QPM
W6RCC
W6SC
W6TEU
W6TMP
W6UJ
W6VAT
W7CNM
W7EJD
W7ETK
W7HYW
W7KSA
W7LYL
W7NIN
W8CJ
W8FJX
W8HRV
W8MQR
W8NOH
W8PM
W8TAJ
W8WSL
W9FNR
W9TWC
WØBCJ
WØCWW
WØIEL
WØLWG
WØVBQ
WØVDC
CE3AX
CN2AP
CO2OM
CT1AS
CT3AA
DL1CR
DL1DA
DL1KV
DL1LZ
DL3SZ
DL6CV
DL6GB
DL6SS
DL9PX
F3YP
F8IW
F8PA
FE8AB
G2DM
G2DVD
G2WQ
G3AWL
G3BQR
G3CDC
G3CHW
G3CSE
G3EBH
G3GAF
G3HEP
G3GIQ
G4GI
G4GJ
G4LP
G5RM
G5UF
G6XY

G8CD
G8NV
G8TS
GW4CX
HB9BX
HB9EW
HB9MX
HB9NL
I1ADX
I1AFQ
I1BCB
JA1CR
KH6EL
KH6LF
KP4WD
LA6O
OE3CC
OE5CA
OE8FK
OH1PI
OZ1W
PAØKE
PAØFD
PAØMOT
PK6HA

PY1ARZ
PY3QX
SM5ANY
TF3AR
VE1CU
VE1QK
VE6MN
VE6MZ
VK5MF
VP9OO
VQ8CB
VS7NG
ZD2DCP
ZE4JC
ZL1PO
ZL2GH
ZS6CT
ZS6OS
ZS7C

100
W1BBN
W1BUX
W1COM

W1DBM
W1EQ
W1EYP
W1IOZ
W1NS
W1PEG
W1PPZ
W1QNC
W1RYJ
W1WPO
W2ADQ
W2AWH
W2BWC
W2CBS
W2EGG
W2GSN
W2HAZ
W2HYV
W2HZN
W2JJI
W2LRW
W2PGU
W2QJM
W2RA
W2SGK

W2TJK
W2VYX
W2ZQW
W3AFM
W3CPB
W3ETD
W3EWR
W3FJU
W3GRS
W3HA
W3JAK
W3JLJ
W3KHU
W3KJJ
W3MQC
W3OHC
W3ORU
W3QLW
W3RBF
W3SOH
W3VOS
K4AIM
W4CRI
W4GXB
W4KCQ

W4KIT
W4KRR
W4POF
W4RTX
W4SOV
W5BK
W5CD
W5COP
W5CTM
W5IX
W5KCR
W5NTT
W5QKZ
W5QLY
W5QN
W6BUY
W6CGP
W6DUC
W6EKC
W6GEB
W6GHM
W6ITH
W6MI
W6QNA
W6VBY

W6VZG
W6YMH
W6ZEN
W6ZTW
W6ZZ
W7FMX
W7ITN
W7JUO
W7KEV
W7ONG
W7PHO
W8AL
W8CQ
W8FJR
W8HSW
W8ICC
W8IQS
W8IV
W8JGU
W8JM
W8LCN
W8LYP
W8NKU
W8OPG
W8PXP

W8SSI
W8YGR
W8ZCK
W8ZIY
W9JNB
W9MZP
W9QLW
W9UAZ
WØARN
WØBFY
WØBMQ
WØFFV
WØUYC
CE6AB
CO2BM
CR9AG
CT1FM
CT3AV
DJ1BZ
DL1BS
DL1DC
DL1VR
DJ2BC
DL3FM
DL3NX

DL3OO
DL3QQ
DL3RM
DL3XS
DL6TW
DL7CW
DL7DA
EA0AB
EI2S
F7BO
F8PI
F8PM
FG7XA
G2AO
G2BJY
G2FXB
G2GM
G2ZZ
G3AAG
G3ACC
G3BDS
G3BNE
G3CSL
G3CWW
G3CWZ

G3FXB
G3HJJ
G3HYM
G3IAD
G3TC
G3VW
G5CR
G5WC
G8JO
G8JR
G8LG
G8UK
GI3BKG
GI4NU
GM3EDU
GM8AT
GW5FN
GW8UH
HB9DH
HC2KJ
HC7KD
I1PL
JA6AO
KH6SO
KL7PJ

KL7UM
KZ5GF
OA4AK
OE1CD
OE1KF
OE1SQ
OE5LV
OH2WM
OK1GT
OK1WF
ON4CY
ON4FP
ON4HB
OZ4KX
OZ4PA
PAØBK
PAØHG
PAØUV
PK4KS
SM3ACP
SM5AHK
SM5AHK
SM5IZ
SM7IA
SP1JF

VE1EA
VE1NE
VE2ADQ
VE2BK
VE2KZ
VE3ARS
VE3OR
VE3QB
VE7AAD
VE7CN
VE7SB
VE7ZK
VK3RJ
VQ4BU
VQ4HJP
VQ4KRL
VS6BA
YS1O
YU3AC
ZL2FI
ZS5KF
ZS6IH
ZS6OW
ZS6SG
4X4DR

RADIOTELEPHONE

245
PY2CK

233
W1FH
VQ4ERR

228
ZS6BW

219
W1JCX
W1MCW

217
W1NWO

215
W3JNN
XE1AC

214
W8HGW

213
W5BGP
W9NDA

211
SM5KP

210
W9RBI

208
W6AM
W6DI

207
W8GZ

203
EA2CQ

202
W2APU
W2BXA
GM3DHD
ZS6Q

201
CX2CO

200
W8BF
G2PL
ZS6DW

196
ZL1HY

195
CN8MM

194
W3BES
CM9AA

193
ZL2GX

192
G4ZU

191
WØAIW

190
W2AFQ
W5EFC
G3HLS

189
W4HA

188
W5JUF
CT1CL

185
I1SM

184
G8IG

182
W3GHD
ZS6FN

181
W1MB
W7HIA
EA2CA
G3FNN
TI2TG

180
W4MKB
CE3AB
PY4CB

178
LU4DMG

177
W6KYQ

176
W9ROQ
G3DO
HC2JR
PY2AHS

175
W5ALA
W5ASG
PK4DA

174
SM5ARP

172
W4EWY
W8DMD
G6RH

171
W1ADM
W1LMB
W3KT
CT1PK

170
W1ATE
W3DHM
W4AZD
W4OM
W7MBX
W8KML
W9HB
W9RNX
CO2BL
OD5AB

169
YV5AB

167
W1BLF
KV4BB
PAØNU

165
W5NMA
PY4VX

164
G5VT

163
W3IMV
W9JJF
VE3KF

162
G5RV
HB9J
I1AMU
PY4KL
SM5LL

161
W1ENE
W2WZ
W3EVW
F9HF
G2ZB
I1BIC
I1YJ

160
W4DCR
W6MBD
W8BKP
WØNCG
CO2BK
F9HE
G6AY
LU4DD
PY1AQT

159
LU8CW

158
W3GHS

157
W1CLX
W2JT
W4CYU

156
PY4RJ

155
W8REU
F8PQ

154
W8AJW
ON4PJ

153
VP9G

152
W1HX
W4ESP

151
W2EOH

W2QF
W3MAC
W4AAW
W6GVM
I1ASM
I1CAR
LU4MG

150
W2VWN
W3BET
W4GMA
W8QJR
W8VDJ
WØGKL
G2MI
GM3AVA
HB9LA
KH6OR
YV5EC

149
W2AEB
ZS1DO

148
W1HKK
W9BVX
PY2JU

147
W3ECR

146
W6YY

145
CR6BX

144
W2RGV
W2ZX

143
W3UIP
W5KC
G2BXP
I1CAR
TI2RC

142
W1BEQ
W2VWN

141
W4FBH
W8CLR
W9HP
F8EJ
F9RM
G3BID
KL7AFR

140
W1EKU
W1GOU
W1PST
W2AKX
W4HRR
W5KBU
W6CHV
W6TT
W8HUD
WØHX
WØPRZ
CE3AE
G6LX
I1UA
LA5YE
OZ7TS
VE7ZM

VP6SD
ZP5CF

139
W7ADS
W8JBI
G6BS

138
W9FDX

137
W9QLH
WØANF
F8CW
G2AJF

136
CP5EK
G2WW

135
W2ZKG
HC2OT
TI2HP

134
W1QPN
W4GIO

133
W6NIG
CE1AH
I1RM

132
W1KJU
W1MMV
W6VFR
W8TJM
W9IOD
EA4CX
I1CQD
ZS1KW

131
W1FFO
W2FXE
W2ZW
W8LAV
W9UUN
F8SK
G8QX
GM2DBX
HB9FU
PAØJA
PY1NC
PY4PI
VE3BDB
ZL1KG

130
W1GKK
W2JY
W2NHZ
W3DKT
W4NHF
W5DMR
W6WNH
W8MWL
W9BZB
WØPUE
WØVSK
CX4CS
CN8BA
F8XP
G8KP
I1AXD
I1VS
KT1WX
ON4YI
SM5WJ

129
W2ZVS
VP6CJ
ZS6FU

128
W3JNM

127
W3AEV

126
W3DPS
ZS5CU

125
W1CJK
ON4MS
PY1FR

124
W2PRN
W7HXG
W8NXF
WØEYR
I1RC
OZ3Y

123
W3KVB
W4FBH
W8AUP
W9TJ
CX3BH
F9PH
ON4AR
PY5UG
ZS3G

122
W5HFQ
W8ZOK
WØJRY
G2ALN
KL7AON
OQ5LL
SM5ARL
VE7VO

121
W3CGS
W4ANE
W4BOC
W4JCK
W9NLP
EA9AR
G3COJ
G8UG
GC2RS
I1BJC
I1CTE
OH2SE

120
W1RZD
W2QKJ
W2SGX
W3BUX
W3DWA
W4AQR
W4DCQ
W4EEE
W4IYM
W4MB
W4NYN
W5CEW
W5GXP
W6IKQ
W6MJB
W8BIQ
W9WHM
HB9DY
VE1CR

VE3BNQ
4X4DK

119
W5JBD
HK4DF
LU3DH
LU3PF
VK3BZ
VP5FR

118
W2VQM
W6TZD
W6YI
W7PEY
WØTJ
DL7BA
OD5AD

117
W1HRI
W4KAE
W6YX
EA4CM

116
W5EB
W8NGO
F3WV
I1BSB

115
W2MFS
W3RIS
W5KUJ
W7EMP
W8HRV
WØGUV
I1KDB
LA7Y

114
W2GLF
W4NBV
W8ZMC
ET2LV
G3BNC
GM2UU
PY1AGP
TI2EV

113
K2CJN
W2PBI
W3MMH
G5PP
LU8BS

112
W2BRV
W4BA
W4MRA
W5JJA
W6CHY
W7EKA
W8AJH
G4JZ
I1BPW
VE2GQ

111
W2CKY
W2PRF
W2UTH
W9CZC
W9JYU
MP4KAC
PY4AJD
VE7MS
YK1AC
ZS2IW

110
W2BQM
W2GX
W2IUV
W2JIL
W2TXB
W2YYL
W3BYL
W3FGB
W3HUV
W4FPS
W4IQG
W4JGO
W6SYG
W8BFQ
W8DMJ
W8LJ
W8QAD
WØEHF
CT1DX
DL3EA
EI4Q
F8MY
G3YM
G5LN
HP1BR
I1FLD
LU3EB
OD5BA
OZ7SM
ZS1GG
4X4RE

109
W1KWD
W4NDE
CO2OZ
DL4TL
EA4DB
EA6AR
G4JW
HB9CX
HB9ID
PY4LP
ZS6Z

108
W1BAV
W2AOX
W2VYH
W3KTF
W3MWP
W4LIM
W8RVU
DL1LH
F9EZ
I1AHW
I1RLH
OZ5BW
ZS5GU

107
W2DCO
W2RUI
W4LZM
W4QT
W7HLB
WØJYW
EA3FG
F8LE
G4MS
G5OO
HB9JZ
I1AIJ
IT1AFS
OH5NW
PY6CO
4X4BL

106
W1FZ
W3AER
W7AHX
W8MKY

W9DPI
DL1FK
G8VB
I1CWX
TI2OA
VK3JE
YN4CB
ZL2JB

105
W1QGJ
W2JJI
W2ONV
W6AED
W6UYX
W8JWV
G2MQ
G3DPJ
SU1HF
VK2DI
ZE2JK

104
W1BPH
W2PPS
W4AHF
W4EBO
W8ACP
W8SDR
W9FHZ
W9LXQ
CE3AG
EA4CK
EI2L
EI3S
F3OX
G6TA
G8QW
I1GZ
I1SGA
LU4ES
LX1SI
PY4PQ
PY5DP
ZD4AH
ZS6LW

103
W1JYQ
W1PDF
W2DPS
W2CGP
W2IZS
W2NQR
W2QWS
W3NA
W3VKD
W4AYF
W8EMZ
W7AUS
W9EWC
W9ZPT
WØUQD
DL4UZ
EA7EM
EA8AX
F8SE
G2AKR
GW3CDT
HK4FV
I1KP
IS1AYN
KG4AP
PY1ANU
PY6CN
VK5LC
VQ4SC
YS2AG
3V8BB

102
W2DYR
W2LV
W2PBG

W2QCP
W2WCY
W4CWV
W4DOU
W4KYB
W5JWM
W5NZE
W6PWR
W6SAI
W6SHW
W7HTB
W8IWI
W9WXT
WØSQO
WØSUG
WØWSH
CO7GM
CT1FL
DL3DO
DL3TM
DL7AB
G2DP
G3CCO
G3XC
GC6FQ
GI6TK
HB9HM
I1AUH
KP4ES
OE5JK
ON4LJ
PAØMDW
SM5FL
TA3GVU
VE2WW
VE3AUJ
VE7HC
VS2DQ
VS9AH
XZ2SY
ZD1SW
ZL3LR
ZS2AT
ZS5G

101
W1QWU
W1RFE
W1WQC
W2LSX
W2RTX
W2UAT
W2WME
W3ORG
W3SFK
W4DEO
W4IIB
W4LPT
W5ZS
W6KPC
W6PKI
W7MBW
W8CYL
W8NML
W8NWO
W9WBA
W9LQ
W9VND
WØMKF
WØNWW
CT1MB
CX3AA
F3PW
G6WX
HB9BR
HP1BR
I1ASO
I1CSP
I1KZ
I1NK
I1QQ
I1RB
I1WAL
I1ZV
KP4EZ
KZ5DG
OH2OV

VE3AIU
VE3BQP
VP9WR
VS1AY
YK1AA
4X4AD

100
W1CUX
W1FQX
W2DSU
W2FZO
W2KSN
W2MA
W2OR
W3AM
W3DYT
W3PA
W3RVM
W4BVX
W4CRI
W4DSC
W4DYM
W4ECE
W4EYG
W4GLR
W4LGG
W4NQN
W4PGZ
W5ALB
W5ERY
W5GZ
W5SFT
W6ITH
W6MEL
W6OZE
W6UZX
W6ZTW
W7ADH
W7HQC
W8ALC
W8BRA
W8DXO
W8EKW
W8EWB
W8FJX
W8MRC
W8VQD
W9CKP
W9GZK
W9HMG
W9JUV
W9LTR
W9UJ
WØFUH
WØGEK
WØGSW
CT1QF
CX2CN
CX5AF
DL1SD
EA3GI
EI2W
EI4L
GM3DZB
GW8BW
G2HIF
G2LS
G2VJ
HB9ET
I1AOF
I1BXK
KP4HZ
LU8FAO
LX1DC
OE5YL
ON4DH
OZ5KP
PAØGJ
PY1RC
SM5FA
SM6OE
VE3AOL
VE3TW
VP5AR
VQ5PBD
XE2KW

I.A.R.U. News

QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country, as listed below. (**Bold-face** type indicates a recent change from previous listings.) *W, K, and VE amateurs may send foreign cards to A.R.R.L. Headquarters for which no bureau is here listed.*

For service on incoming foreign cards, see list of domestic bureaus in most *QST*s (page 140 of November) under the heading, "A.R.R.L. QSL Bureau."

Algeria: **G. Deville, FA9RW, Box 21, Alger**
Angola: L.A.R.A., P.O. Box 152, Luanda
Argentina: R.C.A., Avenida Libertador General San Martin 1850, Buenos Aires
Australia: W.I.A., Box 2611 W, G.P.O., Melbourne
Austria: **OVSV, P.O. Box 15, Kierlingerstrasse, 10 Klosterneuberg**
Austria: QSL Bureau (U. S. Occupation Forces), APO 168, % Postmaster, New York, N. Y.
Azores: Via Portugal
Bahamas: C. N. Albury, Telecommunications Dept., Nassau
Barbados: **Geoffrey Scholey, VP6AM, 24 Highgate Gardens, Collymore Rock, St. Michael**
Belgian Congo: P.O. Box 271, Leopoldville
Belgium: U.B.A., Postbox 634, Brussels
Bermuda: VP9D, James A. Mann, The Cut, St. Georges
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: Desmond E. Yong, VP3YG, P.O. Box 325, Georgetown
British Honduras: D. Hunter, Box 178, Belize
Bulgaria: Box 830, Sofia
Burma: **XZ2OM, P. O. Box 1490, Rangoon**
Canton Island: H. B. Johnson, KB6BA, U.S.P.O. 06–50000, Canton Island, South Pacific.
Ceylon: P.O. Box 907, Colombo
Chile: Radio Club de Chile, Box 761, Santiago
China: M. T. Young, P.O. Box 16, Taichung, Formosa
Colombia: L.C.R.A., P.O. Box 584, Bogotá
Cook Islands: Ray Holloway, P.O. Box 65, Rarotonga

Visitor Dave Marks, W2APF, gets a look at the medal presented to G6CL, General Secretary of the Radio Society of Great Britain, when he was made an officer of the Most Excellent Order of the British Empire by Her Majesty Queen Elizabeth II.

Costa Rica: Radio Club of Costa Rica, P.O. Box 535, San Jose
Cuba: Radio Club de Cuba, QSL Bureau, Lealtad No. 660, Havana
Cyprus: Mrs. E. Barrett, P.O. Box 219, Limassol
Czechoslovakia: C.A.V., P.O. Box 69, Prague I
Denmark: P. Heinemann, OZ4H, Vanlose Alle 100, Copenhagen
Dominica: VP2DA, Box 64 Roseau, Dominica, Windward Islands
Dominican Republic: Calle Duarte #76, C. Trujillo
East Africa: (VQ1, VQ3, VQ4, VQ5): P.O. Box 1313, Nairobi, Kenya Colony
Ecuador: Guayaquil Radio Club, Casilla 784, Guayaquil
Eire: I.R.T.S. QSL Bureau, I. Morris, EI6U, 9 Shanrath Rd. Whitehall, Dublin
Fiji: S. H. Mayne, VR2AS, Victoria Paraed, Suva
Finland: SRAL, Box 306, Helsinki
France: R.E.F., BP 26, Versailles (S & O);
(F7 calls only)
F7 QSL Bureau, APO 163, % Postmaster, New York, N. Y.
Germany (DL2 calls only): Via Great Britain
Germany (DL4 calls only): DL4 QSL Bureau, APO 757, % Postmaster, New York, N. Y.
Germany (DL5 calls only): Via France
Germany (other than above): D.A.R.C., Postbox 99, Munich 27
Gibraltar: E. D. Wills, ZB2I, 9 Naval Hospital Road
Gold Coast: **E. L. Lloyd, ZD4BL, P.O. Box 565, Kumasi, Ashanti**
Great Britain (and British Empire): A. Milne, 29 Kechill Gardens, Hayes, Bromley, Kent
Greece: C. Tavaniotis, 17-A Bucharest St., Athens
Greenland: APO 858, % Postmaster, New York, N. Y.
Grenada: VP2GE, St. Georges
Guam: G.R.A.L., Box 145, Agana, Guam, Marianas Islands
Guantanamo Bay: William Hamm, KG4AF, NAS, Navy 115, Box S, F.P.O., New York, N. Y.
Guatemala: Manuel Gomez de Leon, P.O. Box 12, Guatemala City
Haiti: Roger Lanois, % R.C.A., P.O. Box A-153, Port-au-Prince
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541, Hong Kong
Hungary: H.S.R.L., Postbox 185, Budapest 4
Iceland: Islenzkir Radio Amatorar, P.O. Box 1080, Reykjavik
India: Box 1, Munnar, Travancore, S. India
Indonesia: P.A.R.I., P.O. Box 222, Surabaja, Java
Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.I., Via San Paolo 10, Milano
Jamaica: Thomas Meyers, 122 Tower St., Kingston
Japan (JA): J.A.R.L., Box 377, Tokyo
Japan (KA): F.E.A.R.L., P.O. Box 111, APO 500, % Postmaster, San Francisco, Calif.
Kuwait: Doug Taylor, MP4KAA, Box 54, Kuwait, Persian Gulf
Lebanon: R.A.L. B.P. 3245, Beyrouth
Libya: See Tripolitania
Luxembourg: G. Berger, 40 rue Trevires, Luxembourg
Macao: Via Hong Kong
Madeira: Via Portugal
Malaya: QSL Manager, P.O. Box 600, Penang
Malta: R. F. Galea, **ZB1E, "Casa Galea," Railway Road, Birkirkara**
Mauritius: V. de Robillard, Box 155, Port Louis
Mexico: L.M.R.E., Liverpool 195-A, Mexico, D.F.
Montserrat: VP2MY, Plymouth
Morocco: A.A.E.M., P.O. Box 2060, Casablanca

(Continued on page 184)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

"Dear Jeevesie," begins an interesting letter recently received "I've just been sentenced to a one-year term as DX editor of the club's monthly bulletin. Any suggestions?"

We might well have suggested immediate appeal to the highest courts. But the fellow followed with incisive questions which precluded facetiousness. Down from its shelf came an old standby that has steered our course for many years — the rare out-of-print *DX Editors' Manual* by Alva Betzoop, Y1PES. (Al served 27 years at hard labor as a DX scribe until an attack of acute alexia put a merciful end to his miserable career.)

"What's the basis and purpose of a DX column?" asked our correspondent, getting right down to fundamentals. The query was duck soup for Betzoop:

. . . A DX column is (1) a clearing-house, within limitations, for the exchange of factual and interesting DX information; (2) a documentation of DX doings which automatically becomes part of amateur radio's historical library; and (3) a forum for discussion of the state of the DX art, its ethics and procedures.

"At present only about ten per cent of my club is interested in DX," continued our inquisitive pen pal. "How do I arouse sufficient response and participation?" Chapter Eighteen of the *Manual* considers this matter:

A regenerative DX column must be conducted with a view toward attracting new blood to the DX angle of the game. The traffic man, v.h.f. man or rag-chewer of yesterday could be the DX newcomer of today; the DX newcomer of today can be the sharpshooting international communicator of tomorrow. He should be welcomed and encouraged. To restrict the scope and appeal of a DX column to a select clientele actually, in the long run, is to perform gross disservice to that very group. . . .

Our inquirer next made comment on the extreme contributorial inertia of certain DX hotshots in his outfit. Sagacious Alva has something to say on that score, too:

The patron of a clearing-house can expect to benefit from it mainly in proportion to his own contributions . . . and the facilities of a DX-information clearing-house cannot be properly utilized without due cognizance of handicaps attending its production.

"I now have 150 watts and a ground-plane. Should I fit myself out with a kw. and five-element beam?" (Heavens — why not?) Y1PES alludes to this in a footnote on page 874, Volume III:

. . . Faced with responsibility to his readers, a DX hack's attention inevitably shifts from his own problems, countries total and QSL file to the problems, countries totals and QSL files of others. In this regard he finds the pen mightier than the signal and comes to appreciate the ancient DX apothegm, " 'Tis more blessed and informative to receive than to transmit."

* Please mail all reports of DX activity to DX Editor Newkirk at 4128 North Tripp Ave., Chicago 41, Illinois.

Well, so much for our condemned correspondent and the *DX Editors' Manual*. Incidentally, the papa of this particular pillar — one W1DX, ex-W1JPE-W6CAL — used a beautifully simple approach to the problem of DX-column construction years ago: When two DX hounds meet on the street how does the conversation go?

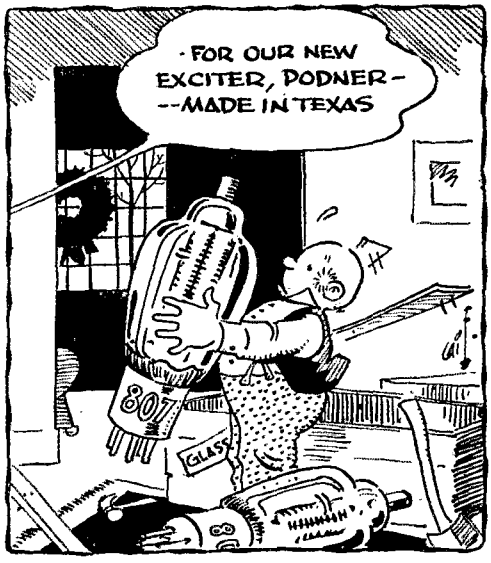
First, of course, a transcendental "Say, did you hear the one about the," after the initial handshake. Then comes, "*What* have you been working and hearing lately?" followed by, "Say, *where* do I send my QSL for JU1CY?" Finally they swap yak on DX transpirations in Togoland, Tannu Tuva and West Dubuque before they go their merry ways. Works out something like this. . . .

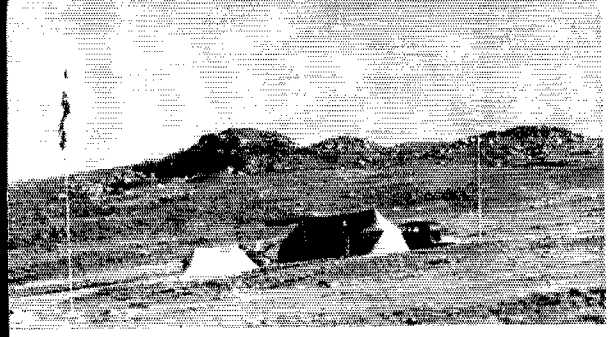
What:

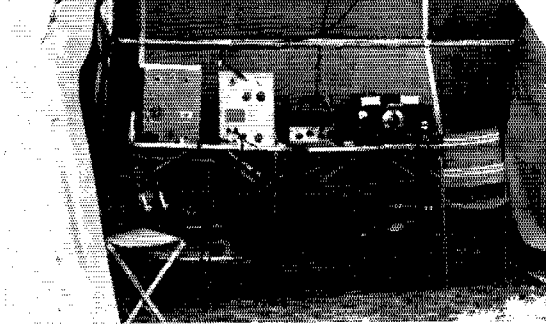
October and November presented the DX world with a six-ring circus — our "How's" mailsack is distended with voluminous DX reports for 10 through 160 meters. With good receiver-blocking daytime stuff rolling in simultaneously on 10, 15 and 20 meters it's difficult to decide which band to work. For contest men one answer is three or more receivers or, more economically, mixing front ends for simultaneous three-band tuning. A matching necessity is a transmitter with three immediately-selectable finals (or three rigs!) as well as a three-band skywire set-up. Then at night the same dilemma develops all over again on lower frequencies. Good conditions can be a problem!

Anyway, in the text to follow, frequencies (given in number of kc. above the lower band limit) appear in parentheses, times without. E.g., (9) = 14,009 kc. if the paragraph deals with 20-meter work. Times are GMT, using the nearest whole-hour figure such as 7 for 0720, and 0 for 2349. Space limitations necessitate mentioning each DX call sign just once per band. Let's go!

10 **'phone** developments caused many of the gang to forget all about their routine pursuit of new countries. After the long 28-Mc. DX drouth a few 10-meter Gs and DLs outsold 14-Mc. Asians in a walkaway. The first







In one of the major DXpeditionary efforts of 1955, the hardy band of French hams at Ieft junketed up Andorra's 8500-foot Maya Peak to dispense over 600 delicious PX1EX QSOs (220 to W/VEs) during early August. V.h.f., 14, 7 and 3.5 Mc. were used, on battery power. That receiver is an HRO of 1936 vintage.

postsunspot-minimum WACs on ten were scored by some. W1WXC, aided by **LU6ES, ZS6RA, HB9RV, 4X4BL, ZL1GJ** and W6DQO, worked all continents within six hours. **CR7AD, CT2AG, FA3OA, VQ4s** AA/VQ4 FK KPB. **ZE2s** KI KR, **ZL1OF** and **ZS3AB** also worked W1WXC. Shortly after these triumphs John's new 3-over-3 wide spaced 75-ft.-high spinner crashed to earth in a 65-m.p.h. New England breeze ._._._ G3IDG, who sticks to low-power c.w. when transmitting, logged 'phone signals from **CE3CZ, EA8BV, TA3US, VQ4s** EO EU RF, **ZB1AY, ZDs 3BFC 4BR, ZEs** 1JE 2KZ 6JB, **4S7YL, 4X4s** BD DK and **5A2TZ** ._._._ **CR7CO** raised many Europeans, U. S. stations as far west as WØ, South Americans and **CR6AO.** Watch for CR7CO at his favorite spot, 28,360 kc. ._._._ Steel City ARC's W3KWH, operated by W3MPK, struck a 28-Mc. A3 bonanza: **CN8MT, CR6AG, FB8RG** (ex-FD3RG), HB9QQ/ZS3, **VQ2s** FU HJ, VQ4 ZD3 ZD4, **ZB2P,** numerous **ZSs ZLs** and **ZP5JE. EA8BQ** and a KT1 escaped ._._._ Out west, W6NJU mixed it with **VK4TN** and **ZL2RZ;** out east, K2DSW picked up Europeans and **KV4BB** ._._._ G3IEE recorded **W3s QMG QYF, W4s** DWN GFQ and K4CYF as outstanding U. S. signals during early 28-Mc. awakenings ._._._ Other East Coast success on 10: *K2AJD* rang up CT1s, **HI6EC, PJ2AP,** Europeans. *K2JLA:* **CR6BX,** VK4, **ZL1CD.** *W2WNS:* **ZS1JD** ._._._ WØUWD reports a fast QSL from **YS1A** ._._._ W8GNY's 10-meter good fortune began as early as September: CR6, **CR7BB,** ZD3, **OQ5RU** and a dozen ZLs and ZSs came back in addition to scads of Gs Fs and other Europeans.

10 c.w. was paid more attention in a few week ends than it has received in all of three years. G3IDG logged **LZ1KPR, OQ5RU, UB5s** KAA KBR KDR, **UJ8KAA, VP8AI, YO3VI, ZC4RX** and ZSs. **HZ1HZ** and W1LVH gave Allan's 10-watter two new continents on the band. G3IDG's 28-Mc. c.w. operating schedule calls for 1800–1900 GMT on Mon., Wed., Fri., plus earlier sessions Sat. and Sun. — rockbound on 28,056 kc. ._._._ W1PWK grabbed that HZ1, too, but **FF8AO** got away ._._._ K2DSW keyed with **GC3EML, KG4AK, VK4YP, YU3BC** and other assorted Europeans. **FO8AM** refrained ._._._ W6YY relays the band-opening schedules of **ZL2s** AX and RC: every Saturday 0300–0500 GMT ._._._ So this settles it; ten is back again for sure. And say — what ever happened to TVI?

15 'phone, of course, will be hot as a pistol if 28 Mc. is open. "The lid has finally blown off for us here in the Bay area and the whole world has been coming through on 15," gloats W6ZZ. Several noncontest WACs shine forth in Miles' log, one 5 hr.-41 min. masterpiece involving **EI4X, FA8DA, JA1AM, CE3II, KH6BHB** and a Yank. Then Grahamland's **VP8BD** showed up to make it WAC+1, seven continents. The next day, Oct. 10th, wasn't so good; it took W6ZZ three minutes longer to work all six continents. **CE3DY, CP5EK, CR9AH, DU7SV, HH7NM, HR1LW, KA2s** KS MS, **KG6NAB, KL7BFW, KR6s** AF CR, **KV4s** BB BD, **OQ5CX, TI2BX, VP6FF, VK9DB, ZE1KR** and many VK/ZL colleagues further delighted Miles ._._._ W4NQM reached 110 A3 countries on 15 because of **CR7BB, GC3EML, KG1KW, LX1DC, MP4BBL, SP5AH** and **YO3GM** ._._._ W4WVM made it 79 in the same category thanks to **EAs 8BQ** and **9AZ** ._._._ **LU4AAR,** reporting via W4NQM, collected **CN8MM, SM1BSA** (rare for WASM), **SVØWO, ZB1AJX** and **4X4BD** ._._._ **FQ8AG, PZ1RM, VQs 3DQ** and **5EK** raise W4UWC to the 80th step ._._._ NCDXC's *DXer* and WCDXC's *DX Bulletin* report 21-Mc. 'phones **CR6s** BH (330) 17–18, BX (200) 20. **EA8s** AX (155) 13, BO (170) 20, **FF8AK** (200) 20, **FM7WQ** (130) 20, **HH4MV** (187) 17, **OD5AD** (27) 13, **OQ5s** BQ (125) 20, HH (140) 20, **VK9BW** (163) 21, **VP8AQ** (150) 18, **VQs 2GW** (60) 17, 4ERR (225) 20, **VSs 1BO** (180) 14, 6CL (140) 12, 6CW (150) 13, 6DA (140) 12, **ZC4RX** (180) 13, **ZD4s** AE (160) 18, BR (23) 22, BV (230) 22, **ZD9AC** (250) 17, **ZE2s** JK (215) 18, KR (132) 19, **ZP6CR** (50) 18, **ZS3s** AB (110) 19, K (180) 19, **ZS9G** (270) 14 and **AP2L** (210) 13 ._._._ Here and there among the 15-meter gang, *K2DSW* raised **HK5ER, TG9s** TH TU. *W4BGA:* **HH2JL,** Europeans, heard **OK1AA** (329) 18. *W6HIS:* CE KH6, **VPs 5DX 6FR, ZL1GJ.** *W8DLZ:* **ZP5IT** (350) 18. *WØPRM:* heard **KT1WX, OE5JK, VQ5FS, ZB1AJ, ZD1SW, ZE6JY, 5As 1TA 2TZ;** worked Europeans, **OQ5GT, ZD4.** *HR1LW:* many Europeans. *KH6AVH:* **CR7CO** (270).

15 c.w., too, is feeling its oats. W1PKW fell under the spell of **CN8AF** 20, **GC2CNC** 16, **I1BLF/Trieste** 19, **FA8RJ** 15, **KH6BCU** 21, **VQ4SS** 19 and **ZE6JY** 20 ._._._ **CR6BX, DU7SV** 23, **EA8BO** 21, **FA8CR** 21 and a VQ4 chatted with WØUWD whose 40-meter vertical seems to work out fine on 15 ._._._ **FA8DA** (85) 21 and **ZE3JP** (60) 18 connected with W8DLZ ._._._ **DM2AEK** 15, **OA4ED** 23 and **VP8BD** 15 await W5HIS QSLs ._._._ Unusual **DLØST,** a Trieste I1, **ZC4IP** and **9S4AX** surrounded K2DSW ._._._ One Sunday P.M. was sufficient for W9EU to gather up **ET3AH** (35) 20, **VQ4RF** (103) 20 and other nifties ._._._ K2BZT settled on **HA5KBA** (80) 17 and **ZB1AY** (90) 16, also completing 4-band sweeps with DL7AA, EA1AB and PAØTAU ._._._ W6ZZ's radiotelegraphic efforts favored **ET2AB, FA9RW, KG6NAB, OE5JK, OK3DG, VK9DB,** sundry ZEs and ZSs. Miles has a 21-Mc. country tally of 86, 141 all bands. He notices quite a few U. S. 'phones and Novices well outside their band limits — *hey there!* ._._._ Speaking of Novices, WN3BWU has no trouble working DL EA F G KP4 KV4 LU PY and **ZD3BFC** with his 50-watt 6146 and Minibeam. WN3BOA's attic dipole and Adventurer are death on CT1 DL EA F G and HB9s. Come now, WN/KNs, who's got that first Novice WAC? ._._._ At this shack and that, *W1CTW:* GC, **FM7WD** for 21-Mc. c.w. No. 74. *W6NJU:* Europeans, FAs. *WØPRM:* **ZE3JO.** *DL4ZC:* ET3, **KZ5VP.**

20 c.w., crowded out of its usual lead-off spot by high-frequency upstarts 10 and 15, by no means has been forsaken by the gang. A de-e-e-p breath and we begin with W4QCW's accumulation: **FD4BD** (24) 22, **FK8AM** (70) 5, **KX6NA** (65) 3–12, **PZ1BS** (14) 21, **UA6UI, VK1RA** (95) 3 of Mawson base, **VP8AI** (42) 1, **VQ8CB** (50) 12 of Chagos, **VR2BZ** (18) 5–14, **VS1GX** (90) 13, **VU2SX** (95) 12, **XZ2OM** (98) 15 and last but hardly least, **MP4QAL/Bahrein** (50) 18–20 ._._._ K2BZT counters with **CE7BS** (9) 0, **HA5s** KBA (9) 19, KBC (20) 13, KLA 14, **HZ1HZ** (77) 19, **JA3AB** (88) 24, **SPs 5AR** 14, 9KAD 20, 9KAS 18, **UQ2AS** (30) 19, **VP8BC** (28) 22 and **4X4FA.** Hayden commends Chilean amateurs for a perfect QSL record so far as his bookkeeping is concerned ._._._ W9EU's 250-watter continues to hold its ground against the gallons: **DU7SV** (91) 13, **EAs 6AM** (18) 22, **8BF** (40) 23, FB8 FD4, **FK8AH** (8) 4, **GD3UB** (22) 23, **HEs, KA2NA** (61) 2, **KG6ABN** (76) 14, KX6, **LUs 3ZK** (78) 23, 6ZT (67) 0, **MD5UK** (44) 20, **MP4JO** (40) 3, **PZ1, VQs 6LQ**

(60) 21, 8AG (14) 4, VS1GS (49) 12, VS6s CG (10) 13, CO (54) 14, DE (36) 13, VU2s JG (43) 3, RC (40) 3, ZDs 3A (70) 23, 6BX (43) 20, 6RM (14) 19, ZS8L (42) 13, 4X4AP (14) 22 and DXclusive XW8AB (12) 13 . . . . . K2GRV, 15 years young, went up to 88 with EA6AU (10) 14–22, FY7YE (75) 14, GC3KAV (72) 14–21, GD3IBQ 6, HP1EH 5, IS1ICXF (20) 11, KJ6BG (22) 16, LU9ZT 19, LZ1KAA (19) 13–20, OQ5HI 9, SU1DD (90) 13–19, VPs 1FL 15, 2KB 13, 2VB/P 14 on shipboard, 5DC 12 on Turks, 7NI 4, 8AQ (100) 13 of Grahamland, VQ4GC 8, YN1PM 16, 3V8AN 16, 5A2CL 17 and 9S4AX 14 . . . . . FK8AC, FO8AG, KR6LJ, SU1IC, SVØWU, VPs 1VR 5BM, YN1KK and ZC4VP pushed W2KGN over the top to 103. Stan contemplates possible Caribbean DXtracurricular operation in '56 . . . . . K2GFQ's 168/151 attainment was partly the responsibility of BV1US (60) 13, ET2AB (15) 23, FQ8AX (50) 20, SVØWT (45) 23, an MP4 and 3A2 . . . . . K2DSW comes up with IS1FIC, KA2USA, YO3FT (95) 18, ZB1BF, 9S4BN and VP2AD of the Leewards . . . . . CT2BO (9) 23, FB8BR (10) 18, HA and I1BLF/Trieste clicked with W8DLZ . . . . . Some guys just live right. W9KXK gave ZS6C a buzz one A.M. without response. Then he heard FB8XX (71–100) 8–13 call the ZS6 to tell him a W9 was calling, Fortunately, the Kerguelens chap hung around to work W9KXK . . . . . W2GVZ and others had their curiosity aroused by XV2LD (55) 17 who claimed a Maldives location. Pat also managed XZ2 VP8 ZS8, LUs 3ZF 5ZF 5ZK 7ZT and other Argentine Antarctic entries . . . . . CO2SW is under full DX steam once more. Sergio flagged down I5REX, PJ2MA, SU1REC, YJ1DL (4) 21–0 and ZD8AA — *muy bien* . . . . . DM2s ABL 18, ACN 19, EL2P 7, FD4, HE9LAA 22, KG1FR, VP2DL 19, ZB2I 19 and a 5A2 got together with W4TFB . . . . . Log excerpts hither and yon. *W1ANU:* KV4AA. *W2CR:* UA6 XW8 XZ2. *K2EUH:* FY7YF. *K2IKZ:* DLØST, KV4AQ. *W3YUW:* GC, OY7ML. *W5HIS:* KG1 KJ6. *W6NJU:* YJ1. *W8YKC:* heard XF1A (see "Whence"). *W9CLH:* DU7, CN8GF, CX2AF, YU3KT. *W9FGX:* EA8 FM7, KG1AA, TF2WAF, VP2KB, VP8, ZP5AY, 9S4. *W9IFZ:* HP1ZM, VP6PJ. *WØPRM:* PJ2AV. *WØVBQ:* FB8 HE, OY2Z (13) 19, VQ6, 9S4BS. *DL4ZC:* FK8AB 12, KL7, KR6QO 12, VQ8 . . . . . WGDXC and NCDXC, with an assist from Milwaukee ARC, donate likely 20-meter c.w. customers AP2M (65) 16, AR1EW (22) 3, CE7ZJ (90) 12, CRs 6AI (40) 20, 6AL (60) 22–23, 6CF (15) 22, 6CS (26) 13, 7AD (160) 17, 7AK (160) 17, 7CG (73) 13, 7DI (74) 14, 9AI (46) 15, EAØAB (48) 22, EL2L, ETs 2US (76) 13, 3AH (22) 15, F9YP/FC (15) 21, FK8s AL (110) 14, AO (12) 3, FP8AP (60) 1, FQ8AY (77) 22, FW8AB (23) 5, GC3EML (4) 21, HA7OL (52) 20, HI6EC (77) 0, KC6CG (75) 13, KJ6BJ, MP4TAA (61) 17, OX3UD (55) 1, SPs 8KAF (75) 20, 9KAT (60) 14, TF2WAM (56) 12, UAs 1KAI 14, 1KFA (30) 15–16, 1KL (29) 16, 4KKC 16, 4LE 19, UAØKFC (103) 9, UB5KAA (80) 15–16, VKs 1DC (150) 6, 1ZM (150) 6, VK9s OQ (23) 14, RM (46) 13, VP8s AD, BD (98) 2, BF (65) 18, VQs 2GW (80) 19, 3CB (59) 17, 3CF (70) 17, 4EO, 8AI, (122) 12, VR2s AD (7) 6, AR (17) 4, VU2s ET (26) 13, HF (65) 16, KV (50) 14–15, MA (130) 15, MD (6) 14, RT (20) 15, XZ2AD (60–86) 13, YA1AM (80) 3, YI2AM (94) 20, YO3s RD (30) 21, VA (10) 20, ZC4s IP (65) 16–17, RX (88) 21, WR (50) 16–17, ZDs 2DCP (40) 2, 2NWW (20) 22, 3BFC (58) 6, ZEs 3JZ (50) 20, 5JE (43) 14, 6JJ (23) 14, 6JP 20, ZM6AS (42) 9, ZP5GM (40) 18, ZS7s C (180) 14, D (63) 13, 3V8AB (75) 21, 4S7LM (129) 14, 4X4s CK (30) 19, FR (90) 4, GS (30) 5, IO (105) 19, 5As 1TL (10) 21 and 4TZ (60) 17. VS4NW is a new arrival in Sarawak.

20 'phone we'll let speak for itself, egged on by W9EU's most recent A3 roster: DU1AP (157) 13, DU7SV (195) 14, ET2US (187) 2, KA2s IM (255) 12, NY (190) 14, KR6QX (142) 12, KT1WX (187) 23, KW6BB (245) 14, KX6BU (225) 13, VS1CZ (126) 13 and 4X4SK (140) 3 . . . . . F9YP/FC, FY7YE, SP5CC and YO3GM (160) 17 carry K2CJN to 122/118 on 'phone . . . . . KG1AA, SU1CR, VQ5FS, ZE2KI and 5A2TL will QSL KL7FAF (WØLKU) . . . . . W1ANU came to grips with CN8GL, KG1BO, KG4AO and K2IIO/VE8 . . . . . CR6AU short-skipped with CR7CO (200) while W/Ks drooled . . . . . SWL J. Rocha pulls through folk like CR7DI 18, HA5s BC BD KBC 19, TF2WAL, VR6AC (145) 3–5, ZS9C (140) 4–5, 5A1s TD and TA 20 in Brazil . . . . . W4CBQ bore down for CN2AH, CT3s AF AI, EA8s AI, BA, GC2ASO, IS1s BFJ CYZ, HC8GI, KC6CG, KJ6BG, LX1JW, MP4s BBL BBV, OD5s BN DA, OK1MB, PX1YR, SVØs WM WT, TA3ÚS, VK9DB, VSØCW, 9S4s AD BS and royal HZ1TA, rising to 133 . . . . . ACs 3SQ (170) 12, 5PN (98) 15, C3WV (122) 17–18, CR7s AD (164) 14, AK (160) 17, CZ (105) 4, F9JD/FC (205) 19, FB8s BC (125) 4, BR (8) 16, HH4MV (185) 0, HI6EC (77) 0, HZ1AB (190) 17, KG6SB (25) 4, MP4KAB (125) 17, OD5AF (150) 17, OE5CK (118) 6, TF2s WAC (115) 22, WAF (108) 17, VP1EE (160) 1, VQs 3CF (70) 17, 5EK, 8AL (128) 3–4, VSs 1EW (119) 17, 1GR (250) 17, 2BN (155) 18, 2DB (112) 15, XZ2SS (155–170) 18, YI3WW (150), YJ1DL (6) 6, YU2CE (23) 18, ZDs 3BFC (106) 8, 6BX (30) 19, 9AC (150) 8, ZE6JJ (48) 4, ZM6s AB (160) 1, AT (144) 5, ZSs 2MI (139) 14 of Marion Isle, 7C (76–173) 14 and 5A1TM are suggested by NCDXC and WGDXC collaborators.

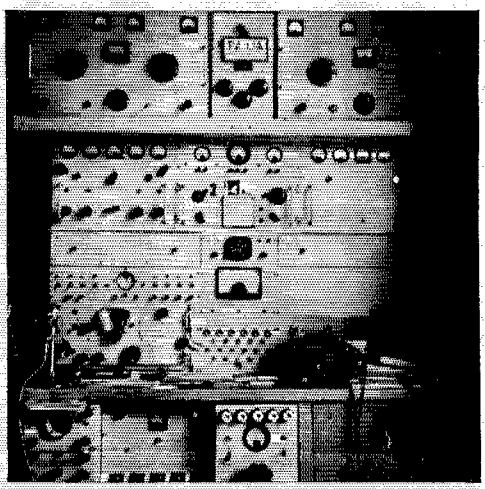
40 c.w. perked up on the night shift at the same time that higher frequencies grew gay by day. Much of the scrumptious stuff that slid down to 40 early in the past few seasons has remained on 20. But K6HFA zeroed in on DU7SV (15) 9, JAs 1AE (25) 3, 1AFF (20) 14, 1KM (10) 14, 3BJ (10) 14, 6AK (20) 14, VP6PJ (10) 10 and CX7CO (39) 9 . . . . . FA8DA, I1BNU/Trieste and ZD4BT conferred with W4HOZ, four months a General . . . . . WØVBS uncovered VP5DC 2 of Turks and 3V8AN 5 . . . . . HA5KBA, HK3KG and ZB1PP ganged up on K2DSW . . . . . Southerners LUs 4ZG 7 of So. Orkneys, 7ZT 8 and an FA8 mingled with W4TFB . . . . . W5HIS swapped RSTs with CE6AB, HP1EH 3 and VP7NJ 3 . . . . . CE7ZJ, JA8s AI AT, LU5XA and W7VZX/KM6 looked good to W7YAQ . . . . . In the "hmmm" department W1ARR nominates one ZA4KAA, and DL4ZC recommends PX1ZA who (the PX1 says) receives QSLs via RSGB . . . . . Here and there. *W1FTX/1* tried out LZ1KAA/P. *K2BZT:* 3A2. *K2JYS:* CM8QZ, a 7-Mc. regular. *W5ONQ:* morning VKs and ZLs. *W7UVC:* JA6JS (5), XE1OE (7) and VKs with a 15-watt 6L6 tritet. *W9LNQ:* F3NB with seven watts. *IIR1LW:* scored *350th* 40-'phone contact in schedules with VK4TN; ZD9AC (250) heard on A3 . . . . . WGDXC 40 c.w. addenda: FB8XX (15) 15, KJ6BJ (21) 6, LU2ZG (21) 6, OE3HP (20), VQ4EO (10) 5, ZD6BX (15) 16 and ZS3AC (25)6 . . . . . WN1FID's QSO with VK2XZ (168) 13 is a nice bit of Novice DX.

80 c.w. DX, except for an occasional week-end splurge, is noticeably more scarce this season. GD3UB (4) 0 and VP7NS (90) 2 appear on K2BZT's ledger . . . . . W3YHX surprised himself with HP3FL on 22 watts

With this rare photo SU1AS substantiates a correction to October "How's" copy. Ahmed, radio-active for the past fifteen years, claims the No. 1 Egyptian amateur license while SU1IC holds No. 2. SU1AS likes p.p. 811s, grid-modulated at 100 watts input, and usually sticks to radiotelephone.

. . . . . W4TFB makes the long haul to CE4AD with little difficulty . . . . . KL7BFT is regularly amazed the way W7WQR's *two* watts plows into Kodiak on 75 'phone.

160 c.w. opened early in September when W3RGQ slipped up on G6GM. W3EIS took his cue and appropriated said G6GM plus KZ5PB in early October . . . . . As promised, W1BB outlines plans for this season's Transatlantic Tests, as follows. "This season, instead of setting a few special dates for the Tests, *every* Sunday morning between 0500 and 0800 GMT, December through February, is designated for special efforts in working 160-meter DX. An active group of English and other European amateurs, in coöperation with U. S. A. amateurs, is behind this effort, carrying on what has been a yearly operating activity since 1932. All 160-meter stations throughout the world are invited to participate. . . . Most Ws will operate in the 1800–1825-kc. segment while most DX will be found between 1800–1900 kc., with special emphasis between 1800 and 1875 kc." For periods when DX is scarce and conditions questionable it is recommended that W/K/VE/VO stations call during the first five minutes, the third five minutes, fifth, etc., of each hour, listening during the second, fourth, sixth, etc., 5-minute periods of each hour; DX stations, the



DL3BJ's classy tabletop arrangement (left) and the cozy console of PAØJA are interesting DXamples of modern European ham installations. These stations punch powerful signals into North America and both are DXCC. PAØJA's rotary beam is as elaborate as his shack; a free-wheeling mast, sheathed in a fixed steel casing, is turned by a motor geared in at ground level. *(Photos via W2BVS, W6KQY, WØIFM and DU7SV).*

opposite. Close clock synchronization with WWV is urged. W1BB will act as liaison for the gathering of reports on Tests results from North American amateurs; DX stations outside North America may communicate their results to G6QB . . . . . W1BB's tortuous 1.8-Mc. grapevine, assisted by tugs from W2s EQS PEO, W3RGQ, W6KIP, W8GDQ and others, indicates that **FB8XX**, **ST2NG**, **VS6s** CQ CW CZ, **ZC4TA**, **ZD3BFC**, **ZL3GQ** and **ZP5**GM will be among the rarer customers performing on Top Band this winter. Good luck and good fishin'!

Where:

QSLs for YA1AM from U. S. stations should go via ARRL; from non-U. S. amateurs, via RSGB. YA1AM pens, "Outgoing QSLs from me to American hams will be sent to ARRL Hq. or directly to call area QSL bureaus." . . . . W6SWG feels that DXers who send dollar bills to XW8AB for return QSL postage will be interested to learn that the dough never reaches Marcel. The same is true concerning many other rare-DX stations — unless otherwise instructed, use international reply coupons, never cold cash . . . . . EL2X has his Liberian logs on hand ready to dispose of QSL inquiries received via the address to follow . . . . . G3JFD is unable to help you with VP8AA QSL problems, contrary to an earlier recommendation . . . . . YU1FR still has logs and QSLs for his prewar YU7BJ activities and will be pleased to receive correspondence on the subject . . . . . From the mill of CN8DS (K2DS): "A great many QSL cards are available at Hq. 17th AF, director of communications. . . . Cards are coming in daily and a problem of recordation and storage is being experienced." Former operators of CN8Fs A C E F G H J N P Q R S T W X Z, CN8Gs A C D G H I K L N O P Q R S V, CN8Es A B C H I J M N O P S T U W X and Z are requested to send stamped self-addressed envelopes for forwarding. February 1, 1956, is the deadline after which the backlog must be eliminated. Address 17th AF Hq., APO 118, New York, N. Y., for the attention of the director of communications. The period involved extends from January, 1951, through December, 1954 . . . . . A lively trade this month in the QTH department. W1s BDI RDV WAI WPO, W2s GVZ ZGB, W3ZEN, W4s MGD PRM QCW, W8OTI. W9s CFT FGX LNQ LI NN WØCPM, K2BZT, WN5KNE, DL4ZC, KC6UZ, T. Kneitel, J. Rocha, NCDXC and WGDXC caused Jeeves to record postal data on

AC5PN, P. O., Kalimpong, India (or via VS1CZ) . . . . . **AR1EW**, Navip, Box 351, Damascus, Syria . . . . . **CR7AD** (QSL via LREM) . . . . . **CX5IV**, A. J. Patron, Entre Rios 964, Paisandu, Uruguay . . . . . **CX6BD**, P. Olave, P. O. Box 29, Montevideo, Uruguay . . . . . **DL4TR**, 25th Comm. Sqdn., APO 633, New York, N. Y. . . . . **EL2L**, S. Butler, c/o Liberian Govt. Radio Svc., Monrovia, Liberia . . . . . ex-**EL2X**, N. Raymond, 141-30 Pershing Crescent, Jamaica 35, L. I., N. Y. . . . . **ET2RP**, SFC R. Pherigo, 9434 TSU, APO 843, New York, N. Y. . . . . ex-**FD3RG**-F3RG (QSL to FB8RG) . . . . . **GM3HXT**, Fochaberg, Morayshire, Scotland . . . . . **HC1PJ**, c/o U. S. Embassy, Quito, Ecuador . . . . . **HH5EA**, E. Anacreon, Box 43, Cap-Haitien, Haiti . . . . . **HK3FT**, C. Estefan, Ap. Aereo 6005, Bogota, Colombia . . . . . **HZ1TA** (QSL via HZ1HZ) . . . . . ex-**KC6AA**, R. Hatcher, WØENT, RFD 4, Lee's Summit, Mo. . . . . ex-**KC6ZB** (QSL to KX6ZB) . . . . . ex-**KC6ZC** (QSL to KX6ZC) . . . . . ex-**KJ6BG**, W. Kirk, 1109 Monroe, Pasadena, Calif. . . . . **KL7BPK**, D. R. Greenawalt, jr., 903 Austin Tower Apts., Ketchikan, Alaska . . . . . **KX6ZB**, R. Q. Stoughton, Majuro, Marshall Islands . . . . . **KX6ZC**, Doris Stoughton, Majuro, Marshall Islands . . . . . **LU6ZT** (QSL via RCA) . . . . . **LUØs ZD ZV** (QSL via RCA) . . . . . **LZ1KAA**, K. Ivanov, Box 336, Sofia, Bulgaria . . . . . **M1H**, A. Casali, Cas. Postale 80, Republic of San Marino . . . . . **OD5BN**, American University, Beirut, Lebanon . . . . . **OD5DA** (QSL via OD5BN) . . . . . **OX3BP**, B. Poulsen (OZ5BO), Kap Tobin, Greenland . . . . . **OX3WB**, W. B. Petersen, Kap Tobin, Greenland . . . . . ex-**PK4DA**, A. Bles, 81 Rembrandtlaan, Voorburg, Z. H., Netherlands . . . . . **PY7IE** (QSL via LABRE) . . . . . **PZ1BS**, P. O. Box 848, Paramaribo, Surinam . . . . . **PZ1CD**, P. O. Box 848, Paramaribo, Surinam . . . . . **ST2DB**, H. Best, P. O. Box 516, Khartoum, Sudan . . . . . ex-**TF2WAF** (QSL to WØTVH) . . . . . **TF2WAM**, APO 81, New York, N. Y. . . . . **TF2WAN**, APO 81, New York, N. Y. . . . . **TG9RR**, R. Ruble, Box 353, Guatemala City, Guatemala . . . . . **UA6KOB**, Box 74, Odessa, Ukraine S. S. R. . . . . ex-**VP1DJ** (QSL to VK7DJ) . . . . . ex-**VK1PG** (QSL to VK2PG) . . . . . **VK9MR**, M. Rieper, Madang, T. N. G. . . . . ex-**VK9VW** (QSL to VK3VW) . . . . . **VK9XK**, S. R. Coleston, Samurai Island, Papua . . . . . **VP1EE**, C. G. E. Eves, P. O. Box 10, Stann Creek, British Honduras . . . . . ex-**VP1GG** (QSL to VR2BC) . . . . . **VP5BR**, D. Mathias, 2 Easton Ave., Kingston, Jamaica . . . . . ex-**VP6LH** (QSL to VR2AM) . . . . . **VP8BC**, Box 117, Port Stanley, Falkland Islands . . . . . ex-**VQ4FA**, J. Edgington, 27 E. Dr., Carshalton Beeches, Surrey, England . . . . . **VR2BC**, G. B. Gregory, c/o Dept. of Agriculture, Suva, Fiji Islands . . . . . **VU2NR**, B. A. Raju, Box 534, New Delhi, India . . . . . **XV2LD** (QSL via ARSI) . . . . . **XZ2AD**, U. Hla Oung, 102 Inya Rd., Rangoon, Burma . . . . . **XZ2SY**, P. O. Box 833, Rangoon, Burma . . . . . **YA1AM** (QSL via ARRL or RSGB — see text preceding) . . . . . **ZD4BL** (QSL via ZD4BZ . . . . . **ZD4BZ**, P. O. Box 109, Kumasi, Gold Coast, Africa . . . . . **ZP3IB**, E. Olnedo, via Concepción, Tacuati, Paraguay . . . . . **ZP5JE** (QSL via RCP) . . . . . **ZS8L**, Box 4, Maseru, Basutoland . . . . . **ZS9G**, D. Baird, Box 196, Livingstone, No. Rhodesia . . . . . **3A2BH** (QSL via USKA) . . . . . **4W1AXB**, Box 467, Sania, Yemen, via Cairo, Egypt . . . . . **5A1TL** (QSL via K2MSG).

Whence:

Asia — XZ2AD, active in Burma as far back as 1928 when he signed AI2AC, still cavorts on 14 Mc. with p.p. 6146s at 100 watts. "In the old days we used Hartley circuits with UV-202s and Reinartz receivers. Zepp antennas were favorites for all amateurs. I never used spark, as spark was prohibited in Burma in those days. Do you remember when wood baseboard was used, with coils of big tubing, and the layout was spread over the board so that a 20-watt outfit occupied as much space as the present-day kilowatt?" XZ2AD likes to QSL 100 per cent but laments a poor percentage of answers from U. S. amateurs. Check his cor-

rected QTH in "Where" . . . . . Afghanistan, one of the rarest entities on the ARRL DXCC Countries List, got a ham-band boost through the activities of YA1AM, a former OD5. This one is somewhat undercover and the operator prefers anonymity for the present. An 814 at 175 watts, an SX-28 and an 8JK beam do the job in Kabul. YA1AM seeks a bit more selectivity to help duck European QRM — pile-ups, naturally, are terrific . . . . . MP4BBL, on U. K. leave, should be back at it from Bahrein next month, according to W4NQM. MP4QAL has been the most active DX hound in those parts although local traveling causes Fergie to miss some good openings now and then . . . . . Via W6SWG, XW8AB reports XW8AA back in France, QTH unspecified. XW8AB is authorized to work all bands 3.5 through 28 Mc. . . . . W3YHI, a confirmed v.h.f. man Stateside, ventured onto 20 meters at Iwo's KA0IJ. "The c.w. gang mobbed me! What a DX dream — I was running a BC-610 to a pair of Vee beams aimed at the U. S. A." You may also bump into W3YHI at the helm of KA2IM near Tokyo. KA0IJ took a beating in autumnal gales which reached velocities of 170 m.p.h. Incidentally, it's an organizational station and there usually is at least one ham around to keep the Bonin-Volcano group available DXwise . . . . . AC5PN scouts for Ws on 14,190 kc. around 1600, learns W6YY. John also reports the VS2DW BC-610 back in action thanks to a new transformer and 100TH courtesy W9YFV and W4MKB, respectively . . . . . Via WGDXC sources, the MP4KAB operating schedule for Kuwait awaiters: daily except Thursdays, 1500–1700 GMT; Thursdays, 1400–1900. George concentrates on U. S. A. signals Thursdays and Fridays between 1600 and 1700 on 14,125- or 14,150-kc. 'phone . . . . . W2CDJ punches buttons at KA2AS, while W6HTH returns to Uncle Sugar after a spell of ham paradise at KA2NY . . . . . JA1CR writes of Korean activity on the part of school station HL2AA, Seoul, an installation licensed to work bands from 1.8 through 144 Mc. At this writing, however, the ITU-FCC ban still applies to the Land of Morning Calm.

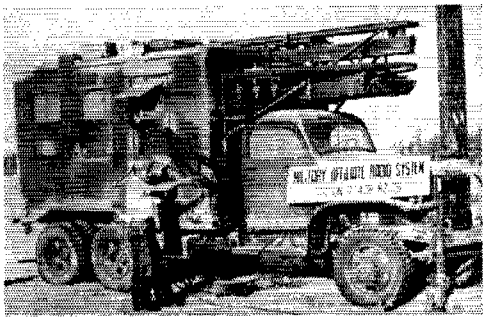
Africa — Asmara's ET2RP, who signs W9MDV back home, stirs things up on 20 with twenty watts and a 700-foot long-wire. He likes his c.w. around 14,058 kc. but he and fellow Yanks do radiotelephone honors with a 200-watter between 14,170 and 14,190 kc. when the spirit moves. This via W3ZEN . . . . . ZS1PD, now farming in Rhodesia, turned the DX bug loose in Basutoland during his 1955 session at ZS8L. The regular ZS8L and other ZS8s are evidencing interest in the DX facet. ZS1PD gave ZS8L QSOs to hams in over sixty countries . . . . . W4MGD finds EL2L a good bet for Liberian QSOs and QSLs. Sam prefers c.w. work around 14,050 kc. . . . . EA9DF's contemplated jaunt to Ifni this winter depends on acquisition of suitable portable gear — fingers crossed . . . . . Egyptian licensing data via SU1IC: Amateur tickets are divided into four classes with 10, 25, 50 and 100 watts input permitted, respectively. Ten-watt licenses are for c.w. only, while other classes may use 'phone. SU1IC labors toward WAS and DXCC with a 75/58 DX record at last tally — not bad for an 807 at ten watts . . . . . "According to FB8BR, FR7ZA has taken a job at an airport in Madagascar. So that looks like an end to FR7s for a while." This uncheery note from W4QCW.

Oceania — Pacific Trust Territory notes thanks to KC6UZ: KC6s ZB and ZC swapped islands and now are KX6s ZB and ZC on Majuro. KC6s AA and AJ departed homeward, the former now pounding brass as W0ENT with the Missouri State Police c.w. and 'phone nets. Ed of KC6CG, also heading Statesward, leaves a well-filled log behind on Ulithi atoll where the Loran station's skipper will take over as KC6CG's chief op. KX6NB busies himself with 14-Mc. s.s.b. pursuits. KC6TA, Truk's doctor, employs a new Viking and beam set-up primarily for skeds with KH6s. KC6UZ, himself, continues ever vigilant as the Territory's FCC-style monitor. Authorized maximum amateur power in the Trust Territory now is pegged at 600 watts . . . . . W6YY reminds us that ZLs 1PA and 2GX make for the Kermadecs next month contingent upon chartering adequate transportation for the 1400-mile trip. The last Kermadec active, ZL1AHC, kept himself aloof by operating only 40 and 80 in local fashion and QRTd early this year. ZL2GX and VR2BZ were the first QSOs for FW8AB after W6MUR's replacement plate transformer was put to work; FK8AC assists with FW8AB outbound-QSLs chores . . . . . VR2BC, ex-VP1GG, moved to Fiji via Los Angeles, San Francisco, Vancouver and Honolulu, reporting wonderful hospitality at all points. Visits with W6s ATO and MRV were especially enjoyed . . . . . GM3DHD reports receipt of the first NZART (New Zealand) WAP 'phone award won by a European station. Other A3 WAPs have been earned by ZL2GX, HC2JR, VK4HR, ZL1HY, VK6RU, VK4FJ, VK4WF, ZS6BW, PY2CK, W6YY, VK4RW, ZL1MQ, CM9AA and VK5CE in that order . . . . . WGDXC sources mention possible DXpeditioning to Timor where CR10AA remains QRT for lack of gear . . . . . W6GBG secured a WIA (Australia) WAVKCA award for 1948–'49 activity as KH6PY. Now he's hot after another from Palm City. NCDXC lists VK5s AL BV HO IP JQ and SA as workable from Australia's Northern Territory, one of the toughest nuts to crack for WAVKCA honors . . . . . Top-band hounds note there is no 1.8-Mc. allocation in Australia for normal ham use, so VK participation in 160-meter doings is restricted to the SWL variety. Aussies are assigned 1.84-1.86 Mc. for emergency use only . . . . . From PA0GN, W1WPO has it that ex-PK4DA made it back to Europe all right after a rough session in Indonesia . . . . . Ex-VR3A, now in Australia for a while, expects to return to Fanning in 1957. W2GT hears Ray will spend part of the interim in the U. S. A. and England . . . . . FK8s AC AH and AL put together a rig for use as FK8AR/MM aboard the *Quebec* which plies regularly between Noumea and VK ports.

Eu ope — The year now drawing to a close saw several successful Continental DXpeditions crowned with garlands of QSLs, one of the most recent being that of HB9s as 3A2BH. For the record, F8EX (ex-FQ8WB-F8EX/FC-F8EX/AR and active since 1925) of current PX1EX fame lists his group's Andorran endeavor as the fifth such recorded. Others occurred in *June, 1951*, 7B4QF (ON4QF, F7AR, W6SAI, SM5UN); *July, 1951*, PX1A (EA3 FL HE); *August, 1951*, PX1AR (F7s AR AT); and *November, 1951*, PX1AA (DL4IA). Resident PX1YR appeared on the DX scene in 1952 and continues modest 'phone activity. The PX1EX party was organized with task-force thoroughness. F8EX specialized in procurement of all necessary official permit papers, plus power generation and antennas; F8EO was responsible for DX-band reception; F9UK handled details on both rigs, plus v.h.f. reception; F3s IB and TJ were in charge of operation site, records, QSLs and other details. Excluding Russian areas, the incongruous Vatican State and Albania twosome now hold the doubtful distinction of being the most unavailable European items on the ARRL DXCC Countries List . . . . . YU1GM (W4GMP) bade farewell to Belgrade in October but YU1FR reports the import of W4OQP for a two-year stay. Thus we'll doubtless be working another Yank with a YU tag . . . . . F9IL, REF's DUF award manager, entreats S. Dak. and N. Mex. 14-Mc. c.w. enthusiasts to help him complete WAS. Edmond has been stuck at 46 for several years . . . . . During a pleasant visit to W2OLU's shack, GM3IAZ pointed out that the average G station can work half his necessary DXCC countries within a 1000-mile radius. Within a similar circle W1s or W2s can collect but a handful . . . . . W6KQY and XYL W6LNP visited many rare DX spots during their extensive European auto

(*Continued on page 182*)

A solid bet for Asian QSOs and QSLs for several years now, HZ1AB's desert installation continues active on several DX bands. W6CRV kept the HZ1AB logs well filled through most of '55, and K4DCC (ex-W5IIY), shown here, capably carries on. (*Photos via W1CBQ*)



Operating News

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

Thrills and Top Values in Our Amateur Radio. The crowning moment on getting one's ticket quite possibly is in getting that *first reply* after calling a station tuned in so painstakingly! A new high in operating excitement is around every turn (each contact *beyond* one's own radio district). DX!! But there are many values in amateur radio with lasting and recurrent qualities beyond the novelty stage. We mean things like (1) the surprise and satisfaction of hearing an old friend calling us on the air, (2) the solid satisfaction that results from having *handled* a communication, (3) the sharing in the appreciation of the recipient on delivery of a message, (4) the personal pride in making a new circuit or gadget attached to one's rig improve the performance, (5) the arrival of the CP certificate that symbolizes ability to set down a solid 20 words per minute accurately and 5 or 10 to the line (?), or (6) perhaps it's our WAS or RCC award, or (7) our ORS certificate when earned by a series of good monthly station reports and use of savvy in *net operating*. The Novice who limits his amateur life to Novice/v.h.f. voice communication *alone* can never know the whole enjoyment of traffic and DX success that can result from extending his personal ability to cover "80" and "20." Mobile, s.s.b. and RTTY are other challenging horizons and techniques each having their reward but also requiring *operating results* to demonstrate their concrete values. One's equipment is but an aid to the operator's judgment in choice of bands, timing ability, familiarity with operating procedures and coöperation with brother operators in the net — for it always takes *two* stations and operators to turn in a worth-while record or traffic file of his amateur operating accomplishments.

14- and 21-Mc. Frequency Observance. For years ARRL Official Observers have been at this problem of frequency observance, sending helpful alerting cards to keep amateurs in all bands out of FCC trouble. Novice sub-band harmonics (radiation on improper multiples of their crystal-controlled frequencies) are *one* problem and OOs continue to assist. Of late they have been working on a 15-20-meter 'phone-band problem. W2FE has noted what was apparently radiation from inadequately shielded, modulated, multiplier stages, "a lot of Ws and Ks working 'phone outside 14.2-14.3-Mc. limits . . . also stations in the 100 kc. below this calling CQ 15." KV4BB, assistant Director, now writes that "Both high and low ends, 20 'phone, get their share of off-frequency operation. But 15 has fellows all the way down to 21.2 Mc. blissfully calling CQ." The most frequent offender seems to be the one who cannot measure his frequency right, and just *hopes* his Heathkit or Viking VFO is accurate enough, he says. Then there is the high-power boy who likes to crowd the edge. His frequent error seldom takes him over 400 cycles out. A third type worker buys a rock at 7 Mc. and figures he has a piece of precision quartz impervious to temperature, time or tuning. These latter characters are the ones that take an FCC notice to convince. In one hour's listening (a fair sample) I have found eleven 21 Mc. stations in five licensing areas off frequency." WØPME says he has heard WNs even *below* 21,100 kc. calling DX and inviting FCC citations.

We fellows (all bands and modes) owe it to ourselves to abide strictly by our regulations. Only such a course can maintain the respect for our group as being good citizens and engineers in the tradition of the amateur service. To get careless invites official citation. FCC Secs. 12.111 and 12.135 list our *authorized* frequencies and state the requirements for frequency measurement and regular check by means independent of the transmitter. See the *Handbook* measurement chapter and December *QST* if you need references on the proper setups to use to avoid this sort of trouble. It is the course of wisdom also to take note in making operating adjustments of the FCC announcement that appeared on page 10, Oct. '55 *QST*; FCC now is enforcing more strictly the requirement that side band frequencies and all radiation resulting from modulation must be confined to the authorized band limits specified for A-3.

Operator License Suspension. FCC has recently acted to suspend additional amateur radio operator licenses, where particular sections of the regulations have been violated:

FCC Ordered (10 October, 1955) that the Advanced Class operator license of Harold M. Boring, Los Angeles, Calif., BE SUSPENDED for a period of *one year*. This is under authority of Section 303 (m) (1) (D) of the Communications Act of 1934, as amended, and Section 0.292 (f) of the Commission's Rules. Licensee may not permit his station, W6DZJ, to be operated by any person. The action is responsive to FCC noting that on September 5 and 16, 1954 and May 14, 1955 and on various other occasions while engaged in W6DZJ operation, operator transmitted obscene, indecent or profane words, language or meaning in violation of Section 12.157 of the FCC rules.

ARRL Appointments and Awards. All operators now active and starting in the game are invited to write or send a radiogram for the booklet *Operating an Amateur Radio Station.*

This not only covers ARRL awards but treats message form and net operation and sets down the qualifications for members to hold specialized ARRL SCM appointments. Here is the field of station appointments:

ORS — Official Relay Station. Traffic service, operates c.w. nets; noted for c.w. skill and procedure ability.

OES — Official Experimental Station. Experimental operating, collects and reports v.h.f.-u.h.f.-s.h.f. propagation data, may engage in facsimile, TT, TV, etc., experiments working on 50 Mc. and/or above.

OPS — Official Phone Station. Sets high voice operating standards and procedures, furthers 'phone nets and traffic.

OBS — Official Bulletin Station. Transmits ARRL and FCC bulletin information to amateurs.

OO — Official Observer. Sends coöperative notices to amateurs to assist in frequency observance, insures high-quality signals, and prevents FCC trouble.

Leadership Posts

RM — Route Manager. Organizes and coördinates c.w. traffic activities. Supervises and promotes nets and recruits ORSs.

PAM — Phone Activities Manager. Organizes activities for OPSs and voice operators in his section. Promotes 'phone nets and recruits OPSs.

SEC — Section Emergency Coördinator. Promotes and administers section emergency radio organization.

EC — Emergency Coördinator. Organizes amateurs of a community or other area for emergency radio service; maintains liaision with officials and agencies served; also with other local communication facilities.

Through participation in ARRL organization, inviting and accepting appointment from one's SCM (address page 6 each *QST*) you receive more in operational results and fraternal satisfaction than you possibly can achieve through your individual efforts alone. This is all by way of inviting every new and old amateur who is active to use the instrument of the ARRL net, the RACES and AREC groups, the local affiliated radio clubs, section nets and an active SCM-appointment as appropriate ways to extend and increase personal amateur radio results and enjoyment. *F.E.H.*

W1AW OPERATING NOTE

The complete schedule of W1AW operations appeared on page 61, November *QST*. See that issue for full information on when and where to look for W1AW.

A.R.R.L. ACTIVITIES CALENDAR

Dec. 2nd: CP Qualifying Run — W6OWP
Dec. 12th: CP Qualifying Run — W1AW
Jan. 7th: CP Qualifying Run — W6OWP
Jan. 7th–8th: V.H.F. Sweepstakes
Jan. 14th–15th: CD QSO Party (c.w.)
Jan. 17th: CP Qualifying Run — W1AW
Jan. 21st–22nd: CD QSO Party ('phone)
Feb. 3rd: CP Qualifying Run — W6OWP
Feb. 4th–19th: Novice Round-up
Feb. 10th–12th: DX Competition ('phone)
Feb. 14th: Frequency Measuring Test
Feb. 15th: CP Qualifying Run — W1AW
Feb. 24th–26th: DX Competition (c.w.)
Mar. 9th–11th: DX Competition ('phone)
Mar. 23rd–25th: DX Competition (c.w.)

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on December 12th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,010, 52,000 and 145,600 kc. The next qualifying run *from W6OWP only* will be transmitted on December 2nd at 2100 PST on 3590 and 7128 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions will be made from W1AW each evening at 2130 EST. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately 10 minutes' practice is given at each speed. References to texts used on several of the transmissions are given below.

Date Subject of Practice Text from October *QST*

Dec. 1st: *A Modern Medium-Power Transmitter*, p. 11
Dec. 7th: *A De Luxe Amateur-Band Receiver*, p. 21
Dec. 9th: *The Simplest Converter*, p. 27
Dec. 13th: *The "Extended Lazy H" Antenna*, p. 20
Dec. 16th: *Wait and See*, p. 31
Dec. 19th: *Tuning the Mobile Antenna*. . . . , p. 32
Dec. 22nd: *More Power with the AT-1*, p. 36
Dec. 27th: *Results, 21st ARRL DX Contest*, p. 60

A.R.R.L.-AFFILIATED CLUB HONOR ROLL

With pleasure we here present the second section of our Honor Roll listings for 1955 in accordance with the Board policy for special recognition of all affiliated clubs whose *entire membership* consists of members of the League. Refer to page 80 of June *QST* for the earlier listing of additional active clubs with 100 per cent ARRL membership. Our honor list is based each time on analysis of data received in the '55 Annual Report of Club Data conducted to meet Board requirements. In early '56 a new form will be sent each active affiliate for the filings on which continued affiliation and new Honor Roll listings will be based. Many clubs are now engaged in mid-season activities such as code and theory classes for newly-interested persons, civil defense, building, technical and "examination" programs for members. The early '56 survey will assist the nation-wide compilation of our status and progress besides getting required ARRL information. The following clubs now will receive "100% ARRL Club" certifications following this listing in *QST*:

Amateur Transmitters' Association of Western Pennsylvania, Wilkinsburg, Pa.
The Band Hoppers Radio Club, Ferguson, Mo.
Candlewood Amateur Radio Association, Bethel, Conn.
Cattaraugus Amateur Radio Society, Gowanda, N. Y.
Central Illinois Radio Club, Bloomington, Ill.
Decatur Amateur Radio Club, Decatur, Ala.
Decatur Signal Depot Radio Club, Decatur, Ill.
Enid Amateur Radio Club, Enid, Okla.
Gadsden Amateur Radio Club, Gadsden, Ala.
Great Bay Radio Association, Dover, N. H.
Helix Amateur Radio Club, San Diego County, Calif.
The Lamesa Amateur Radio Club, Lamesa, Tex.
The Maui Amateur Radio Club, Kahului, Maui, T. H.
Mid-Island Radio Club, Freeport, N. Y.
Muscle Shoals Amateur Radio Club, Sheffield, Ala.
Muskingum Amateur Radio Assn., Zanesville, Ohio
Northern Chautauqua Amateur Radio Club, Dunkirk, N. Y.
The Oakland Radio Club, Inc., Oakland, Calif.
The Order of Boiled Owls, Levittown, N. Y.
Pittsburg County Amateur Radio Club, McAlester, Okla.
Rock River Radio Club, Dixon, Ill.
St. Louis Amateur Radio Club, St. Louis, Mo.
Sandusky Valley Amateur Radio Club, Fremont, Ohio
Se Kan Radio Club, Chanute, Kans.
Soo Radio Club, Sidney, Nebr.
Southwestern Minnie Radio Club, Marshall, Minn.
Winona Amateur Radio Club, Winona, Minn.

We are very pleased to see some of the ECs taking nough interest in the AREC to propose some changes in its organization. In the past month we have received two letters proposing some organizational changes. Maybe you'd be interested in them.

Our old friend Tiny, WØGDZ (now WØGDZ/3), who did such a stellar job in Western Nebraska when he was EC out there, sent in an article entitled "Let's Look at AREC." He says our chain of command, if you want to call it that, consists of a National EC, a Section EC, and from there on down it's pretty much a matter of how the SEC and/or SCM wants to organize it. Tiny suggests that we set up an Assistant SEC under the SEC, County ECs under them and Community ECs under the county ECs. Under the Community EC he would have an assistant EC for c.w. and an assistant EC for 'phone. He also outlines detailed duties for the community EC and his assistants. The theme of his plan is that SECs have too much to do, especially in large or populous sections — that they need assistants to help them; that there is a jurisdictional void (i.e., the county) between section and community that needs to be filled; and that the community plan is needlessly complicated and requires too many people.

The other letter was from W4SOD, one of our more active ECs in North Carolina. Ed makes the following five points: (1) The SEC should appoint NCS in emergencies, meanwhile acting as NCS himself. (2) The SEC should maintain very close contact with any other communications agencies so that the AREC organization can be worked in with them. (3) The SEC should make periodic bulletin broadcasts with information on any emergency situation. (4) Incompetents should be weeded out. (5) The SEC should appoint policing stations to clear frequencies and enforce discipline; those who do not fall in line should be "blacklisted."

Well, your ARRL, as a membership organization, is responsive to pressure. In the end, willy nilly, the way the majority of you want it done is the way it shall be done. For the time being, we'll submit no rebuttal to any of the facets of either of the above two proposals — although we did so in correspondence with the individuals concerned. We *like* to get concrete, well-thought-out suggestions and proposals of this kind. If you have some, let's have 'em. But try to temper the desirable with the possible by bearing a few things in mind, to wit:

(1) Get that national perspective. What's good for your part of the country may not be any good at all for another part.

(2) Before suggesting a change, make sure that you are not assuming the people to carry it out will do better than they do in carrying out the present plan. The changed plan itself has to be better; the people will be the same ones — we're stuck with them.

(3) Make sure you know what's wrong with the present scheme before you propose changes in it. That is, consider first the possibility that the present plan is a good one if properly implemented.

(4) An ideal arrangement is not always a practical one. It's a hard, materialistic world, and we have to consider the practicalities. One of the commonest misconceptions is that your Headquarters has (or can get) unlimited personnel to implement any plan. It just isn't so. And if you have more than you can do, you wind up not doing any of it as well as you might; your efficiency is in indirect proportion to the load.

And so, keeping the above in mind, let the comments and suggestions and proposals come. We love 'em.

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During September, many forest fires broke out on the west coast, and amateurs of several groups were put to work supplying emergency communications for fire fighters and evacuees.

In the Medford, Ore., area, W7CRN visited the fire at Blackwell Hill on Sept. 4th, and relaying through W7VIL and W7TJJ, got the facts back to a local broadcast station. On Sept. 5th, civil defense aid was requested in the Rogue River area. W7VBB went to Butte Falls and W7ZVO to Rogue River. W7VIL held down control in Medford. With the aid of W7s ULR TAH LNG ISP and UGE, a system was worked out to chart the progress of the various fires. This worked so well that a few days later a request for assistance came from Yreka, Calif., through K6AKF. W7VIL rounded up four mobiles (W7s ZVO YET TAH and CRN, with W7WOX as an operator) and proceeded to Yreka Forest Service headquarters. W7s ZVO and CRN then proceeded to Humbug Camp and from there to the fire boss's camp, from which communication was established with headquarters. W7s BLN and HDN assisted in keeping the frequency clear. On September 9th the Forest Service Communications Chief (W7JHC) issued another call for help. W7s CRN and VBB established a fixed station at the Forest Service's warehouse and started rounding up amateurs to help. W7s OPH and NFZ set up a station at Grants Pass. W7ZVO tried to climb Mt. Ashland so a rig could be set up to command a wide area, but car trouble prevented his making it. W7TJJ also tried it and failed, but W7ULR made it and started handling traffic at once. W7KTG made the top but had to return because of car trouble. W7VPH then made the climb and assisted W7ULR. W7s BEG and TJJ operated portable rigs as relay stations. Operation continued around the clock until Sunday night, Sept. 11th, on amateur bands, at which time Forest Service equipment arrived; however, amateurs continued to do the operating until Monday. Amateurs were called upon and responded in the initial stages when communications were so badly needed between fire camps and headquarters, Forestry Service gear not being available. Mobiles were particularly valuable. Besides those mentioned, the following amateurs served: W7s HPO MAQ OFS OJA VBG WQR.

A view inside the emergency mobile unit of K4FAI, Shaw AFB, S. C. This unit was used for the first time during Hurricane Connie, at Myrtle Beach, S. C. During Diane, the van was set up at Ocean Drive, S. C., to help keep traffic moving on both amateur and MARS frequencies. (*Official U. S. Air Force Photo*)

Lucy Spargo, K4ALM, operating during Hurricane Connie and Diane at K4FAI, Shaw AFB, S. C. Lucy worked many long hours during these storms and handled a lot of emergency traffic. She is XYL of K4ANI, who is in charge of K4FAI. She is also ex-KL7ZQ and ex-W6ETF. (*Official U. S. Air Force Photo*)

W6MWR reports that on checking with K6AKF at the fair grounds in Yreka on Sept. 8th, he was assigned to the "Haystack" fire. He set up at a high point in the area with a makeshift fixed antenna to relay information from mobiles operating with fire fighting crews, relaying to the base station at Yreka. The amateurs were released on September 10th, after helping Forest Service set up their own equipment. W6MWR states that lack of communications in the early stages greatly hampered efficient fire fighting, and not until amateurs arrived on the scene could the necessary coördination between fire fighting crews and base camps be established. The following additional stations (not mentioned above) were added in reports by W6MWR and W6JDN of this emergency: *W6s* DVD FKI HRZ HNL JDN JEQ LL SDP SXF; *K6s* BWC DWT EPK GIB WDG; *W7s* QJQ SXF; K7WAT W9FBP/6.

K6KPU, Santa Barbara SEC, reports work by amateurs in his section during September fires there. Communication on two meters was maintained by W6ENJ, W6EGQ, K6EUM and KN6JGP in the fire area with K6JUN at Goleta airport, W6BOU acting as relay from Santa Ynez Peak. With no telephone operating north of Santa Barbara, the following amateurs stood by on 3975 kc. to aid in out-of-city traffic: *W6s* BRY UQL QAA/m NSE BCY; *K6s* KPU EJT CT EAQ/m DKZ AUW EJV.

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In addition to extensive flooding caused by Hurricane Diane's death throes, considerable wind damage was caused in other places by Connie, Diane and Ione. Let's summarize some of the reports we have received on this:

Connie and Diane came so close together that it is virtually impossible to separate them in this report. W4ANK sends us a fine running account of activities in South Carolina during these two hurricanes. As Connie approached on August 9th, W4FFH activated the S. C. Emergency Phone Net on a 24-hour basis. The new Coastal Emergency Net also received its baptism of fire during these hurricanes under its coördinator, W4ZRH. While the storm was below the 30th parallel, W4DVR was NCS. FCC cleared 3805 and 3795 kc. for net operation, at the request of W4ZRH. Only coastal stations, inland stations needed by the NCS and mobiles were allowed to participate; other stations were asked to report with their section nets. The net carried on for several days in this fashion. Before they could take a deep breath, Hurricane Diane was upon them, and net operation commenced all over again, this time with even better efficiency. K4FAI left Sumter and operated all night from Windy Hill, maintaining contact with K4ANI. W4ULH again took his mobile to Myrtle Beach, and K4CDE moved a portable rig to that location. K4ADO operated fixed and mobile at Myrtle Beach on August 15th. *W4s* TPE VPN RCR TWW, K4ADD and W6ZOP, all mobiles, provided contacts with isolated towns. Coöperation of amateurs near the frequency made FCC clearance unnecessary. As the storm passed the 30th parallel, W4VSX, the station of the Charleston Shipyard Radio Club, took over NCS. Mobile operators were not put on watch (they were needed for other uses), making a shortage of operators at control. Operating this station were *W4s* ZRH TPE DOW VPN USW and W1AUD/4. The following were dispatched to McClellanville to provide contact with Charleston: *W4s* VPN TPE, K4ADD — all Charleston mobiles. Other mobiles were dispatched to Myrtle Beach and Windy Hill. W4FFH submitted a complete report similar to the above, but supplementing it with a list of over 200 calls of amateurs who participated. He mentions these as outstanding during Connie and Diane: *W4s* HDR DXW GIF COA RCR GQV ULH GQO UJR FFH; *K4s* ADO FAI. Logged during Connie were: *W4s* ADC AID AUL BAR BEQ BHJ BMV BNN BUJ BXG BYF BZX CCG CEG CHD COA CRF CXJ DIU DQX DRU DUR DVE DVQ DVR DX DXW DYG DYP EAI EAR EC EDQ EJC EJF EJV ELW ERG FBP FFH FM FQP FUS FVV GCB GCV GEO GIF GLH GLU GQO GQV GTF HAP HCZ HDR HGW HH HHO HLN HME HMG HOD HOZ HRC IGB ILQ IZD JCP KED KKC KTI KUE LEV MPR MTW MZF NJG NQP NTD NTO NTW NUN OAK OCS OMP OQQ OSC OSJ PG RAG RCR RPD SBR SEC SOD SOF SRZ STH SVD SWR SYN SZG TDJ TJA TOW TPE TSU TTG TUN TWW TYS UFP UJR ULH UOQ VJI VLE VNK VOH WIQ WP WS WYM YAA YGY YMV YOS ZER ZGP ZIZ ZJ ZKE ZPB ZPE; *K4s* ADO ALM ALN ANI AOG AVU AXQ BBW BEG BFC BFY CTX CUE ECH EKG FAI FDA FDC FDT KKC MCJ NCH NCW QCC SOI USN WCZ WDF WEE. Most of these were also logged in Diane, but the following additional also reported: *W4s* BJD BUJ BXP CAU CKQ CRF DBU ECH EGI EYH HOO HQN HWZ LLH LOV LWU MZX NTQ OJM RJI SMA TFL TFU TFZ TQC TUN UMW VOJ VTP YKK YMB ZKE ZQS; K4NAW; W1BYA/4; W2KGO. South Carolina amateurs received a message of appreciation (via W4ANK) from Governor Timmerman, and Rear Admiral Crawford, USN, Commandant of the Sixth Naval District, sent a letter of Commendation to the Charleston Naval Shipyard Amateur Radio Club for the work done by that group.

Regarding Connie and Diane in North Carolina, we have two sketchy reports. One is a clipping from Lumberton, N. C., indicating that EC W4SOD was on the job from his own station, along with W4NUN operating from a broadcast transmitter site, relaying emergency messages from coastal stations to base stations to the north and east. The other is a letter from W4ACY, president of the Greensboro Radio Club indicating that W4GNF, club station, served as NCS of a network of amateurs during the Connie and Diane visitations. All North Carolina amateurs were commended in a letter to the governor written by the N. C. Civil Defense Director. The Greensboro Club was also awarded a plaque "For a Job Well Done During Hurricanes Connie and Diane from the WCOG Party Line."

Virginia SCM W4KX indicates participation in Connie and Diane by Virginia amateurs. *W4s* YRU VYZ YVC/m and *K4s* CDA BGT and FDG were instrumental in handling Air Force traffic from an Air Force installation on the Virginia eastern shore to the Pentagon (K4AF). The problem was possible evacuation of the installation. The Virginia C.W. Net was active throughout Connie and Diane, with the following taking part: *W4s* YZC VQZ TCC YEN SVG BZE TYC AJJ WDZ NHX WC CEU BCI CZB; *K4s* DBC BUJ; *W3s* HXN WZL NRE; *K2s* IRM GAS EQP. The Roanoke Club station, W4CA, operated eight hours assisting both Virginia and N. C. emergency nets. Ops were *W4s* CKW CYK AYC OLD LNX KHE KQC KQE ZZV.

Toronto SEC VE3KM reports that Connie stirred up quite a ruckus in his section, creating a northeast blow down Lake Ontario and tearing huge gaps on the shoreline, washing out houses and cottages along a two mile stretch. One control and one mobile station were put into action immediately at Stony Creek, as requested by the Red Cross. Later, three mobiles were on hand, and Red Cross started to send messages for blankets, clothing, etc. The ten meter net was then alerted, but, as it happened, was not needed. Meanwhile, in Toronto, the Civil Defense Net on 3765 kc. was on alert from 1700 to 2310 on August 13th. A two-meter net was also set up for communications between Toronto, St. Catharines, Hamilton, Kitchener and Niagara Falls. The following *VE3s* participated: AIB AEJ

NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc.)

C.W.		*'PHONE*	
3550	14,050	3875	14,225
7100	21,050	7250	21,400
	28,100		29,640

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be *vacated immediately* to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060; *'phone* — 3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

These frequencies are generally employed by amateurs using radioteletype in the United States.

APU ATK AGJ BJI BUT BXF BQT BLQ BOY BTI BLT BOW BNQ CMP CC CJ DN DTO DZA DFP DQN DPQ DQX DR DSM DHK DC DUU DLS DFE DJE DHQ DDB DRI EAB EAO HZ IA KM NI NO NG RG SO TA XD.

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Ione came along a couple of weeks later. In South Carolina, FCC again cleared 3790-3810 kc. at the request of W4ZRH as the Coastal Emergency Net swung into action. Later the NCS in Norfolk decided to abandon these frequencies and operate on the Virginia frequency, so FCC was advised to cancel the clearance. Once again public officials, including the governor, the Commandant of the Sixth Naval District, the FCC, the Red Cross, Civil Defense, Weather Bureau and commanding general, Sixth Army, were lavish in their praise of the amateur.

In Norfolk, a well-planned setup went into action at 2000 on Sept. 18th. W4OGX (Asst. EC for Weather Bureau) with W4RDI and W4PDF set up portable at the weather station, with emergency power. *W4s* DHZ INJ and K6ITL established net control on 75 and 10 meters at C.D. Headquarters. These stations supplied up-to-the-minute data on the approaching storm. The local 10-meter net was alerted at 0600 Monday, Sept. 19th. Mobiles were assigned to Red Cross shelters, Hospitals, Power Companies, Public Works, and patrol duty. By 2100 that night, relief was being provided for amateur operators if they so desired, but many of them remained on duty. Amateur Radio was the only means of communication left. Not until 0300 Tuesday was the net closed down. EC W4PAK lists the following as having taken part: *W4s* CJZ CKT DHZ DUZ EFO FOD HPC HSW IKZ IND INJ IPA JMB JSR KDN KWY LCW MAY MLD NIP NV OGX OM OYL PAK PDF PMF PWG PWX RDI RGZ SFA SYO TCC TEL TVG ULL VAE VAH VVP WIM YVG ZCY ZKA; *K4s* AHL ASU BGK; *KN4s* AWK BRD DTB; W2WAX/4; K6ITL/4.

The Virginia C.W. Net was activated by W4CZB at 1600 on Sept. 19th, and liaison immediately effected with the Virginia Phone Net. W3NRE established liaison with 3RN. The net continued until 0100 in full-scale operation. NCS were *W4s* CZB AJJ WYC and K4DBC. Stations active in the net included *W4s* PNK CXQ BLR KFC KX PHL IA WYC BZE TYC SHJ SPE/4 IHN; K4CZB; *W3s* WZL NHG COK ULI NRE; W2ANG, K2EQP.

3RN operated on an emergency basis during Ione. The net convened at 1830 and broke up at 2200. The following stations took part in this emergency operation: *W3s* COK CUL GEG GQF HXN IYE MCG NOK NRE ONB UOE WG WZL YVX YYC ZGN; W2SQU; K2CQP; W4FOA.

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August SEC reports were received from the SECs of Wash., Western N. Y., Western Fla., NYC-LI, Eastern Fla., Alabama, San Joaquin Valley, Wisconsin, Colorado, Los Angeles, Vermont, Montana, Oregon, Santa Clara Valley. The last-named is a new reporter for 1955, bringing our total to 28 sections heard from this year. AREC members represented by these reports number 5,340. How about it? Does *your* EC report to your SEC?

We regret the omission of Alabama from the list of sections having a 100% SEC reporting record (Oct. *QST*).

RACES News

During the late lamented SET, you may have heard a station signing W8UTQ representing FCDA Headquarters in Battle Creek. This station was set up in the FCDA Headquarters Building, using a kilowatt transmitter (but a rather inefficient antenna, W8LBM states sadly), and was operated by *W4s* LBM UTQ DUA and W1AVN. It is hoped that the station will be set up for regular operation in the near future by FCDA staff members who are amateurs. We'll keep you informed.

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It seems that Los Angeles' extensive RACES organization also participated in "Operation Alert 1955." We're sorry this wasn't received in time to make the writeup in September *QST* (only missed it by two months, hi), but here's the dope: The simulated disaster in LA demolished both city and State Region 9 controls. The city control was thus established at Van Nuys and operated in conjunction with the regional control at that point. The Regional Radio Control was located on a hilltop in the Santa Monica mountains, communications with the regional control center being by teletype and telephone. A post-test survey by SEC W6QJW reveals some interesting statistics. There were 895 operators on duty, 530 of whom were RACES certified, at 475 RACES-authorized stations. Eighty-one nets were in operation, and 580 stations, using 85 emergency power plants. The message total handled by RACES was 914. Stations operating in the Disaster and Special Emergency services were also primarily manned by amateurs. W6QJW estimates 30% of traffic was handled by RACES Stations.

TRAFFIC TOPICS

In preparing this copy, we're just on the eve of departure on a two-weeks-field trip which will include the Midwest Division ARRL Convention, at which many interesting pow-wows on the subject of traffic work have been promised. Once before (at San Jose, Calif., in the summer of 1954) we attended a convention at which traffic work was a major subject of discussion. And it just occurs to us that these conventions are wonderfully suited to our getting together for some traffic-man to traffic-man discussions in which personal acquaintances can be made, differences resolved, plans for the future worked out, and a better *esprit de corps* injected into our traffic work — which has a habit, sometimes, of becoming pretty impersonal. It's always good to know the other fellow personally.

What do you say we traffic men make a bigger attempt to attend these amateur gatherings? Not only will it help accomplish the above objectives, but it will establish traffic handling more emphatically as a phase of amateur radio. We're getting tired of having conventions and hamfests monopolized by DX men, v.h.f. zealots and casual ragchewers. Let's get in there and show the amateur world that we traffic men have a following, too!

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The Early Bird *Net* traffic count for September was 306. The net now has a Certificate of Merit to any amateur who renders outstanding service to the net in any capacity.

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National Traffic System. This copy had to go to bed on October 15th on the nose. Any reports not received up to that time just won't make it. We mention this because usually we're two or three days late and can accommodate slightly late reports. But take our advice, don't count on it. The Managing Editor is a harrrrd man!

Conditions seem a little better so far this year, don't you think? At least we haven't had any 80-meter evenings yet when all local signals are inaudible, while those over a thousand miles away come booming in. Oh, we'll have some, never fear. But the sunspots are on the upgrade, and we're looking forward to a heyday for traffic work, and particularly for NTS. With more stable conditions, we'll be able to observe something a little closer to the original NTS plan. What is it? Drop us a line and we'll send you a copy.

September reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation*
EAN	22	646	0.98	24.8	93.9%
CAN	22	871	0.54	39.6	100%
1RN	26	269	0.53	10.3	90.7%
2RN	26	244	0.83	9.4	97.4%
3RN	41	180	0.31	4.4	92.3%
4RN	20	75	0.25	5	32.1%
RN5	44	601	1.00	13.7	62%
RN6	27	221	0.47	8.4	33.7%
RN7	52	263	——	5.1	29.7%
9RN	26	658	0.92	25.2	100%
TEN	68	1316	——	19.4	64.9%
TRN	18	47	0.39	2.6	59.3%
Sections*	367	1987			
TCC-EAN		74			
TCC-CAN		448			
TCC-PAN		272			
Total/Summary	759	8170	RN5	9.7	9RN/CAN
Record	759	8170	1.20	15.4	100%

*Section nets reporting: W8N (Wash.); AENB, AENP and AENT (Ala.); QKS, QKS-88 & QKN (Kans.); KYN (Ky.); NTX (N. Texas); WVN (W. Va.); MON (Mo.); CVN (Calif.); M8N Fone & M8N C.W. (Minn.); N. Dak. Fone & N. Dak. C.W.

Note that we've broken some September records. Nice going, gang. Things continue to look up on NTS.

W9DO has taken over the CAN managership from W9JUJ and has gone right to work. Take a look at that first CAN report. Maine had the only perfect attendance on 1RN; 49 different stations participated. Early sessions of 2RN have been discontinued because of lack of interest;

the net now has only one session, at 1945 EST. 3RN had an extra session in connection with Hurricane Ione. W4OGG reports that RN5 is going smoothly, but he'd like to see some section net activity in Louisiana and Mississippi. RN6 needs some representation from Nevada, Arizona, Utah, Colo. and New Mexico. Washington, Oregon and British Columbia are the only sections well represented on RN7; how about that, you northwesterners? The 9RN report showed excellent progress, with all sections represented 100%. WØMVJ had to resign from TEN temporarily, but WØDQL is filling in for him until a replacement can be found.

Here's the PAN-TCC roster, as WØKQD takes over the directorship from W6HC: *W6s* ADB BDF/7 BPT VZT IPW; *W7s* KZ CCL; *W0s* KQD KØWBB K4AQQ/6. The CAN-TCC roster consists of WØBDR, WØSCA and W9CXY; WØSCA has taken the managership reins from W9JUJ. We hope to have a complete EAN-TCC roster in the very near future. W2ZRC is a recent EAN-TCC acquisition, and with his new kilowatt he should be valuable.

Now that conditions are ripening, anyone interested in transcontinental traffic handling on an organized basis should contact W8UPB (Eastern Time Zone, except Ind., Ky., Tenn.), WØSCA (Central Time Zone) or WØKQD (Mountain & Pacific Time Zones).

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for September traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3WIQ	230	477	625	30	1362
W9DO	81	550	584	47	1262
W3WG	6	601	599	2	1208
W2KEB	50	538	445	113	1146
WØSCA	12	558	549	16	1135
W4PFC	10	546	520	10	1086
W3CUL	97	492	368	76	1033
WØBDR	37	508	425	7	977
W2KFV	24	401	447	34	906
W7PGY	45	388	355	31	819
W7BA	17	391	368	21	797
W5DTA/5	4	359	363	17	743
W9TT	11	300	401	0	712
W9NZZ	192	245	0	243	680
WØCPL	5	303	275	28	611
W9CXY	11	293	256	33	593
WØGBJ	13	275	203	67	558
W9WRO	7	272	263	6	548
WØKQD	35	271	240	2	548
W9UQP	11	288	195	20	514
W9EHZ	32	226	225	27	510
WØGAR	10	244	247	7	508
K6HOV	5	250	148	102	505
W7VAZ	20	242	198	44	504
Late Reports:					
W3WG (Aug.)	14	596	596	4	1210
K6FCY (Aug.)	283	323	0	18	624
W3WZL (Aug.)	44	219	248	12	523

More-Than-One-Operator Stations

W6YDK	36	1681	1424	181	3322
W6IAB	30	1034	868	166	2098
KH6AJF	421	600	522	81	1624
K4FED	16	622	604	18	1260
W9JP/9	1058	2	0	0	1060
K5FFB	30	435	461	24	950
KH6QU	21	341	251	88	701
W1USA	36	331	321	10	698
K2ATR	34	202	440	16	692
KØWBB	63	302	261	33	659
K4WAR	28	278	233	45	584
K5FFA	10	250	247	23	530
Late Reports:					
W6IAB (Aug.)	28	918	857	61	1864
W4LEV (Aug.)	33	46	423	436	938
K4WAR (Aug.)	24	291	278	13	606

BPL for 100 or more *originations-plus deliveries:*

W8JYJ 221	W4OCG 105	Late Reports:	
W7AHV 156	W4DDY 102	W3CVE (Aug.) 165	
WØNIY 115	KP6AK 100	W1UKR (Aug.) 158	
W4HDR 114		K3WBJ (Aug.) 144	

More-Than-One-Operator Stations

WØPHM 149 W4ONV/34 105

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: KP4WT, VO6AH

The BPL is open to all amateurs in the United States, Canada, Cuba, and U. S. possessions who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month. All messages must be handled on amateur frequencies, within 48 hours of receipt, in standard ARRL form.

ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
Yukon *	Dec. 15, 1955	W. R. Williamson	Mar. 17, 1949
West Indies	Dec. 15, 1955	William Werner	Aug. 15, 1952
Utah	Dec. 15, 1955	Floyd L. Hinshaw	Feb. 18, 1954
W. Florida	Dec. 15, 1955	Edward J. Collins	Oct. 15, 1955
Quebec *	Dec. 15, 1955	Gordon A. Lynn	Dec. 15, 1955
Virginia	Dec. 15, 1955	John Carl Morgan	Feb. 11, 1956
Oklahoma	Dec. 15, 1955	Dr. Will G. Crandall	Feb. 15, 1956
Maritime *	Dec. 15, 1955	Douglas C. Johnson	Feb. 15, 1956
Georgia	Jan. 16, 1956	George W. Parker	Mar. 18, 1956
Arizona	Feb. 15, 1956	Albert H. Steinbrecher	Apr. 15, 1956
Tennessee	Feb. 15, 1956	Harry C. Simpson	Apr. 15, 1956
Connecticut	Feb. 15, 1956	Milton E. Chaffee	Apr. 15, 1956
Washington	Feb. 15, 1956	V. S. Gish	Apr. 15, 1956
Alberta *	Feb. 15, 1956	Sydney T. Jones	May 1, 1956
Louisiana	Mar. 15, 1956	Thomas J. Morgavi	May 31, 1956

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid, petitions must be filed with him on or before closing dates named.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Western New York	Edward G. Graf, W2SJV	Nov. 21, 1955
Alabama	Joe A. Shannon, W4MI	Dec. 14, 1955
East Bay	Roger L. Wixson, W6FDJ	Oct. 14, 1955

In the Indiana Section of the Central Division, Mr. Seth L. Baker, W9NTA, and Mr. Gilbert L. Himmelheber, W9JBQ, were nominated. Mr. Baker received 304 votes and Mr. Himmelheber received 112 votes. Mr. Baker's term of office began Oct. 14, 1955.

In the Northern Texas Section of the West Gulf Division, Mr. Cecil C. Cammack, W5RRM, and Mr. E. C. Pool, W5NFO, were nominated. Mr. Cammack received 341 votes and Mr. Pool received 161 votes. Mr. Cammack's term of office began Oct. 15, 1955.

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Clarence Snyder, W3PYF — SEC: NNT. RM: AXA. PAM: TEJ. Pa. Nets: 3610 and 3850 kc. GCW is new Adams County EC. SSU has been reinstated as Bucks County EC and LCL now is taking over for Lehigh County. NNT, the SEC, is on a speaking tour telling of his experiences in the August floods. EM is Bucks County Radio Officer. AMC is director of communications for Palmerton. His son, BNR, is assistant. ABT, the U. of P. ARC, is on the air again. NNT asks all applicants for EC appointment to contact him as soon as possible. IVM has the new portable rig completed for 2 meters running 150 watts for the v.h.f. part. BHC has a new 10-meter mobile. The Delaware-Lehigh ARC will begin on-the-air code classes under ZBE. MAC is back on the air with new B&W 5100 and 75A-4 receiver purchased through the contributions of local people and amateurs throughout the East. Lew lost all his equipment during the August floods. DHJ is a new OBS and will carry ARRL Official Bulletins on 3850 kc. at 1745 and on 28,888 kc. at 2145 Mon. through Fri. The Hilltop Transmitting Assn. of Red Lion reports new officers are QOL, pres.; GES, vice-pres.; WGO, secy.; ZPJ, asst. secy.; VVK, treas.; VXI, asst. treas. The Club is sporting a club station, ZGD, with a pair of 813s built by QOL. BHC has been appointed Radio Officer for Northumberland County. EU now is president at GH. YDX has plans for a new 20-meter beam. SMC and LJ are sharing air time at YDX. GIY is a new OPS. ZOM is the new EC for Northampton County. QBF is doing a terrific job in operating the station at the Bethlehem Red Cross Chapter House. GJA headed a group of Lancaster Radio Transmitter Society amateurs in the recent disaster test held in Quarryville. VBI and YGX will conduct license tests for Novices and TEJ was speaker at the Lancaster group meeting in September. CUL reports good APO outlets again reaching Europe the same day as deliveries. AXA reports the EPA C.W. Net is in fine shape and running like a top. AXA has a new 813 rig in the building stages. The West Philadelphia Radio Assn. is now publishing a bulletin called *Flash* for its members. OWK and UQV are working on a radio-controlled model cruiser for exhibit at the Almo Convention in January. The North Penn ARC is starting a 40-meter c.w. WAS Contest for its members. AEQ, the Lehigh University Radio Club station, is back on the air. Traffic: W3CUL 1033, YVX 183, YDX 143, WUE 130, TEJ 120, OK 116, DHJ 78, WKX 40, ELI 39, AXA 30, BNR 19, NOK 18, PVY 14, ZRQ 14, PYF 13, QLZ 12, OGD 4, EAN 3, YYT 3, ADE 2, DPC 2, ZOM 2, BBX 1, SMF/3 1.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, John W. Gore, W3PRL — The St. Mary's County AREC, under the direction of BUD, participated in the St. Mary's County Fair held Sept. 23–25th at Leonardtown. A 10 × 14-ft. tent with a 12 × 16-ft. tarp covering the porch and a 2½ × 3½-ft. sign explaining the AREC describes the "shack." An 800-watt 115-volt, 60-cycle gas-generator supplied the power; a 2-meter transmitter and two 2-meter receivers and a four-element horizontal yagi constituted the equipment. BUD, BCP, and YRI manned the "tent." PPY, at Lexington Park, assisted in relaying the traffic from the "tent." ECP has been appointed EC for the Washington, D. C., Area; IZL, EC for Prince Georges County; FVK, EC for Carroll County; NAE, EC for Anne Arundel County; RXS, EC for Wicomico County; UCR, EC for Harford County; UNV, EC for Garrett County; VVP, EC for Talbot County; VZZ, EC for Cecil County; and VLL, EC for Baltimore City. Amateurs in the above areas should contact your EC for AREC application blanks. On Sept. 16th a Washington group provided all the communications and handled all the traffic necessary in the arrangements incidental to the opening day of a 3-day event, "The President's Cup Regatta," boat races on the Potomac River at Washington. Communications were handled on 2 meters, with transmitters located at the two yacht clubs, the barge, reviewing stand, police boat, and one each on 3 yachts. Participating under the chairmanship of FNU were UNP, OBR, YAG, RXK, FWP, PZK, TYJ, WZN, PWB, and CZT. The Naval Research Laboratory Amateur Radio Club has become affiliated with the ARRL. The Washington Mobile Club held a hidden transmitter hunt on Sept. 18th. First prize was won by NUT and second prize by NJF. The Club also participated for the 6th time in the Washington Cerebral Palsy Telethon by collecting funds with mobile units as directed by Hq. VOS has forwarded cards for DXCC. The Washington Radio Club held its meeting Sept. 2nd. WN3DCO won a hand set as door prize. CDQ is president. It was decided that the Club again this year set up classes for the training of new amateurs. Those in the area should not hesitate to volunteer for service in this undertaking. The Club meets the 1st & 3rd Fri. of the month at the D. C. Chapter, Red Cross Bldg., 21st & E. St., N. W. KAN heads the Washington, D. C., TVI Committee. Harry Rutstern gave a talk on "What Your Signals Look Like" by demonstration with Spectrum Analyzers at the CARC on Sept. 12th. At the Sept. 26th meeting the CARC presented a "Question and Answer Session." Since putting up his 10-meter beam, YYB has discovered that there are countries other than the U. S. A. YZI's new QTH will have a built-in rotary beam support, 100 per cent shielded room for the "shack," special circuits for his shack for miscellaneous equipment, and proposed 1-kw. transmitter. LUV has been heard breaking out on s.s.b. with his new Viking transmitter. OMN also was operating his linear final on s.s.b. JZY has been working DX on 15 meters. BKE has a new DX-100. CVE is NCS for TCRN and in emergencies has set up the net so that under semi-alert members meet on 7042 kc. on the hour, and under full alert 7042 kc. is monitored continuously. This net in emergencies ties in directly with the Weather Bureau for interchange of up-to-the-minute conditions for the net and Red Cross. Red Cross has complimented TCRN on the grand job they have been doing. PRL, the SCM, and PKC, the SEC, visited the Antietam Radio Assn. at Hagerstown on Sept. 6th. During the week of Sept. 19–24 the ARA had a "Message Center" in operation at the Great Hagerstown Fair. The club call, CWC, was used during the operation and considerable traffic was handled. Among those ARA members participating during the last emergency were OYX, TJV, and YRK. Traffic: (Sept.) W3WG 1208, WV 327, WZL 176, CVE 114, UCR 88, PRL 51, CDI 36, ECP 27, PKC 20, JZY 12, NNX 12, RV 9, OYX 8, BKE 4, FY 4, PQ 2. (Aug.) W3WG 1210, WZL 523, K3WBJ 372, W3CVE 342, UCR 149, BUD 121, COK 68.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — SEC: W2ZVW, PAM: ZI. UAE has been appointed OPS and a Section Net certificate has been issued to K2EFA in Millville. ZI has just returned from a trip to the Northwest and Canada. During the Delaware River flood emergency the following stations took part in traffic work: K2GMW, ETG, W2QJO, LST, LQL, KYF, NHJ, SUG, JWN, CBT, HKY, CCS, and 3PYF. All did a swell job and are to be commended for their work. During the Hurricane Ione emergency many of the above stations were on hand, as well as the following stations: W2DZU, HIA, ZVW, 3WQL, K2AQI, GEB, IUC, BGQ, and BHQ. An exceptionally fine job was done by our SEC, ZVW, in the Phillipsburg-Easton Area during the flood. The RACES personnel also was called to active duty during the "Ione" alert. In the Delance, Riverton, and Palmyra Area and extending south to Camden the RACES and AREC operators did a very fine job. K2HQL, Riverside, is with the USAF in France and expects to return home soon. The Jersey 'Phone Net now is in session Mon. through Sat. at 6 P.M. and Sun. at 9 A.M. on 3900 kc. K2CPR participated in the WAE Test, the VE/W Contest, and the Sept. F.M.T. UAE is moving to a new QTH. Look for the 50-Mc. round table at 8:30 P.M. Mon. K2PDM is a new ham in West Trenton. HBE, Westmont, ex-W9YRQ, expects to have a new 100-watter on the air soon. We hope to have new ECs for the Southern counties very soon. With their help it is hoped that mobile and emergency operation will be coördinated so that more efficient use of our facilities will result. Traffic: W2RG 161, YRW 85, K2HZR 67, JKC 32, W2ZVW 26, ZI 21, ASG 6, K2CPR 4.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTB. SEC: UTH/FRL. RMs: RUF and ZRC. PAMs: TEP and NAI. NYS C.W. meets on 3615 kc. at 6:00 P.M.; ESS on 3590 kc. at 6:00 P.M.; NYS 'Phone on 3925 kc. at 6:00 P.M.; TAR on 3720 kc. at 4:00 P.M.; NYS C.D. on 3509.5 and 3993 kc. at 9:00 A.M. Sun.; TCPN 2nd Call Area on 3970 kc. at 7 P.M.; SRPN on 3970 kc. at 10:00 A.M.; ISN on 3980 kc. at

This Christmas Season

as we reflect upon the many good things that have come to us, I feel a special warmth in connection with the 10th Anniversary of the American Radio Relay League. . . . It was just about 10 years ago that I received my first ham license.

Like the League, Hallicrafters has dedicated itself to a creed "of, by and for the amateur." Congratulations and thanks to the A.R.R.L. for its untiring efforts on behalf of radio and the radio amateur.

Merry Christmas to Hams Throughout the World

— Bill Halligan, W9AC

3:00 P.M. 147.5 Mc. has been selected for RTTY activity in the Niagara Frontier Area. ALR keeps nightly schedules with 8RMH and TKO on 2-meter RTTY. K2CUQ is doing FB with the Viking Ranger. ALR, ZOC, and TKO gave a talk and a demonstration of 2-meter RTTY to the ARATS. ORI gave an interesting talk on v.h.f. at the RAWNY meeting. MZ is doing FB handling traffic for TCPN. FEU had a bad fire in his new home. The Oswego Ham Club Picnic was held at Selkirk Pk. The first fall meeting of RAGS saw the "General Electric House of Magic." BTB has been appointed chairman of the United States Public Relations Committee of U.S. C.D. ARS. Appointees: K2DJN, K2DYB, W2GBX, and K2AMZ, as OPS; K2LRN as OES; K2KIR, K2DVC, K2GIG, and W2BKC as OO. Renewals: AQY, PYC, CLX, and FE as EC; K2DYB as ORS; RQF as OPS. Net certificates were issued to K2IYP and PYC. ALL, UXP, UTH, and K2CEH attended the W.N.Y.-Southern Ont. V.H.F. "Do" at Oakville. K2EVP's XYL presented him with a baby girl. K2JUN, of Ithaca, passed the Gen. Class exam. *Special Note:* The Empire Slow Speed (ESS) Net meets on 3590 kc. at 6:00 P.M. daily, with K2DYB as net manager. The Morning Net on NYS has been discontinued as HVZ is going to college. The former NYSS has been discontinued as K2CLA shipped to Formosa. The Bell Telephone Co. put on a demonstration of Microwave at the Oneida Hamfest. Congrats to RXW on the usual good show. 1SS spoke about "Old Timers." K2KNN can be heard from the Naval Air Station at Norfolk as K4MC. The RARA V.H.F. group met at the antenna farm of UTH. K2KOL dropped the "N" and is on with a Ranger. K2HVZ is at Cornell U. and is heard from W2CXM. OZY, Clinton Co. RO, has received 3 Gonset Communicators as an initial issue for network equipment. NIZ has worked Albany on 2 meters. The antenna of K2BGK on 2 meters is atop a 60-ft. pole working FB. K2HJC has new Globe King fixed and Elmac for mobile. BTB visited ZGT. OZY gives Novice exams in Clinton Co. QWA is modifying antennas. BDB has an 829 at 100 watts on 2 meters and a 348 receiver with converter. K2GWN is using a Globe Scout to drive the final to 400 watts. UAD is back on 2 meters. CTA, UXP, ALL, and K2INO are mobile on 2 meters. ZI was a visitor at the RARA meeting. UTH, QCN and CE are on s.s.b. K2s MAJ and CBJ have DX-100 transmitters. WTO and DOD have new antenna farms. MSJ has been appointed secretary of the Sidney Club to fill the vacancy left by K2JZT. The RAGS has very interesting programs lined up for the current season. They are a must at Niagara Mohawk Pwr. Co., 300 Erie Blvd. OZR spoke on "Lightning" at a meeting. K2AHH has a final of 4-250As, modulated with 849s. Traffic: W2RUF 233, ZRC 204, K2LSF 188, DYH 82, W2OE 54, K2DSR 29, W2RUT 23, K2GWN 18, W2FEB 16, BKC 12, K2DG 9, CUQ 4, W2RJJ 4, ZHU 3.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — SEC GEG. RMs: UHN, NUG, NRE, and GEG. PAMs: AER and LXE. The Breeze Shooters Net, via UJP, reports. RSB reminds all to apply for license plate forms. TDC is being transferred, so BSN loses a windgauger. QYF, SIR, BEX, PII, NCP, VYK, and VEK were among 20 in a caravan attending the Akron Hamfest. TTR compiled and PC had new directories made for the club. SIR has a new R-90 Harvey Wells. EUL is working on a 304TL final and two beams. KPS is going fixed. The Allegheny-Kiski ARA recently had Director Crossley as a speaker at a meeting. Installation of the club station has been completed and RVC will be more active from now on. The club also demonstrated how amateur radio operates to four area scout troops during October. The Bucktail ARC, Emporium, reports a successful Field Day. ZKY reports into the BAR Net on 10 meters. BEQ is a new Technician. RMX vacationed in Iowa and says mobile on 40 meters was best. PTU was mobile on 40 and 80 meters during his vacation. IIX and TYC report excellent results with 20 watts portable from the beach where they were vacationing. WII was mentioned in connection with flood traffic he handled in August. The Steel City ARC station, KWH, now has sixteen-element 2-meter, three-element 6-meter beams up on the tower and a new 2-meter converter. The Indiana County ARC is now an ARRL affiliate. Mobiles QON and YVC and fixed YOK furnished communications at the air show. YCG gave information on 2 meters to the club, which is interested in that activity. Sorry to report the death of TAP, of Kittanning. The Washington County ARC had several members visit with SUK and QSO with W8IJG on 50 and 220 Mc. The Radio Association of Erie again is sponsoring code and theory classes at the YMCA Tue. at 7 P.M. During the CAP air show traffic was handled by NXK, YKE, BFB, STK, NRL, and TMK. ZNY is now a full-fledged General Class licensee, as is BVM. A new Novice call is WN3BQE. Hams aiding CAP at a plane crash recently were LKJ, BFB, NXK, YKE, and STK. BOW is on 10 meters. AQY is operating mobile. PIY, OIE, KVB, OIH, KKJ, QPP, VNC, YWL, and QMY are often heard on 10 meters. Traffic: (Sept.) W3WIQ 1362, NRE 56, YA 47, UHN 30, ZEG 25, SIJ 20, ZEW 18, KNQ 10, GJY 3, DPC 2, LOD 1, VKD 1. (Aug.) W3YUL 77, YA 35.

CENTRAL DIVISION

ILLINOIS — SCM, George T. Schreiber, W9YIX — SEC: HOA. RMs: BUK and MRQ. PAM: UQT. Cook County EC: HPG. Section Nets: ILN c.w., 3515 kc.; IEN 'phone, 3940 kc. DO is the new manager of the Central Area Net. He also was honored at the annual banquet of the Joliet Amateur Radio Society as the club's amateur of the year, and was presented with a gold-plated bug in recognition of the traffic he has handled. The first annual award of the club's "Roger Wilso" trophy went to YYG for turning in for the club the highest number of points for an operating position in Field Day activities. New officers of the Chicago Radio Traffic Assn. are HPG, ARF, KLH, and UKY. SES was cited by the Chicago fire department and the c.d. people for his assistance to the fire fighters at the big blaze in Whiting, Ind. UDL is the only girl radio operator in Joliet. Lightning struck the antennas of AMA, PVD, and UZ but damage was at a minimum. YAC corrects us, saying he *did* deliver a Field Day message from AP/9 and FVD and turned in one from SW/9, the CSRA. BUK got all the plate volts through his arms but the shock threw him away from the transmitter. EHS now is completely portable and has fun trying to beat his own time from auto to complete field installation. UIN completed 20 years on the air and celebrated by starting his code lessons Sept. 10th. CSW reports the North Central Net handled 305 messages in August. New Novice calls heard are KN9AXS, the XYL of VEY, EUW, KN9BBD, KN9BBA, KN9BCY, KN9BBG and KN9BCI, the last five grads of a class of 35 conducted by the Central Area Radio Club. New General Class licensees are OUS, VNI, NAX, and VJR, and KLD is Extra Class. ASK received his 20-w.p.m. code endorsement sticker. The St. Clair Amateur Radio Club held a swap session after its monthly meeting. BA deplores the fact that the XYL has decreed no holes in the new buggy for three months, hence no mobile. EET renewed his OO appointment. Congrats to VSW, who got himself an XYL and a job in the Army at the same time. YLU has applied for a renewal of his XE5PD license and plans to operate from XE-Land in December. EU is the new DX Century president for 1956. PGW transferred the mobile rig to a new car and the next day took off for a Florida vacation. OAV is back on 20 meters after a long layoff and is being given a run for the DX by DEI, who has a new 400-watt job. JCX, a YL, is now in the high speed code class and operates 40 meters daily. DPY has a new RTTY rig and recommends it to PEB, who still is fighting modulator troubles. NN buried 34 radials under his V-72 vertical and the DX results he reports are most pleasing. The first annual RTTY meeting was held Oct. 2nd with more than fifty operators in attendance, reports BGC. The Knox-Warren Radio Assn. furnished communications for the auxiliary police on Halloween, reports VSX. GDI has received several nice thank-you notes from fellow hams he has helped to avoid FCC citations. New officers of the YLRL Illinois Chapter are RPC, YJC, MXI, STR, GME, and Dorothy Galitz. New ARRL affiliated clubs are the Swani Amateur Radio Club and the Radio Amateur Megacycle Society. HKA spent two months on a vacation in Michigan where he did well with his 100-watt mobile. OUS is a new OES. LCH teaches school and VYH is his community's leading dental surgeon. DDP is building a new home and has made plenty of provision for proper antennas. OCB did some work on his antenna with pleasing results. IDA is going great guns on s.s.b. DRN worked 98 stations in the V.H.F. Sweepstakes, on four v.h.f. bands. NIU is working to convert an old cab transmitter to 2 meters. FNX likes the results of his new standing-wave bridge. ITM and ALO, the southernmost active hams in W9 (Pulaski County) say they will send a certificate to amateurs who work them both and apply to ITM. Both are on 7-Mc. c.w. Traffic: (Sept.) W9DO 1262, CSW 177, K9USN 133, W9OR 129, EHS 105, YIX 86, FAW 85, SME 70, BUK 63, QQG 55, MRQ 48, CTZ 47, LL 27, SXL 27, CEE 26, STZ 23, CZB 18, LRV 18, BA 17, EHY 17, VSX 17, ICF 9, LXJ 9, FNX 4, VER 4, VEY 4, KLD 3. (Aug.) K9USN 41, W9LRV 26.

INDIANA— SCM, George H. Graue, W9BKJ — This being my last report as SCM I wish to thank each and every one who has contributed news items and traffic reports for this column and also the many club secretaries for their bulletins. It was a pleasure to serve and I regret I'm compelled to decline serving such a swell gang of hams. In the future send all your reports to S. Lew Baker, W9NTA, 276 West Sumner Ave., Martinsville, Ind., your newly-elected SCM. BPLs for the month are JP/9, TT, NZZ, WRO, EHZ and UQP. The new net manager and RM for QIN is UQP. The recently-appointed PAM is EQO. AYW is EC for Wells County. UXK is PAM for 160 meters. KG1AG and VE8PF visited NZZ. EAO/9 was in operation at the Jefferson JayCee Fair. RBX will attend Purdue U. YB has been quite active at Purdue the past several months. ALL is giving Novice Class exams. EEO has been appointed director of communication for Porter County. LGD operated mobile for 16 hours at a recent fire at Whiting. KDV and VNV are back from a three-month vacation

(*Continued on page 132*)

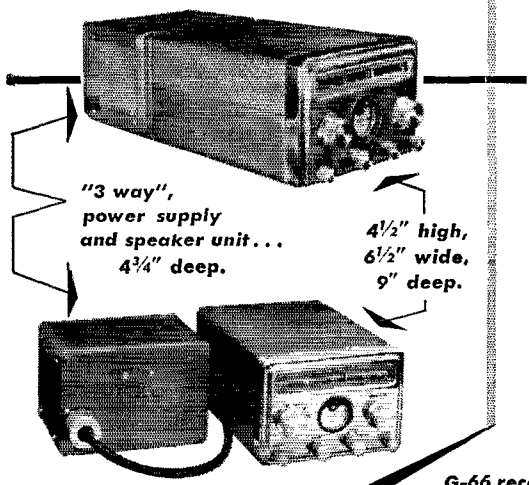
GONSET G-66

THE MOBILE RECEIVER with all the answers!

Now . . . one complete receiver gives you everything you can possibly want for superior mobile reception. Six bands, including standard broadcast . . . each amateur band individually calibrated, each spread across the easy-to-read slide rule dial scale. An important economic consideration lies in the fact that, while your present car may have a 6 volt battery, next year's car may have a 12 volt system. A separate "Three way" power supply takes care of this contingency, operates from 6 volts, 12 volts and . . . 115 volts AC! G-66 can also be removed from the car and put into operation on AC power mains. The performance of G-66 can be compared favorably to an excellent communications receiver, one that is equally effective with AC or DC power sources.

at your fingertips

Panel antenna trimmer—panel "S" meter—panel BFO pitch control—slide rule dial with rotating drum exposes only band in use—40:1 tuning ratio—automatic noise limiter—AVC.



all the answers

Provides outstanding operation on all reception modes . . . AM, CW, SSB with a new high order of stability for CW and SSB reception now made possible by stabilized HF and BF oscillators and by the use of a crystal controlled second conversion oscillator.

Double conversion, (2050 kc 1st I.F.) and double input tuning, (3 tuned circuits) on higher bands for very high image rejection.

265 kc 2nd I.F. with 8, high "Q" tuned circuits gives 3.5 kc bandwidth at 6 db down, together with steep "skirt" selectivity.

pertinent data

6 bands: 540-2000 kcs.—3500-4000 kcs.—7000-7300 kcs.—14-14.35 mcs.—21-21.45 mcs.—28-29.7 mcs.

8 tubes plus OB2 voltage regulator.

Front panel and chassis slip readily in and out of outer housing which may remain permanently mounted in the car.

"Three way" universal power supply and speaker unit attaches and plugs into rear of receiver as a cabinet extension. May also be mounted separately and connected with patch cable. Terminals are provided for external speaker, also for receiver muting.

G-66 receiver less power supply . . 169.50 net.

"3 way", (6V-12V-115V AC) universal power supply and speaker unit . . . . . 39.95 net.

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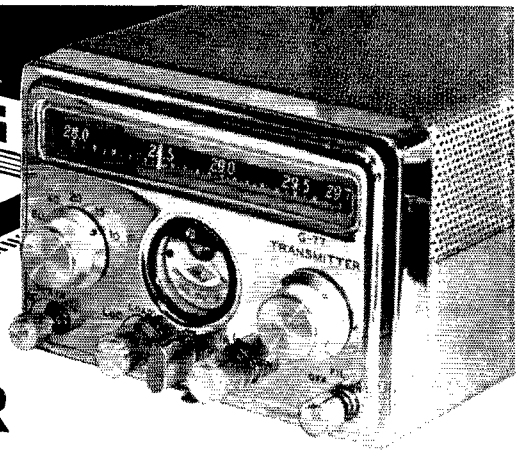
ANNOUNCING

G-77

MOBILE TRANSMITTER



Gonset announces the G-77, a completely new mobile transmitter, fully modern in design, forward-thinking in basic concept.

G-77 and the new Gonset G-66 receiver are companion units, identical in size and appearance. Both are sensible "Packages", take into account the fact that, in most cars, under-dash mounting space provides reasonable depth but limited width. The G-77 power supply/modulator unit is a separate unit, can be mounted in the trunk or other convenient area and connected to the transmitter by the patch cable/plug

G-77 has every desirable electrical feature: Calibrated, highly stable VFO provides precise frequency control on 80-40-20-15 and 10 meters. Crystal control is optional. Driver-multiplier stages are ganged with oscillator for single-knob exciter control. Grid drive to the final is maintained at a nearly constant value on all bands. Final amplifier is a type 6146 at 50-60 watts input, fully modulated. A pi network output circuit gives full control over amplifier loading—accommodates various input impedance values. A newly developed, highly effective and efficient modulator employs integral speech clipping. The audio driver section features high speech gain, making possible the use of PA-type dynamic, reluctance or ceramic crystal microphones. Panel meter reads grid and plate current of amplifier, modulator plate current.

The heavy-duty vibrator power supply incorporates features which ensure exceptionally low current drain on both standby and transmit. Provision is made for operation from 6 or 12V DC.

G-77 Transmitter Specifications

FREQUENCY RANGE: 80-40-20-15-10 meters . . .

FREQUENCY CONTROL: VFO or crystal. (switchable). Each band spread over most of dial. Drum dial exposes only band in use.

POWER INPUT: 50-60 watts, (Modulated). Provisions for CW also.

OUTPUT CIRCUIT: Pi network. Type 6146 tube.

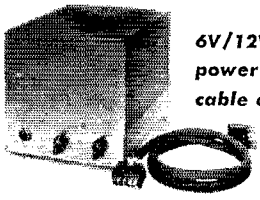
CONTROL SYSTEM: Full press-to-talk, built-in antenna relay. No heavy-duty DC relay required.

POWER SUPPLY: Heavy-duty vibrator, 6 and 12 volts DC operation. Output voltage 500-600 volts full load. Selenium rectifiers, (no standby drain). Half-voltage tap on doubler power supply avoids inefficient dropping resistors in stages requiring reduced voltages. Exceptionally low drain, both on transmit and on standby.

SIZE: Transmitter. 6½" wide, 4¼" high, 9" deep. Identical in size to G-66 receiver.

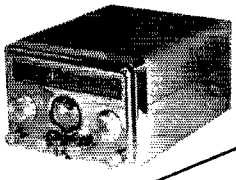
at your fingertips

Range switch . . . VFO tuning . . . Band-spread dial with 40:1 ratio exposes only band in use . . . Pi network input and load controls . . . VFO/crystal switch . . . Metering/VFO spot switch . . . Power ON-OFF . . .



6V/12V DC Heavy-duty power supply with cable and plugs

G-77 Transmitter



GONSET

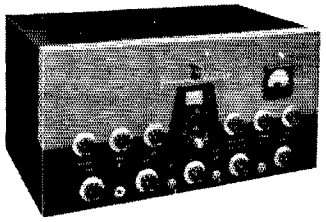
Available at your distributor early in 1956

GONSET CO. 801 SOUTH MAIN STREET, BURBANK, CALIF.

Best Buy Any Season!

JOHNSON AMATEUR EQUIPMENT

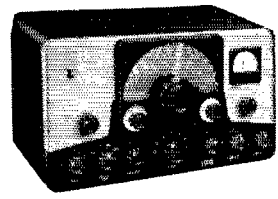
Designed and built by radio amateurs, Johnson Amateur Equipment is your best buy. Packed with features . . . this complete line of transmitting equipment and accessories reflects imaginative engineering as well as budget-conscious pricing. For detailed information on the products listed below or on other popular Johnson amateur products, write for your copy of Catalog 955 . . . yours on request.



VIKING II TRANSMITTER

180 watts CW input . . . 130 watts phone. Bandswitching on all amateur bands from 10 through 160 meters—effectively TVI suppressed—completely self-contained. Available as a kit or completely wired and tested.

Cat. No.		Amateur Net
240-102-1	Viking II Transmitter Kit, with tubes, less crystals, key, and mike	$279.50
240-102-2	Viking II Transmitter, wired and tested	337.00



VIKING "RANGER" TRANSMITTER

75 watts CW input . . . 65 watts phone. All amateur bands from 10 through 160 meters. TVI suppressed—built-in VFO or may be crystal controlled. Timed sequence (break-in) keying system. Available as a kit or completely wired and tested.

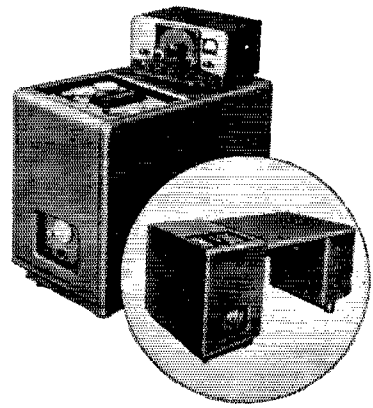
Cat. No.		Amateur Net
240-161-1	Viking "Ranger" Kit, with tubes, less crystals, key, and mike	$214.50
240-161-2	Viking "Ranger", wired and tested	293.00

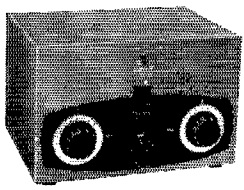
VIKING KILOWATT POWER AMPLIFIER

1000 watts AM, CW, or SSB. Boldly styled . . . contains every conceivable feature for safety, operating convenience, and peak performance.

Cat. No. 240-1000 Viking Kilowatt Power Amplifier—wired, tested, complete with tubes . . . . . **Amateur Net $1595.00**

Cat. No. 251-101-1 Matching Accessory Desk Top and three drawer pedestal . . . . . **FOB Corry, Pa. $123.50**

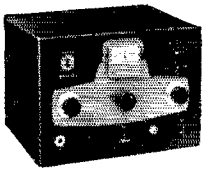




VIKING KILOWATT "MATCHBOX"

Bandswitching—completely self-contained. Covers 80 through 10 meter amateur bands. Fully shielded—performs transmission line matching and switching functions at the kilowatt level.

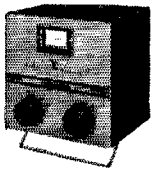
Cat. No. 250-30 Kilowatt "Matchbox", assembled, wired, and tested . . . . . **Amateur Net $124.50**



VIKING "ADVENTURER" CW KIT

Compact, completely self-contained 50 watt transmitter kit. Single knob bandswitching—effectively TVI suppressed. Easy assembly by novice or experienced amateur. 80, 40, 20, 15, and 11-10 meters.

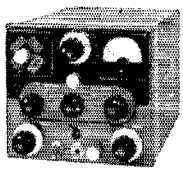
Cat. No. 240-181-1 Viking "Adventurer" Kit complete with tubes, less crystals and key.... **Amateur Net $54.95**



VIKING VFO KIT

Variable frequency oscillator with 160 and 40 meter output for frequency multiplying transmitters. Accurately calibrated 160 through 10 meters. Available as a kit or wired and tested.

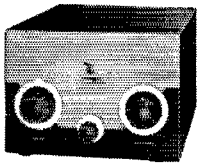
Cat. No.		Amateur Net
240-122-1	Viking VFO Kit, with tubes.....	$45.50
240-122-2	Viking VFO Kit, wired and tested..	69.75



VIKING MOBILE TRANSMITTER

Power-packed . . . rated 60 watts maximum PA input. Bandswitching 75, 40, 20, 15, and 11-10 meters. Under-dash mounting. Controls readily accessible. Available as a kit or wired and tested.

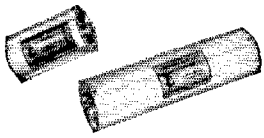
Cat. No.		Amateur Net
240-141-1	Viking Mobile Transmitter Kit, less tubes.....	$99.50
240-141-2	Viking Mobile Transmitter, wired and tested, less tubes —available on special order.	



VIKING 250 Watt "MATCHBOX"

Performs all loading and switching functions required in medium power stations. Fully shielded—covers 3.5 to 30 mc. Built-in transmit/receive relay.

Cat. No. 250-23 Viking 250 Watt "Matchbox", assembled, wired, and tested..... **Amateur Net $49.85**



SWR BRIDGE

Provides accurate measurement of SWR for effective use of low pass filter and all antenna couplers.

Cat. No. 250-24.....**$9.75**

LOW PASS RF FILTER

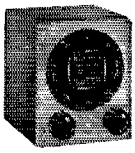
Handles more than 1000 watts RF—provides 75 db or more attenuation above 54 mc.

Cat. No. 250-20.....**$13.50**

MOBILE VFO KIT

Drives any straight pentode crystal stage. Vernier dial calibrated 75, 40, 20, 15, and 11-10 meters. For steering post or under-dash mounting. Available as a kit or wired and tested.

Cat. No.		Amateur Net
250-152-1	Viking Mobile VFO Kit, with all parts and cables, with tubes.....	$33.95
250-152-2	Viking VFO Kit, wired and tested, with tubes..	49.95



2 METER VFO

Exceptionally stable, temperature compensated, and voltage regulated. Designed to replace 8 mc crystals in frequency multiplying transmitters. Only 4" x 4½" x 5".

Cat. No.		Amateur Net
240-132-1	Viking 2 Meter VFO Kit with tubes and precalibrated dial....	$29.50
240-132-2	Viking 2 Meter VFO wired, calibrated and tested—with tubes.	46.50

"SIGNAL SENTRY"

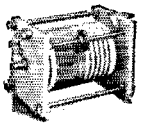
Monitors CW or phone signals without regard to operating frequency. Energized by transmitter RF. Serves as code practice oscillator with simple circuit modification.

Cat. No. 250-25 "Signal Sentry", wired and tested, with tubes. **Amateur Net $18.95**

"WHIPLOAD—6"

Provides high efficiency base loading for mobile whips. Instant bandswitch selection of 75, 40, 20, 15, 11 and 10 meters. Fibreglass housing. Mounts on standard mobile whip.

Cat. No. 250-26 "Whipload-6" Antenna Loading Coil. **Amateur Net $19.50**



AMATEUR INDUCTORS

Wide selection of popular inductor types available: High Power Variable • Rotary • Edgewise Wound "Hi-Q" • Swinging Link.

TELEGRAPH KEYS

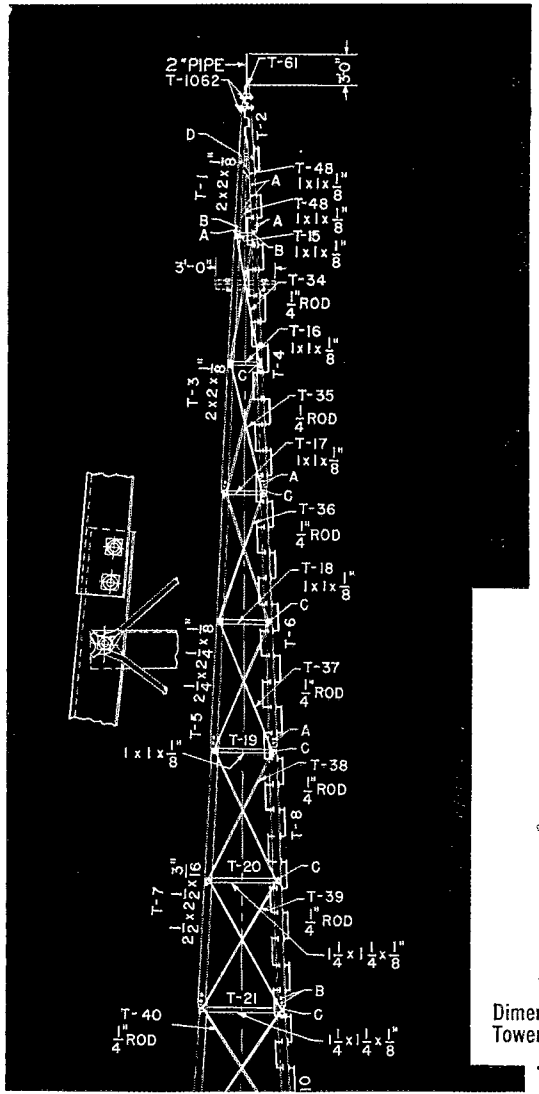
Semi-automatic, high speed standard, heavy duty and practice keys. Code practice sets, cords and wedges for semi-automatic models.

See your distributor

Johnson Amateur Equipment is sold only through Authorized Johnson Distributors—most offer convenient time payment plans. For complete information see your distributor.

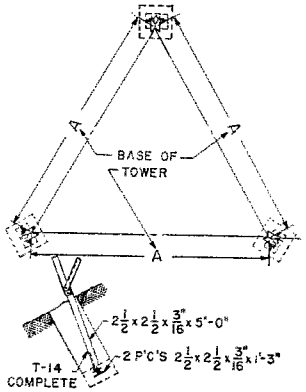
E. F. JOHNSON COMPANY

2840 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA



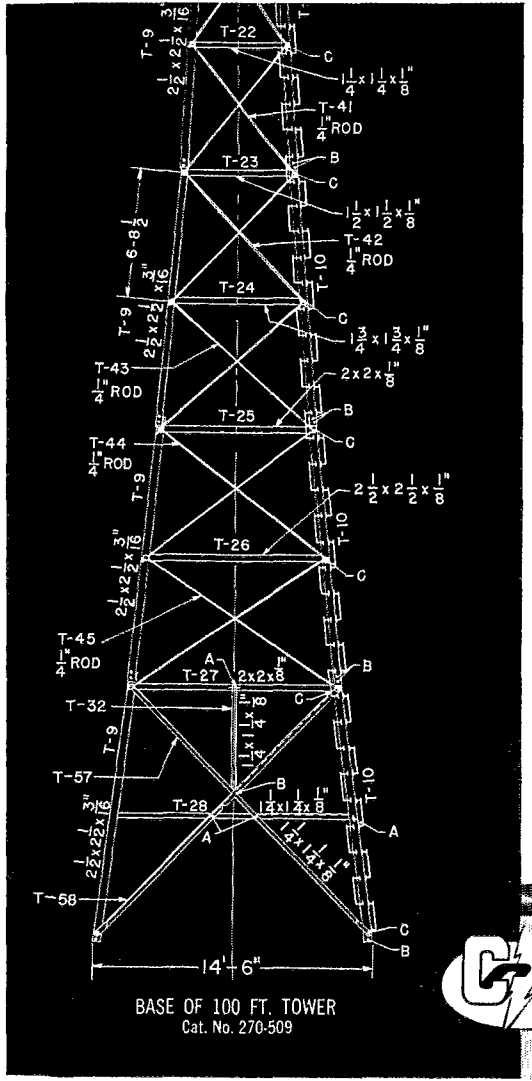
SKY-TOP ANTENNA TOWERS

—FROM COMMUNICATION HEADQUARTERS*



Dimension A: 60 ft. Tower — 6′ ⅛″; 87 ft. Tower — 11′ 1 1/16″; 100 ft. Tower — 14′ 6″

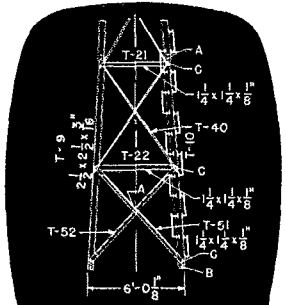
- **Completely self-supporting — no guy wires needed**
- **Simple in design for quick, easy erection**
- **Heavily galvanized after fabrication**
- **Loop steps on corner posts form solid ladder**
- **Triangular construction**
- **Trim, streamline appearance**



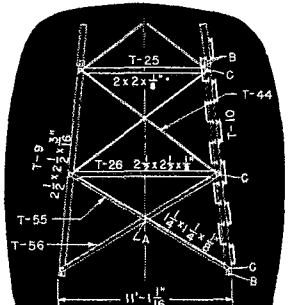
BASE OF 100 FT. TOWER
Cat. No. 270-509

Towers 60, 87 and 100 ft. high

IMMEDIATELY AVAILABLE!



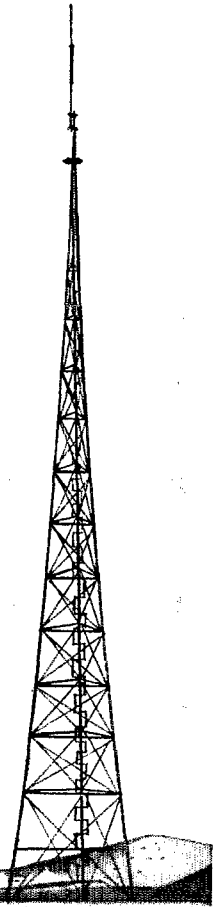
BASE OF 60 FT. TOWER
Cat. No. 250-509



BASE OF 87 FT. TOWER
Cat. No. 260-509

These new SKY-TOP towers have countless uses in the communication fields. Their design is such that they may be assembled by non-skilled, inexperienced personnel at low cost. SKY-TOP towers, completely galvanized after fabrication, will render many years of service without further protection. They are capable of supporting antenna structures having a projected cross-sectional area of 6 square feet, centered 3 feet above the tower top, in winds up to 85 mph. Order SKY-TOP towers in three popular sizes: 60, 87 and 100 ft. height.

For complete detailed catalog information, please request Catalog No. 56 on your company letterhead



Communication Products Company, Inc.

MARLBORO, NEW JERSEY — Telephone: FReehold 8-1880

New HEATHKIT DX-100

PHONE AND CW TRANSMITTER KIT

MODEL DX-100

Shpg. Wt. 120 lbs.

$189.50

Shipped motor freight unless otherwise specified. $50.00 deposit with C.O.D. orders.

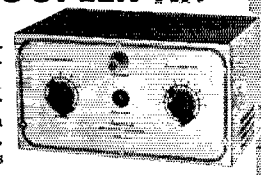
- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, ... 125 watts CW. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver I_P Final I_G, I_P, and E_P, and Modulator I_P. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final. 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20⅛" W x 13¾" H x 16" D.

Heathkit ANTENNA COUPLER KIT

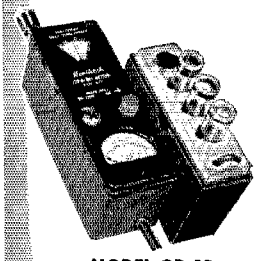


Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-fed long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

MODEL AC-1

$14.50 Shpg. Wt. 4 lbs.

Heathkit GRID DIP METER KIT



MODEL GD-1B

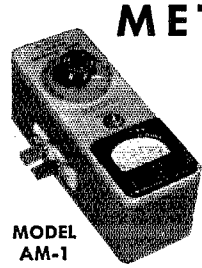
$19.50 Ship. Wt. 4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pretuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1¼ meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at $3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

Heathkit ANTENNA IMPEDANCE METER KIT



MODEL AM-1

$14.50 Shpg. Wt. 2 lbs.

Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100 μa. meter employed. Covers the range from 0 to to 600 ohms. Cabinet is only 7" long, 2½" wide, and 3¼" deep. An instrument of many uses for the amateur.

HEATH COMPANY

A SUBSIDIARY OF DAYSTROM, INC.

BENTON HARBOR 9, MICHIGAN

New Heathkit VFO KIT

MODEL VF-1

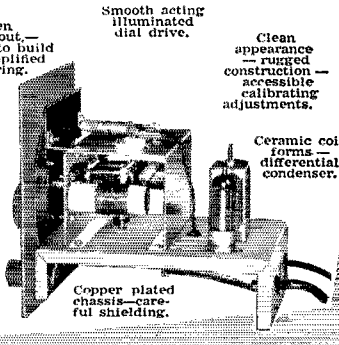
$19.50

Ship. Wt. 7 lbs.

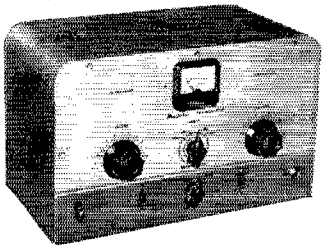
- Smooth acting illuminated and precalibrated dial.
- 6AU6 electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litz or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard ½" crystal holder. Construction is simple and wiring is easy.



Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

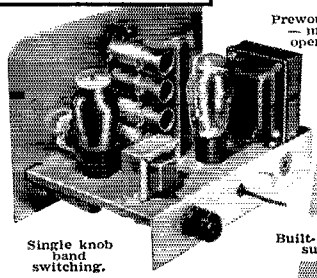
$29.50

Ship. Wt. 16 lbs.

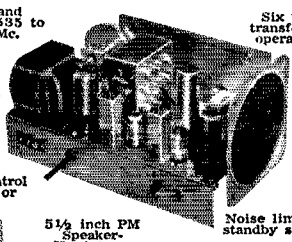
SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.
6AG7 .....Oscillator-multiplier.
6L6 .....Amplifier-doubler
5U4G ..... Rectifier.
105-125 Volt A.C. 50-60 cycles 100 watts. Size: 8⅛ inch high x 13⅛ inch wide x 7 inch deep.

Here is a major Heathkit addition to the Ham radio field, the AT-1 Transmitter Kit, incorporaring many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.

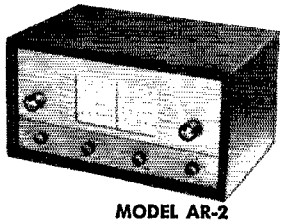


Heathkit COMMUNICATIONS RECEIVER KIT



SPECIFICATIONS:

Range.....535 Kc to 35 Mc
12BE6 .....Mixer-oscillator
12BA6 .....I. F. Amplifier
12AV6 Detector—AVC—audio
12BA6 ....B. F. O. oscillator
12A6.....Beam power output
5Y3GT .....Rectifier
105-125 volts A. C. 50-60 cycles, 45 watts.



A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

MODEL AR-2

$25.50

Ship. Wt. 12 lbs.

CABINET:

Proxylin impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, $4.50.

HEATH COMPANY

BENTON HARBOR 9, MICHIGAN

(*Continued from page 122*)

cruise to the Mediterranean. WLY's station was hit by lightning. AQR has a new Heath VFO. CEA is busy with school work. Six-meter activity is being sponsored by the Marion Club. The Muncie Club is sponsoring a Novice class. Hornets have taken possession of MIV's beam. UQP reports the last ten sessions of QIN with traffic of 76. WWT reports for RFN with a traffic total of 179. CAEN had 23 sessions and a traffic total of 123. EQO reports for IFN, 60 sessions and traffic total of 501. STW has contact with home from the Cornell Radio Club station, 2CXM. FHA has a Viking. N9RVV has left for DePauw. BKJ will assist the SCM whenever there is a need for it, so with these parting remarks, best of luck to the swellest gang I ever knew and 73. Traffic: (Sept.) W9JP/9 1060, TT 712, NZZ 680, WRO 548, UQP 514, EHZ 510, HRY 308, ZYK 290, TQC 183, RBX 150, YB 148, TG 146, JYO 132, BKJ 113, WWT 94, EQO 90, WBA 87, ZRP 87, UXK 84, PQA 81, CMT 76, ALL 66, CTF 58, SWD 55, AB 47, AZF 42, EHE 42, WUH 37, SVL 35, FGX 27, LGD 26, DDK 25, DGA 24, VNV 24, PXG 23, NTA 21, WLY 18, STC 17, AQR 16, PYH 15, QR 10, CEA 8, AYD 6, BDP 6, KDH 6, NSY 6, QBD 6, YVS 6, IGZ 5, GDL 4, DOK 3, NH 1, PPS 1. (Aug.) W9WUH 30.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAM: ESJ. RMs: IXA and RTP. Nets: WIN, 3685 kc., 7 P.M. daily; BEN, 3950 kc., 6 P.M. daily; WPN, 3950 kc., 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29,620 kc. CXY holds down NCS on CAN one night a week, and adds another BPL to his string. WWJ received his WAC certificate. YZA qualified for his 30-w.p.m. Code Proficiency certificate. FFC's new mobile is an A-54A, Morrow 3BR, and motor-driven antenna-tuner. SQM finished the power supply for his new kw. GHT put up a folded dipole for the 3.5-4-Mc. band. MDG was the lucky winner of an SX-85 receiver at the Central Division Convention held at South Bend. The NWRC held its annual banquet at Ladysmith Sept. 27th. IKY is on with a new DX-100 and holds radiotelephone and radiotelegraph 2nd-class tickets. Net certificates (WPN) were issued to KLW, HZO, GYA, and SZR. New calls in Green Bay are KN9AVN, KN9BBT, KN9BBU and KN9AYQ. JEF acquired a new SX-85 and worked KZ5 on 7 Mc. KN9AUM has a Viking Adventurer and an SX-71. A couple of new ones for KXK are FB8XX and F9YP/FC. LSK gave a demonstration of transistors and their application at the MRAC meeting. OVO has just put a Heath Q Multiplier into service. A 28-Mc. ground-plane vertical was installed at NUW, the WVRA (Wausau) station. LSR has an AF67 transmitter and an Elmac 12-V receiver for his mobile installation. GIL is building up a Viking Ranger. DAJ is wiring up a DX-100. New calls in Wausau are KN9BCA and KN9BCB. Traffic: W9CXY 593, WWJ 170, SAA 72, YZA 18, GMY 10, OVO 8, FFC 7, RQM 6, SQM 5, GHT 3, RKP 3.

WISCONSIN SECTION QSO PARTY

December 11, 1955

All Wisconsin amateurs are invited to take part in a QSO Party, sponsored by the Milwaukee Radio Amateurs' Club in order to promote friendship and operating ability among the amateurs of Wisconsin.

Rules: 1) The Party will begin at 9:00 A.M. and end at 11 P.M. CST December 11th. 2) All types of emission and all bands may be used, but a station may be worked only once regardless of mode or band. C.w.-to-'phone operation is permitted but crossband work is not allowed. Stations are urged to work all bands from 2 through 160 meters to raise their scores. A station may compete as a c.w. or 'phone station or both, as desired. 3) The general call will be 'CQ Wis." 4) Information to be exchanged in each contact will consist of the QSO NR, RS or RST report, County, and name of operator. Example: NR 1 589X MARATHON RENO. 5) Scoring: Count 1 point for such information sent and 1 point for such information received for a maximum of 2 points per contact. Multiply the total contact points by the number of different Wisconsin counties worked to determine the final score. Only contacts with other Wisconsin stations can be counted. 6) Logs should include date and time of QSO, call of station worked, number sent, number received, RST reports sent and received, name, county, band, type of emission, power input. It is suggested that sheets from the ARRL Log Book be used for logging and reporting. 7) A traveling trophy will be awarded to the operator with the highest score, regardless of whether that score has been made completely on c.w., 'phone, or a composite of both. Certificates will be issued to the first, second, and third place winners among 'phone, c.w., mobile, and Novice entrants. 8) Send logs to Edward R. Buchholz, W9VBZ, 3648-A North 8th St., Milwaukee 6, Wis.

See how many of your fellow Badgers you can work during the 14-hour contest period. Get on the air December 12th and meet the gang!

DAKOTA DIVISION

NORTH DAKOTA — SCM, Elmer J. Gabel, WØKTZ — Thanks to FVG, KLP, USY, and KNØCND for news items and station activity reports. Let's have more of these reports, fellows. A week on the day job and the World Series sure cut into my air coverage of the section for news items of interest. More DX-100s: VQX is on the air and IHM is building. USY has a new all-band rig with a 6146 in the final, and ZCM has a new 200-watt rig on the air, both homebrew. There are four or five 2-meter rigs in the Devil's Lake Area. Nice going, fellows. Thanks to BFM and QOB the North Dakota early morning weather net on 160 meters should be a reality by now. New hams are KNØCND and CNF in Stanley. RQE, of Kindred, should have his higher-power station on the air from Mandan this fall. Traffic: WØVCQ 55, FVG 41, KTZ 26, HVA 16, DM 8, NPR 8, KØBEA 6, WØFNZ 6, KØATK 4, WØQOB 4, BFM 3, KLP 2, PHC 2, USY 2.

SOUTH DAKOTA — SCM, Les Price, WØFLP — YQR is in his ham shack at Black Hawk and already at work on a 20-meter beam — also, a "V" beam. YOB was mobile/7 for 2 weeks on vacation to Glacier National Park. OII has a new s.s.b. exciter for his 810s. SMV, net control for the c.w. net, reports 14 sessions, QNI 107, high 11, low 4, average 7.6; QTC 47, high 6, low 2, average 3.3. There is no report on the NJQ Net. GDE, net control for the 75-meter net, reports QNI 29, QTC 3, informal 4. KNØCJF is a new ham in Sioux Falls. The Sioux Falls ARC has a code and theory class of 6. More than 250 attended the South Dakota Hamfest held Sept. 3-4 in Yankton. Among those present were President Dosland, a W3 from Maryland, a family of W3s from Pennsylvania, a W5 from Oklahoma, and a W9 from Chicago. Traffic: WØOII 250, ZWL 94, SCT 69, SIR 57, GDE 50, SMV 29, RRN 20, BQH 18, BLZ 15, RSP 8, AYD 6, GWS 3, YDB 2.

MINNESOTA — SCM, Charles M. Bove, WØMXC — The Minneota and Vicinity Radio Club is now affiliated with ARRL. Anyone wishing to attend club meetings should contact Jerry Fraser, WVO, Box 68, Minneota. GTX, your SEC, has reported a new high in AREC membership. Total membership now stands at 544, total mobiles reporting 166, and portable units 32. A new emergency and traffic net has been organized on 10 meters in the Twin City Area. The frequency used will be about 29.4 Mc. and time is between 1900 and 2000 hours on Wed. Everyone is invited to report into this net. Net control is Wayne Trask, who will use his call, UGG, as the net station. FDS and GYH flew down to the South Dakota Hamfest at Yankton. FDS, GYH, TYX, and TKX attended the Ham Convention at Omaha. The St. Paul Mobile Radio Club has elected new officers as follows: HZQ, pres.; QJV, 1st vice-pres.; NGF, 2nd vice-pres.; TPO, secy.; OOO, treas. The Padre Net attended a successful hamfest at Motley. SHU has been appointed as Official Experimental Station. TCF/Ø has moved to Minneapolis from St. Louis and is busy putting up antennas for 40 and 75 meters. Bill wants to make skeds with his buddies in St. Louis. TUS has been busy working on an emergency unit for Cass County to cooperate with the c.d. unit in Backus. VBD has not been on too frequently because of TVI. VBS has been working DX on 40-meter c.w. and has CE7ZJ, VP4LZ, VP5DC, and 3V8AN in his log to prove it. KJZ has organized a YL club in St. Paul to take in the YLs of the Twin Cities. As you probably know, Lydia is heading the YL convention to be held in St. Paul in 1956. She already has secured the Hotel Capri to house this Convention. We are proud to announce that two more YLs have their licenses. They are Sister Marie Dominic, KNØBND, and Sister Paul Marie. LUX has a new baby girl. AEE has a new Ranger. WMA has erected a new beam and acquired a DB-23. WVO's XYL is now VYL. EUI and KFN have a new windmill tower to support their antennas. Traffic: WØWVO 229, KLG 175, UNG 130, KJZ 88, WMA 71, QHS 66, RLQ 65, VEP 65, TUS 51, TKX 49, HFY 45, KFN 45, QNY 39, IRJ 37, RVO 26, VOA 26, BUO 25, MXC 24, VTZ 24, MVJ 23, QDP 20, LUX 19, GTX 17, LST 16, MBD 12, NTV 10, VEZ 8, UCV 6, NBW 4, UMX 4, VBD 3, LIG 2, VBS 2, UAN 1.

DELTA DIVISION

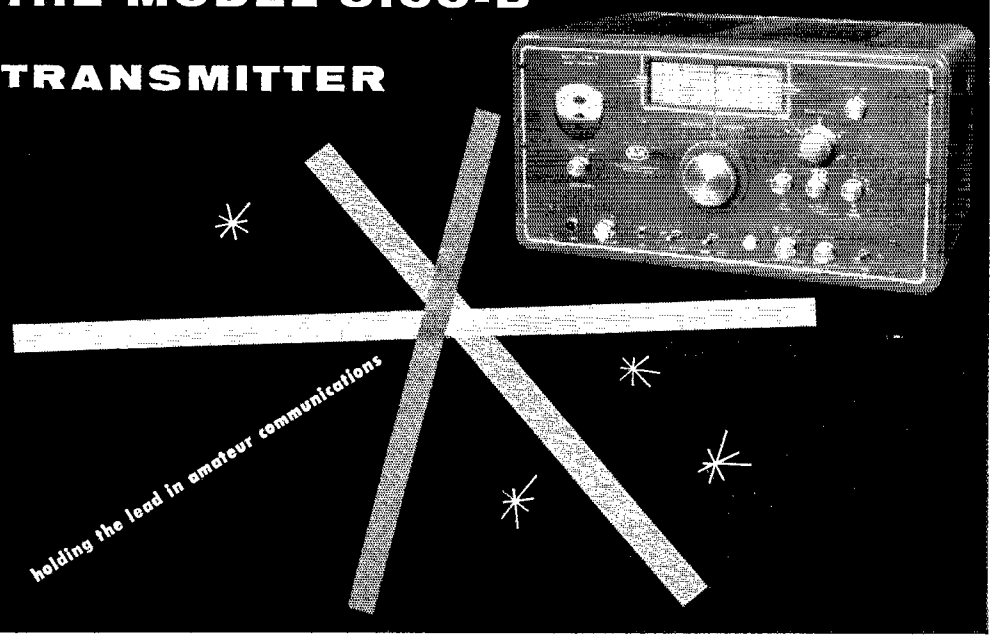
ARKANSAS — SCM, Owen G. Mahaffey, W5FMF — Radio amateurs and prospective hams have organized an amateur radio club at the Ozark Academy with code classes twice weekly. YZI is instructor, with GCD and KN5CPC assisting. EUQ can be heard with a new mobile rig, also a Viking II and NC-183D, and is now handling traffic. Your SCM has been on a two-week vacation and is trying to get up to date on correspondence. The Southeast Arkansas Amateur Radio Club elected the following new officers: WUM, pres.; RPB, vice-pres. and act. mgr.; CAM, secy.-treas.; DSW, club eng. A 500-watt club trans-

(*Continued on page 134*)

Barker & Williamson Presents

THE MODEL 5100-B

TRANSMITTER



The most outstanding feature of the new 5100-B transmitter is its *combination* of features. Unsurpassed performance on AM, CW, *and* SSB has been built into this one transmitter *without compromise.* Here, truly, is the transmitter of tomorrow . . . *today,* with:

- *high level AM telephony—push-to-talk*
- *clean CW keying—break-in on all bands*
- *superlative SSB — combined with the new 51SB-B*

Check *all* the features built into this fine transmitter. Write for literature, or see it at your distributor's. You may decide on the spot that the 5100-B is the transmitter of your dreams. *But you won't realize until you're on the air that words can't begin to describe the sparkling performance of this great transmitter.*

A FEW FEATURES OF THE 5100-B

Input power: 180 watts CW-SSB 140 watts AM phone
Frequency Control: Integral VFO or crystal
Operation: High level AM telephony—push-to-talk. Clean CW keying—break-in on all bands. Superlative SSB performance on all bands with the new 51SB-B generator
Controls: All controls on front panel. Fuse and high-low line voltage switch on rear chassis apron
Tuning: Ganged multiplier stage tuning
Styling: Handsome, distinctive blue-gray crackle cabinet. Semi-gloss gray silk-screened panel. Etched, machined aluminum knobs.
Coverage: 80-40-20-15-11-10 meters
Size: 22" wide x 11½" high x 14¾" deep
Weight: 88 pounds

PLUS

Unitized construction . . . pi-network final . . . integral low pass filter . . . TVI suppressed

SSB— AMATEUR NET PRICE $475.00

a new companion unit to be released shortly . . . the B&W Model 51SB-B Single Sideband Generator . . . can be installed easily in less than a half-hour. No conversion necessary. Write for complete details.

MAKE IT A MERRY CHRISTMAS . . . WITH THE 5100-B
SEE THE 5100-B AT YOUR B&W DEALER'S TODAY . . .
or, write for literature.

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237 Fairfield Avenue, Upper Darby, Pa.

mitter is nearly completed, and a fall training program for additional ham aspirants will begin soon. YHT is in the Army Signal Corps and is attending teletype repair school in Ansbach, Germany. His call is DL4LM, and he says he would be glad to hear any of the old gang on 20 meters. Traffic: (Sept.) W5SXM 39, EUQ 27, FMF 11, ZJI 6. (Aug.) W5ZJI 18.

LOUISIANA — SCM Thomas J. Morgavi, W5FMO — 3905 kc. has been selected by popular vote as the calling frequency for the State of Louisiana. Monitor the frequency in your spare time, use the frequency for establishing contacts within the State, and QSY so that it will be clear for others who want to call in. Suitable markers will be established on all highways shortly to notify mobiles. MWP has a new jr. operator. KSI is mobile with an Elmac. FKA is active on the B.R. Emergency and Magnolia Nets. K5FFA makes BPL again. MXQ answers RN5, CAN, MARS, and New Orleans Emergency Nets. YSN expects to be on with a new transmitter soon. AIE and HAS now are General Class. BMD is active on 75 meters and the Delta Net. Don't forget the hamfest to be held at Shreveport on Nov. 20th. Plan to attend. NDV is interested in starting an 80-meter c.w. net. All interested should get in touch with him. SPZ, at USN, made a 2-week tour of NSS in Washington, D. C. ABX and ALQ are boning up for General Class tickets. BES is EC for the city of New Orleans. He requests that all New Orleans hams contact him for AREC applications and assignments. Several nets will be organized on various bands. HEJ is laid up at Shreveport VA Hospital but is getting along very well. After a long absence, QH is back on 75 meters. KHX raised his beam to 40 feet and is getting out better. All he works is 20-meter 'phone and Minneapolis. Check your appointment expiration date and mail to the SCM for renewal. Keep the reports coming in. FMO worked 4 new countries on 20 meters. Traffic: (Sept.) K5FFA 530, W5MXQ 117, NDV 87, EA 20, FKA 5. (Aug.) W5MXQ 45.

MISSISSIPPI — SCM, Julian G. Blakely, W5WZY — SEC: PFC. RM: WZ. PAM: JHS. Amateur radio scored a hit in Mississippi with two recent TV programs devoted entirely to ham radio. The first show, carried over WLBT of Jackson, was directed by PFC and CQJ, with TAK, SHX, and YCT in starring roles. The program was presented on "Platter Party" with "Be Be" Kaye as M.C. It turned out that only one platter was spun and the program ran until the station signed off at midnight. An amateur station, TAK/5, was in full operation in the studio, and contacts were made in adjoining states as well as with the mobiles touring the city. The second program, presented some three weeks later, was entitled "How to Become a Radio Amateur" and was carried off with equal success under the direction of RDA, of WLBT, and PFC, Jackson Club president. EYY, APZ, and a large supporting cast made it a topnotch show. Eighty per cent of the engineers of WLBT are active hams. Congratulations to all the hams who made these programs such fine entertainment. They will go down as the biggest Public Relations job for amateur radio in Mississippi. A very Merry Christmas to all. Traffic: W5RIM 74, JHS 56, EWE 31, WZY 7.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV. PAM: PFP. RM: WQW. UIO reports the East Tennessee 'Phone Net is going strong and had a high QNI of 18. GJV explained his new 20-meter beam to the Memphis Club. The Cookeville ARC and the Smoky Mountain ARC are to be congratulated on their new ARRL charters. RRV, PYU, and NLJ presented an outstanding amateur radio show over WTSK-TV. The Maryville-Alcoa Area now has 14 full AREC members. TIE and TIZ are new 6-meter Memphis stations. ZZ, in Knoxville, reports QSOs on 6 meters with Nashville, Chattanooga, and Atlanta. IIB reports that the 6-meter net in Chattanooga now is operating at 2100 EST Tue. WQT, tired of party line difficulties, put a 420-Mc. link into operation with CVM, and now can discuss experiments freely with no interruption! PVD reports skeds with another minister, KN4DOC. We neglected to find out if DOC had his D.D. degree! WQW, our indefatigable RM, put out a fine c.w. net bulletin and roster, with operating hints designed to keep TN the best in the nation. It was suggested that a net fund for flowers, cards, etc., be maintained with contributions to be forwarded to HIH as treasurer. Custodian of a similar fund for the 'phone net is our capable PAM, PFP, who was very pleased on a recent Sun. A.M. when *52* stations answered his roll call! UWA is back at Cookeville, after summering in Kentucky. Traffic: W4TYU 329, TZD 205, ODR 125, VNE 107, PFP 103, IIB 96, HIH 87, PQP 74, VJ 54, HLR 53, UWA 36, SJ 30, SCF 27, TIE 27, CXY 22, YMB 21, PAH 14, HUT 10, RRV 9, SKH 5, K4BKC 4, W4DCH 4, HSX 2, DMU 1, FLW 1, PVD 1, UIO 1, ZZ 1.

GREAT LAKES DIVISION

KENTUCKY — SCM, Robert E. Fields, W4SBI — SEC: CDA. PAM: YYI. RM: KKW. September statistics for the KPN are as follows: 30 sessions, 518 total call-ins, 17.3 stations per session, 113 total traffic, 318 messages per session. Following is a list of stations earning Section Net certificates: GZ, VJV, HOJ, OEE, TUV, ICI, OJK, BAA, OFJ, AGT, and AZV. KRC has changed the direction of his antenna to get better coverage in the western part of the State. KYN held up very well throughout the summer, dropping down in September. The report from the RM is as follows: 30 active stations, 203 total traffic with an average of 3.8 per session. Now that we have cooler weather activity should pick up. SBI has not been too active as he has been on the sick list for a long time and spent a few days in the hospital. UWA is attending school in Tennessee. HOJ is selling out his 100-watt station and is giving up amateur radio for a spell. (Hope it won't be long.) CDA has been rearranging his operating position for better operation. Traffic: W4QCD 241, KKW 153, RPF 65, NIZ 60, HOJ 47, UWA 36, SBI 30, ZLK 27, BZY 25, CDA 14, JUI 7.

MICHIGAN — SCM, Thomas G. Mitchell, W8RAE — Asst. SCM/C.W.: Joe Beljan, 8SCW; Asst. SCM 'Phone: Bob Cooper, 8AQA. SEC: GJH. Take a look at this month's traffic totals and note that JYJ is on top with a BPL-making score. Cy was the outlet for traffic from the Boy Scout Leaders' Conference held at the University of Michigan. Congratulations, and I'm sure that those who sent the messages are grateful for the service. (There is a good supply of BPL cards in the file and I will be most happy to issue same to any qualifier.) The one new appointment issued this month went to QQO, who is now an Official Observer (Class IV). MMI is new in the General Class ranks here in Buchanan and has come up via the Novice-Technician route. DED worked up an amateur radio display for the hobby show in Holland and ARRL Headquarters was helpful in supplying sample certificates and the like to decorate the booth. This is an idea for anyone considering a similar display. New charters were issued to the Coffee Dunkers of Detroit and the South Eastern Michigan Amateur Radio Association of St. Clair Shores and environs. Officers of the latter are NXT, pres.; OBX, vice-pres.; PWN, secy.; MOF, treas.; PED, GKR, and PSA, directors. The Genesee County Club is active with mobiles and walkie-talkies, and is getting its communications trailer equipped. New officers are GJH, pres.; IFK, 1st vice-pres.; RUV, 2nd vice-pres.; YMO, 3rd vice-pres.; RWW, treas.; and QIC, secy. ELW has his 550 ft. "V" beams about ready to fire up. FX has acquired a new antenna farm and is in the throes of moving to same. OQH reports VVI is new in Rogers City. MGQ is heading for 2-meter work. At this time I wish to thank those who cooperated in helping to get the SCM appointments file in order. It is in much more current condition and new appointments are available for active ARRL members who qualify for them. Traffic: (Sept.) W8JYJ 470, NUL 139, ELW 136, NTC 105, PHA 89, ILP 64, SCW 39, SIB 32, RTN 30, QIX 28, QQO 28, RAE 20, IUJ 16, FX 15, HSG 13, IV 13, OQH 12, FOV 11, IKX 11, NOH 9, PHM 5, SJF 3, HKT 2, RVZ 2, WVL 1. (Aug.) W8SHP 23, IKX 14, DED 12, TQP 9.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and E. F. Bonnet, 8OVG. SEC: 8UPB. RMs: DAE and FYO. PAMs: EQN and HUX. *Notice:* After Dec. 14th, all reports should be sent to the newly-elected SCM. New appointees: EEQ and SWZ as OBSs, RYA as EC, and EVH as OES. KIX is now at Great Lakes. The Geauga Co. Net consists of PMJ, NAK, FKC, WOL, FFA, and SVQ. RN has two new verticals. PLQ did some building for the SS Contest. DAE won three log-books in the Sept. LO Party. The Tiffin Club was shown slides of the FO8AJ Expedition at the October meeting. About 75,000 saw the West Park Radiops' transmitting station and exhibition at the *Cleveland Press* Do It Yourself and Hobby Show, Oct. 1–9. AEU was chairman. Parma Club officers are PCJ pres.; and KGA, secy.-treas. The Cleveland Council will sponsor an all-band intracounty contest from 6:00 P.M. Dec. 3rd to 10:00 A.M. Dec. 4th. Numerous awards will be made. GCP is contest manager. Mail reports by Dec. 10th. Amateurs interested in the Upper Ohio Valley Emergency Net should contact 3UVD. Newly-elected Cleveland Council members are NZC, pres.; PCJ, vice-pres.; YPE, secy.; and OPC, treas. The Toledo Club monitor frequencies are 1895, 3960, and 29,200 kc. BGU is up to 80 countries confirmed. BN served as an unofficial judge in the Miss America Contest. New CWA officers are BXB, pres.; MXF, vice-pres.; and FSP, secy-treas. Despite heavy local conflicting activity, AJH, Cuyahoga County EC, reports that 30 messages were handled in the S.E.T. LER has made WAS. BPN is Cleveland Southeast Club pres. while ADC is secy.-treas. AMH reports that FJV, GDB, and AMH are Ohio's representatives in the Early Bird Transcon Net. A certificate of merit soon will be issued to faithful members. About 400 people attended the Findlay Hamfest of Sept. 11th. The GCARA *Mike and Key* reports that 741 persons paid admission to the Cindy Summer Hamfest. GES, PGP, and JTF were winners in the mobile judging contest. The OVARC *Ether Waves* relates that UOD has 100 countries confirmed on 40-meter c.w. and JIN is the all-band, all-emission leader in the club's DX listing. Toledo's *Shack Gossip* now is edited by a pair of lovely ladies, MBI and IAA. They mention that the JORs have a new daughter and that SUF and SDM received their General Class tickets. The Hocking Valley

(*Continued on page 136*)

from the Eimac Gang

K6AFL	W6DJI	W6HQN	KN6OAZ	W6UFU	W1KKP
K6ANN	W6DUW	W6INJ	W6ODT	W6UOV	W2CN
K6BAS	W6DVB	W6IQO	W6OHU	W6UUR	W2QA
W6BAX	W6DWM	W6JFV	W6OMC	W6VBJ	W4DLL
W6AY	W6ETR	W6JZ	W6OMD	W6VQD	W4JNL
K6BCM	W6FBR	W6KEV	W6OS	W6VW	W4TO
W6BET	W6FKS	W6KFQ	W6QIT	W6VYH	W6ENV
K6BJ	W6FYM	W6KM	W6QQV	W6WC	W6JBC
W6BMU	W6GJF	W6LAD	W6RWI	W6WSL	W6QD
W6CBN	K6GPX	KN6LLE	W6RXW	W6YSX	W7ESK
W6CEO	W6GVY	W6LOZ	W6SC	W6ZGV	W9AIO
W6CHE	W6HB	W6MGO	W6SCZ	W6ZLB	W9DZY
W6DDN	W6HHN	W6MUC	W6TVS	W6ZPH	WØAZT
		W6NBD	W6TXT	W7SLC	WØNWW
		W6NGP	W6UF	WN7YWL	WØRPE

Eimac

EITEL-McCULLOUGH, INC. SAN BRUNO CALIFORNIA

bulletin states that NUK has a DX-100; UYD is moving to Chauncey; and FTV, the XYL of RRQ, made Tech. C. license. The Fort Hamilton *Feedback* informs us that IZT has a new Ranger; OFK has joined the Navy; QLF is stationed in VP6; and PNM is trying out 160 meters with eight watts. Dayton's *Rf Carrier* reports that EBL and EBM (OM and XYL) acquired a new son; CEA, OJF, and KFC are on the membership committee; and a contest will be held for the 1956 Hamvention QSL card. The Hamvention will be held on April 14th. The Columbus *Carascope* states that 9LER is stationed at Lockbourne AFB; ETU is ex-2QMO; MOX has gone to s.s.b.s.c.; OMY received his WAS; and TDL worked a KP4 for his 1st DX. Western Ohio's *Ham Flashes* mentions that AEW has joined the Navy; RZ has a new 20-meter beam; OH2MT is visiting in Conneaut; YCU has moved to Michigan; and AHW will be operating as K4ECG during the winter months. Traffic: (Sept.) W8IIR 341, MVJ 280, DAE 267, FYO 178, UPB 131, MQQ 103, DG 69, HUX 44, AL 41, RO 40, VTP 40, AMH 35, HPP 28, CTZ 25, JDN 25, AJW 22, JHH 18, AJH 17, OPX 16. ARO 13, BEW 11, HFE 11, RN 10, WAV 10, ET 9, AEU 8, AQ 8, LMB 8, WYU 7, NZC 6, EEQ 5, MXO 5, BF 4, IIZJ 4, VM 3, APC 2, EQN 2. (Aug.) W8PMJ 3.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — SEC: RTE. RMs: K2BJS and TYC. PAMs: GDD and IJG. News from SARA indicates that future meetings will be held at the Locomotive Club located on Van Vranken Ave. The Club's recent auction was a great success. The auctioneers were K2CKS, GRI, and EFU. Also, plans are under way to incorporate. K2AXY will handle the legal end. Congrats are extended to the oldest member of the SARA, K2AE, who celebrated his 89th birthday. A party was held over the air on 3960 kc. at 0725 hours on July 7th. K2BSD is using his new 'phone patch to handle calls for the boys at an AFB in Greenland on 14 Mc. FGL moved to Syracuse recently. Sorry to have you leave us, Doc, and good luck. After spending 57 hours in the flooded area of Pennsylvania with his mobile and while driving back to Albany, APF mentioned to a New York City ham over the air how nice it would be to have a national organization which could help to replace ham stations wiped out by any natural disaster. The idea caught fire and checks already are being received by him from clubs and individuals who want to promote the idea. Congrats to the little man with the big heart. RTE reports that many of our ECs have failed to file for endorsement. Why not coöperate by letting us know your pleasure now? K2EDH again is active on the traffic nets after a long vacation. A cordial welcome to Bob, KN2MDK, and Carol, KN2OCC, of Vails Gate. EC JJO announces that a weekly series of training classes will be held at the Rensselaer County Court House. Drop a card to Joe for further information. The fall season is with us again and I trust that you will continue your support of this column. Traffic: (Sept.) K2EKE 41, W2EFU 30, K2EDH 24, BE 20, HVN 14.

NEW YORK CITY AND LONG ISLAND — SCM, Harry J. Dannals, W2TUK — SEC: ADO. PAM: NJL. RM: WFL. Section nets: NLI, 3630 kc. nightly at 1930 EST and Sat. at 1900 EST; NYSPETN, 3925 kc. daily at 1800 EST. The new RM is WFL. Chris replaces VNJ, who deserves our thanks for his three years of service to NLI. New appointments: K2CTK as EC; CWD and K2s DDK, DVT, GGG, and JNE as OOs; K2KXZ as OPS; K2KRH as OES. ADO reports increased AREC activity throughout the section with Nassau's 2- and 10-meter groups very busy. The latter group holds hidden transmitter hunts on the last Thurs. of the month and RACES drills on the first Thurs. IAG has 31 AREC members in the Queens Net with 20 active mobiles holding transmitter hunts once a month. FKR is his Asst. EC. BIIJ has been made an honorary member of the Nassau 10-meter Mobile Net. The KEB/KFV team received a Red Cross citation for excellent assistance in the recent hurricane alerts. Welcome is extended to the boys at K2AIR, who made BPL on their first traffic report. K2CQP is now a MARS member. Norm invites all teen-agers and old-timers to join TAN on 3630 kc. nightly at 1830 EST. JOA and K2BJS have been appointed co-communication managers at DSC. AEE participated in Freshman Week activities at Columbia U. K2DVT, net manager, reports that several of the local colleges are active on the College Net (CTN) on 3630 kc. at 1600 EST, Mon., Wed., and Fri. K2JEB now signs 4FFF. BO reports into the 75-meter nets via his mobile en route to work. K2LOA is going all-band mobile. VDT reports good results with a rotary dipole on 14 Mc. K2EQH expects to join the 10-meter mobiles in Nassau. KDO is transferring the mobile rig to a new car. K2BHZ is recovering from a recent heart attack. FI spoke on AREC/RACES at the Nassau RC. LGK suggests that mobiles heard calling "CQ 20" on 10 meters better check their rigs. IVA is operating from IMX. HSZ and PRN are new members of the Order of Boiled Owls. EC has a 40-foot vertical giving excellent results on 20- and 40-meter c.w. DX. K2GHS has an Eldico MT-2 and a Telcraft converter on 144 Mc. K2IAD has a new 32V-3. K2EOF has a new 805 final. K2HSZ is putting up a new 15-meter beam. New officers of the Fieldston HSRC are K2GHS, pres.; K2JVB, secy.-treas.; K2HSZ, trustee. AOD worked 15 sections in the V.H.F. Contest. EEN participated in the W/VE Contest. IN visited South America on a summer cruise. YSL has completed the new shack. New officers of the Amateur Radio Society of City College are K2EWJ, pres.; AMR, vice-pres.; K2CRH, treas. K2GWW earned a 35-w.p.m. CP certificate. NTB has vertical antennas for 40, 20, and 10 meters. Ex-QMO now is signing his old call, 8JSU. K2CJN has a new DX-100. K2JDY reports increasing 50-Mc. activity in Nassau with LCF, LXA, and K2s ACD, AZT, CCX, GZY, IMV, ISG, JFS, JNI, and KRR active on 50.25 Mc. K2HID/6 is awaiting a K6 call in San Francisco. Ex-UCB is now ØVSZ. Ex-DYP now is signing his old call, ILAV. OME moved to West Islip. The Lightbuoy ARC is a new club in Brooklyn. ZJB, with a 35-milliwatt c.w. rig on 28.77 Mc., worked ADO 12 miles away. PC added a 20-A exciter to the Globe King for s.s.b. K2JTW and K2KRJ dropped the "N." K2GXL and K2IBH have a new addition to their family, a boy. YCW is also the proud papa of a new baby boy. CLA has a new KWS-1 and a 75A-4. New members of the NYRC are W2s BFH and JIU and K2s DXU and KMF. GBA has a 32V-1-75A-2 combination on the air with a Communicator on 144 Mc. Your SCM wishes to visit as many clubs as possible to discuss section activities. Please write and arrange a date. Traffic: (Sept.) W2KEB 1146, KFV 906, K2AIR 692, CQP 330, W2JOA 134, K2KXZ 125, W2AEE 124, WFL 101, VNJ 91, K2JEB 89, W2BO 83, TUK 68, OBU 61, K2DVT 43, W2NJL 40, K2ABW 38, VDT 38, AMP 27, W2GXC 25, JGV/1 23, K2EQH 17, W2LGK 16, PF 11, MUM 8, IAG 7, EC 5, K2GHS 5, W2JAT 5, UXY 2, K2CMV 1, W2JBQ 1. (Aug.) K2GWW 146, W2BO 106, AEE 43, K2DVT 41, W2EEO 33, GP 23, IAG 9, MDM 2, K2DEB 1.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — SEC: IIN. PAM: CCS. RMs: NKD, CGG, and EAS. A new ham in West Belmar is KN2PJX. K2KLR is active on 10- and 40-meter 'phone. KN2OOJ is a new ham in Teaneck. K2JSP is active on 10-meter 'phone with a new Ranger. K2IPR is erecting a new tower and expects to add 10- and 6-meter beams to the new stick. While all of this is going on he is rebuilding the shack to accommodate the new rigs under construction. K2ICE has erected a new 64-element 144-Mc. array. Lou warns us to look out for his mighty seven watts from now on. K2ETT is president of the Bogota Club. New members are wanted. The Club meets on alternate Tue. Contact ETT for further information. CVW is getting the bugs out of the new rig. Plans call for some DX work this winter. The New Jersey 'Phone Net meets daily 1800 to 1900 on 3900 kc. CCS has resigned from Westwood Civil Defense to take over the RACES county staff position under RO Anderton, GNU. The Avenel Radio Club is in the groove again after the summer layoff. The Night Owl Net started its third season on 29 Mc. The Net is managed by K2CSY (who invites new members to call in) and meets every Sat. at 2300 hours on 29.0 Mc. The net held a business meeting and elected GVV, pres.; K2DUZ, vice-pres.; K2CSY, secy. K2BAY is now W6TFG. A new club has been organized in the Woodcliff Lake Area. The Club operates from the Pascack Regional High School on Piermont Avenue in Hillsdale and plans to become a full ARRL affiliated club. Present active members are K2JSP, EPD, KN2PHP, KN2PBL, and KN2PBM. The Windblowers V.H.F. Society held its first big blow on Oct. 30th. Four transmitters were set up at selected locations throughout the State on 144 Mc. A special certificate was issued to all stations that were successful in contacting each of the four Society stations. Unit No. 1 at Tenafly was manned by ISK; Unit No. 2, K2BC at Lake Arcadia; Unit No. 3, 3CIP at High Knob, Pa.; and Unit No. 4, K2CMB at Atlantic Highlands. K2PCO is newly on the air at 724 Kearny Ave., Arlington. Looks like IIJL is going horizontal on 144 Mc. We just can't fight it, Geroge. K2DHE is constructing a new all-band rig. KKN is being lured on 144 Mc. Mac is an ex-commercial operator who hates to talk without working the fist. Congrats to all the gang who did such an excellent job in flood relief work over the past two months. Traffic: W2EAS 155, OXL 95, BRC 32, CCS 28, K2BWQ 22, W2HXP 10, CFB 9, K2CHI 2, W2CJX 2, NIY 2.

MIDWEST DIVISION

IOWA — SCM, Russell B. Marquis, WØBDR — PIIM held open house at the Grinnell Corn Festival. The radio booth drew a big crowd, PIO, TIU, AQL, UCE, and BDZ assisted. They originated 149 messages. New appointments: PKT and TGQ as OO. PKY, as ORS. BLH renewed his ORS appointment. JDV is OBS. VWF also is KØCFB at Clearlake. FMX has a new mobile Elmac rig. TLCN is back on winter schedule. The YL Net is growing with

(*Continued on page 138*)

MALLORY HAM BULLETIN

High ripple current ratings show how well Mallory FP Capacitors fit the "hot spots"

For better performance in your mobile rig, you can take a tip from the designers of color television circuits. They must contend with the problem of high ripple currents, and this has become an important factor in choosing electrolytics for color sets.

Mallory FP capacitors show a marked superiority on this score. Our laboratory has run a series of tests on which to base ripple current ratings. The values listed below are typical. They show the ripple rating for various capacitance and working voltages, at 85°C ambient temperature and 120 cycle.

		Ripple Current Rating	
Capacity	Voltage	Mallory FP	Usual Industry Value
80 mfd	450 VDC	670 MA	480 MA
60	450	620	440
100	350	820	500
200	150	1290	525
150	250	1030	515

The reason for the uniformly higher rating of FP capacitors is their superior heat dissipation characteristics. These are obtained by the fabricated plate construction, which permits us to put more effective capacitor area and more electrolyte into a smaller case size . . . and thus obtain a compact design that gets rid of internal heat most efficiently. In addition, all materials and construction details are engineered for long life at 85°C.

While you may not be concerned with design of color TV circuits, these same characteristics are a close indication of the excellent performance you can expect of FP capacitors in equipment that runs at high ambient temperatures. In mobile equipment, especially, that gets squeezed into limited space with little or no ventilation, temperatures may soar far beyond those you find in stationary rigs. For these "hot spots", the ability of FP's to withstand high temperatures (and high ripple currents, when needed) will assure you of the kind of dependability that you can always expect from Mallory.

Your local Mallory distributor carries a complete selection of FP capacitors in the ratings you need. He's a good man to know, too, whenever you need switches, controls, rectifiers, vibrators or any other Mallory precision components.

Don't accept substitutes . . . only Mallory makes genuine FP's.

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improving band conditions. BSG and FMX were portable in Northern Minnesota while fishing. NGS has moved to an antenna farm at Dayton. The Fort Dodge Club was approved for ARRL affiliation. The Central High (Sioux City) Radio Club has elected GWE, pres.; GXQ, vice-pres.; WDK, secy.; and UJD, chief op. of ØLNI. Antennas are on 50-ft. masts on a three-story building on a high hill. KØBPR, the Fairfield Club station, is active on 75 meters. AUL is State Radio Officer for RACES in the Iowa Civil Defense Program. OSC is superintendent of schools at Alburnett. New Novices are KNØCQX and BPE. LGG celebrated her third anniversary as a ham on Sept. 8th. PUR has an SP-600JX receiver. DFA is a new TLCN member. Fellows, how about checking on your appointments and sending them in for endorsement if they need it. Traffic: WØSCA 1135, BDR 977, SQE 272, PZO 246, CZ 217, PHM 149, LGG 135, LJW 111, QVA 98, BLH 80, PIO 57, LCX 52, TIU 42, UCE 41, WYW 20, WPM 18, TGQ 15, PKT 14, PAM 12, NGS 11, NYX 9, VXO 8, IHC 7, OXY 5, UTX 5, JDV 3, SRQ 3, UTD 3.

KANSAS — SCM, Earl N. Johnston, WØICV — SEC: PAH. PAM: FNS. RM: FEO. Did you notice, our new RM, FEO, took over Oct. 1st. KXL/NIY has done a fine job and we're appreciative of his fine work. I'm sure Bill also will do well so give him your support, fellows. The JARC (Johnson County Amateur Radio Club) elected the following officers for the coming year: DEL, pres.; GLN, vice-pres.; OYY, secy.; CIA, treas.; QYP, act. mgr.; OJW, technical chairman; NCK, publicity and public relations. ZUX has moved to a new location and is all set for the winter season. The KVRC, of Topeka, put on an exhibit at the Hobby Show Oct 1st and 2nd in Municipal Auditorium. Traffic: (Sept.) WØBLI 477, NIY 269, FCE 260, FEO 141, MXG 141, QGG 109, FNS 107, OHJ 54, YFE 54, SAF 45, WWR 40, YVM 40, ABJ 20, FDJ 20, RXM 20, TNA 17, LOW 14, BET 12, NLV 12, LBJ 11, VGE 11, DEL 10, ECD 9, AHW 5, EOT 5, KSY 4, YFE 3, ICV 2. (Aug.) WØZSZ 43, SVE 13, EOT 10. (July) WØUAU 4, DEL 1.

MISSOURI — SCM, James W. Hoover, WØGEP — SEC: VRF. PAM: BVL. RMs.: OUD and QXO. CPI spent a two-week vacation on the Gulf Coast — caught fish and dropped his usual traffic total. VTF received a 25-w.p.m. Code Proficiency certificate. PME is working on a 2- and 6-meter rig. QFD recently received an Extra Class license along with OO and OBS appointments. QMF has erected a new 32-element colinear beam on 144 Mc. WPS, St. Louis County RACES Radio Officer, attended the last Suburban Radio Club meeting and completed RACES registration for all members except four. DOA has completed an s.s.b. transmitter. New officers of the Rolla Amateur Radio Assn. are WEF, vice-pres.; NXP, treas. YFV received his Technician Class license. RXG has worked 60 countries. RTW, who was planning a new antenna, had his present one burned out by lightning. Officers of the Lemay-Jefferson Barracks Amateur Radio Club are MSX, pres.; PUS, vice-pres.; IFL, secy.; LCC, treas. SAK received his 1000 Traffikers certificate. EEE, Missouri School of Mines Radio Club, has received an ORS appointment. Traffic: (Sept.) WØCPI 611, GBJ 558, GAR 508, OMM 140, VTF 64, SAK 60, BVL 44, CKQ 41, OUD 39, HUI 32, KIK 32, VPQ 31, WFF 27, RTO 20, BUL 19, GEP 15, RTW 14, PME 9, ECE 7, OIV 7, EBE 5, QMF 4, MFB 2. (Aug.) KØFCT 141. WØOIV 6, QMF 6.

NEBRASKA — SCM, Floyd B. Campbell, WØCBH — Asst. SCM: Tom Boydston, ØVYX. SEC: JDJ. PAM: EUT. The Nebraska Slow-Speed Net meets 7 days a week at 1700 CST and uses the roll-call system. NCS will be on 3750 kc. and will accept QNIs in the top 5 kc. of the Novice band. MAO has a new rig, s.s.b./a.m./c.w. with voice control-c.w. break-in and will have it on 160 through 20 meters. The Nebraska C.W. Net has CIO for a new member and KØAFO in there swinging. SQE, from Iowa, is another very important link. The Net meets daily on 3525 kc. at 1845 CST. QNI for Sept. was 194, QTC 119. Stations reporting in were CIO, DDT, DMY, FMW, IBA, LFM, LJO, NZ, QMW, RDN, SQE, UOB, ZJF, KØAFO, W9VER, PGA/7, and KDW acting as Net reporter. FRS is attending school in Lincoln. CIO is a new OES. PUT is mobile with 696 converted using 807 final and 1635 modulator and BC-454 as receiver converter. KWQ has a new 100 receiver. A sudden spurt of 2-meter activity is reported by VEY. During "Operation Big Stick" they used a 12-bay TV antenna for Channel 10 1000 ft. high. The rig was a 522 converted running 15 watts and worked Iowa, Kansas, and Nebraska with DOU, QMA, VBA, and VEY as operators. VEY has a twelve-element curtain and is getting ideas for a 150-watt final. 6WUK was a recent visitor with DDT. Traffic: (Sept.) WØDDT 284, ZJF 155, AEM 69, RDN 55, ERM 42, KDW 36, MAO 28, ORW 27, HTA 25, QHG 17, NIK 16, FMW 15, CIH 13, PQP 13, EGQ 12, TIP 12, VRE 12, VGH 10, AGP 6, OXA 6, LJO 5, FRS 4, GVA 4, LZL 4, UJK 4, BOQ 3, OOX 3, RMO 3, ZOU 3, BEA 2, CBH 2, DJU 2, HQE 2, HQN 2, KFY 2, NGZ 2, NHS 2, SZL 2, YCY 2.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF. PAM: LWW. RM: KYQ. Nets: MCN and CN, 3640 (0645 and 1845) CPN, 3880 (1800); CTN, 3640 (Sun. 0900); CEN 29,580 kc. The HCARA elected the following new officers: EOR, pres.; UFW, vice-pres.; UQK, secy.; P. Southworth, treas.; VLK, act. dir. The Tri-City Council is off to a flying start, according to TVN, their secretary. ULY was a speaker at the Ellington Women's Club, demonstrating with a Gonset. GVT did likewise for the Southington Exchange. Were there others? GST and GWK are new calls at Southington. CN has opened a second session daily at 2100 on 3640 kc. and invites Connecticut traffic men to try it for late service. During 31 regular sessions, CN handled 221 for the month, plus 11 on the new second session. QNI honors go to LV, KYQ, and TYQ. LV and KYQ visited TYQ recently and were impressed with his layout. TYQ is a pilot for Aramco but manages to be on CN and MCN between trips abroad. MCN held 22 sessions with a traffic total of 73. The most regular early birds were RGB, IBE, and RFJ. TD continues his Official Bulletin schedule. APA still is chasing DX on 40-meter phone and nailed KL7AON, VK3WB and KH6IK. BDI enjoyed the V.H.F. Party and is working on equipment for 50 Mc. With the v.h.f. bands open, records were sure to tumble during the contest. VEIs to W4s were heard or worked by many. The usual good bulletin was received from the Manchester Club. We still want news from the many other active clubs. ILV furnished a nice report from the Waterbury Club, which also handles c.d. activities there. Seventeen operators handled much traffic during the flood. QO wants all to know how much their help was appreciated by Winsted. ZTQ has a new 20-meter beam. RWD renewed EC. HUM renewed ORS, and YBH renewed OPS appointments. New OES: APS. New OO: ANU. Traffic: W1CUH 167, AW 164, YBH 163, RGB 117, KYQ 96, TYQ 72, YNC 69, LV 63, EFW 61, BDI 59, ULY 47, RRE 37, RFJ 33, UED 23, KV 13, APA 7, GIX 6, HYF 5, ZYT 4.

MAINE — SCM, Allan D. Duntley, W1BPI/VYA — SEC: TVB. PAM: TWR. RM: EFR. New appointment: WRZ as OO. The Pine Tree Net meets on 3596 kc. at 1900 kc. The Barn Yard Net meets Mon. through Sat. at 0800–0930 on 3960 kc.; the Sea Gull Net Mon. through Fri. at 1700–1800 hours on 3940 kc.; the Teen-Age Forest Net Sat. and Sun. at 1000–1100. This newer net of teen-age boys and girls is beginning to take shape after the summer vacation. Some of us could learn quite a lot by listening to them. ZAK has a new DX-100 on the air. VV now is on a long-wire antenna and "the one-eyed rat on the banks of the Kennebec put out a lusty signal with his pump handle modulation." SUK is back with a new rig. The Pine Tree Net has missed you, Grover. Get Al and Margie to get going on their code and theory. PTL is back home after a "good neighbor trip" to the Provinces. ED has moved to a new QTH. It would seem good to hear SSF with his deep melodious voice on the airwaves. 2-meter activity is picking up in Cumberland County. Androscoggin c.d. coverage on 2 meters is 100 per cent. State Hq. now is on 6 meters. Your SCM and his XYL confirm that it is tropical at "Tropical Mud Lake." We enjoyed our trip through Northern Maine but are sorry not to have met ALL you people. Traffic: (Sept.) W1LKP 132, WTG 118, UDD 44, EFR 32, QUA 29, TWR 24, UZR 22, NXX 15, RGR 12, BX 11, BBS 10, LYR 8, OTQ 8, SUK 6, EDP 4, YYW 4. (Aug.) W1VBX 4.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1ALP — New appointments: YYZ Randolph as EC. Appointments endorsed: ZBD Hudson, BB Winthrop, WCI Newburyport, MEG Framingham, IO Danvers, SQB Reading as ECs; HWE, UTH, and MEG as ORSs; BB, WLW, and UTH as OOs; IH, MEG and SAI as OBS; MEG as OPS. Sorry to have to report the death of VKR from polio. QVN is moving to Easton. FWS moved to Holbrook. Heard on 2 meters: RRN, GGI, ALX, ZGW, IAS, FSZ, LXR, and K2CCI/1. Heard on 10 meters: DGY, STW, SGT, BNZ, CTS, VKE, UCP, QVK, RUG and KVF. DSZ is on several bands. PJF is on 40 meters. BSW, WN1FFI, and WN1ETH are on 40 and 80 meters. LBL is on 75 meters. ZBD is secretary of a new club, the Bay State Radio Club. The South Shore Radio Club of Quincy will celebrate its 25th anniversary on Jan. 20th. CLF is installing 70-watt Elmac in his car. VTT, now in Lowell, has a DX-100. QLT/MM is on 21-Mc. c.w. on the USS *Albatross Srd*. TBX says a new club will be formed in Norwood. GWP is a new Technician in Ashland. WN1GTX is new in Braintree. BER and DIR have General Class licenses. Radio Amateur Open House held a meeting. TEO is secretary. NF is rebuilding his c.w. rig for TVI. CTR visited Vineyard Haven. The Braintree Amateur Radio Club held a meeting. MKW advises of the forming of a new club, the Cape Cod and Islands Amateur Radio Assn. SQB is moving to a new QTH. Anyone interested in traffic-handling is invited to check in to our Eastern Mass. Net on 3660 kc. at 1900. UE is the Route Manager. KPX and WNT have a new jr. operator. UMY is going to Worces-

(*Continued on page 140*)

Leading Amateur Designs Used RCA Tubes

Many of us "old timers" will remember the "collector's item" RCA catalog pages which are shown here—because many of us got our starts in amateur radio that way. These memorable sheets described such early RCA power tubes as the UV-204 . . . a 500-watt "bottle" that took 500 watts plate input power *and nearly 160 watts of filament power*—and the famous UV-202 that used more filament power than plate power.

It was the *old timers'* courage, sense of exploration, and experimentation with high frequencies and different types of transmission, using these and other early tube types, that promoted the growth of this vital communications hobby. Then... as now...radio amateurs relied on RCA tube leadership for the finest power tubes that money can buy. A check through your historic file of QST's back as far as February, 1920 will show you the dominant role of RCA Tubes in the exciting history of amateur radio.

RADIO CORPORATION of AMERICA
ELECTRON TUBES **HARRISON, N.J.**

ter Polytech. EGZ has a Gonset on 2 meters and a Johnson Ranger. VIN has a Globe Champion. BEI is going to M.I.T. WCI has a DX-100. ZBD had lots of water in his shack during the flood. DIY is working California with his Heath AT-1 on 40 meters in the early A.M. AZU has a new 183-D. AVY is feeling better after his illness. Irving Powell of Hudson has his Novice Class license. The Middlesex Amateur Radio Club now is affiliated with ARRL. THO, our PAM for 6 meters, sends in a list of new calls on this band: AVF, AJI, AAS, ACO, BYY, BYD, BYI, CAC, CRV, CGU, CAV, CDR, GCE, GKI, TUM, TMO, TYY, TVE, TTG, UVB, UFK, VYS, VHD, VSV, VZQ, VYB, WYZ, WTG, W1D, WJF, WNO, WEW, YQI, YWQ, ZGW, ZQC, ZBB. ZMD, ZVI, ZAW, ZJK, and ZEN. Others that he has worked are ADP, AGN, AQE, CTW, CLS, CK, CFU, DYS, DNO, DJ, EZV, EAB, FWQ, FOS, FSG, GLA, HOL, IAP, IMI, JDF, JOW, KKN, KQJ, KNW, LLY, LXR, LUW, MGP, MX, MHL, NAV, NCO, NBI, NPA, OEX, OIR, OOP, OMI, PIU, PEX, PX, QCC, QIB, QBP, RNG, RM, SNR, SXD, TNJ, UAX, VPT, VGY, VCZ, WB, and WLU. A new Net called the 6-Meter Night Owls is on every night at 2200 on 50.28 Mc. and UVB is the "Great Horned Owl" and has a new NC-300. ZSJ has new Eldico TR1TV and 183D. There are 95 stations on 2 meters on the Cape Cod Net frequency, 145,260 kc. Heard on 75 meters: BCN, LYV, EGZ, VOB, ZSJ, OQT, SGL, WHC, UTU, and MKW. VDB has a beam for 2 meters. Heard on 80 meters: GRC, WAC, MKW, BCN, AKN, and PSS. VTX has a new 10-meter ground plane. ZTE, GYU, and 8FFO/1 are on 2 meters via the air plane. GX and ZXC are on 10 meters. AJU is going to Maryland to work for 3 months. CCM, in Newton, has a Ranger. BOA, Winchester, reports a new net, the Teenage Forest Net which meets on Sat. and Sun. at 10 A.M. on 3900 kc. BPW has a new rig and expects an Adventurer. The Winthrop drill had the following 20 stations on with 30 people helping out: BOX, BDU, CMW, DEL, DLY, DPN, DQF, DUV, NMX, FHE, GBI, QA, TEO, HFJ, EAJ, EHZ, DJ, OIR, UOC, and VIS. DNO is giving code practice on 52.35 Mc. at 8 P.M. using t.m.c.w. most every night. Traffic: (Sept.) W1USA 698, EPE 155, IBE 124, UKO 94, CLF 76, AVY 49, BOA 35, VTT 10, BPW 8, TY 8, WU 8, BY 6, LLY 4, LM 2, QLT 2, ALP 1. (Aug.) W1IBE 46, UE 38, NUP 15, EMG 10, BGW 5.

WESTERN MASSACHUSETTS — SCM, Osborne R. McKeraghan, W1HRV — SEC: RRX. RM: BVR. PAM: QWJ. WM C.W. Net meets on 3560 kc. Mon. through Sat. at 1900 EDST. New Novices are WN1GUD, FVI, and FMN. DPY has a new NC-300. CRB received his General Class ticket. KFV has a new 20-meter beam. EOB has moved back to Western Massachusetts. BYH is operating on MARS nets. TPH and his XYL, YGX, have moved to Iowa. QEA has a new DX-100 going FB. UVI lost his mother in September. The BCARA had Chief Engineer Lavandahl of WMGT as speaker at its October meeting. The HCRA is sponsoring a class in amateur radio under the supervision of KUL. UKR has earned a BPL medallion. The WM C.W. Net held a picnic at Look Park, Northampton, on Sept. 11th. In spite of heavy rain the following attended: ABD, BVR, DVW, HRV, JAH, LLN, MNG, WCC, WCG, WEF, ZEL, and ZUU. Because of an oversight the following was omitted from last month's report on Southbridge flood activity: EFC, the local c.d. director, and TTK were hospitalized because of exhaustion from many hours of duty during the emergency. TTN was the only means of communication within the hardest hit area of Southbridge. ZCL also was a member of the group who did such fine work. The Bay State Amateur Radio Club has been formed by a group of hams at the Bay State Abrasive Products Co., Westboro. The Club proposes to operate primarily as an emergency communication network with a control station and mobile units. Officers are SQY, pres.; ZWJ, vice-pres.; SNJ, treas.; ZBD, secy.; and QXE, trustee. Many towns in our section need Emergency Coördinators. If interested, please contact the SCM or the SEC. C.d. activity is increasing and we need everyone's help. Traffic: (Sept.) W1UKR 258, ZUU 161, BVR 117, HRV 27, TAY 22, BKO 16, BYH 10, HRC 4, AZW 2. (Aug.) W1UKR 428, AMI 35, MSN 13.

NEW HAMPSHIRE — SCM, Harold J. Preble, W1HS — SEC: BXU. RM: CRW and COC. PAM: CDX. The Concord Brasspounders will sponsor the Seventh New Hampshire QSO Party on Feb. 18-19, 1956. The Assn. also is making plans for the New Hampshire State Convention tentatively set for September, 1956. CDX needs a volunteer for NCS for two sessions per week on the New Hampshire 'Phone Net. BFT has raised two of his antenna towers from 60 to 90 feet. ELW and EET have received their General Class licenses. The Hillsboro County Emergency Net meets at 1900 on Fri. with YHI as NCS. ZIW is attending Phillips Exeter this winter. AJF is mobile on all bands and will be operating in Boston this winter while at school. AVH has a new 350-watt rig on the air. WUU is rebuilding his big rig. GWY has a new QTH in Nashua. BVD is continuing code classes this fall. The Manchester RC enjoyed an outing at the camp of WUG on Lake Winnepesaukee. Welcome to Novices FZS, GAH, GBF, GDC, GDN, GDO, GGA, GIA, GIB, GIO, GJM, GGP, GSO, GVL. and GZR. WBM has completed rebuilding his station and now operates all bands 3.5 through 144 Mc. Traffic: (Sept.) W1CRW 263, GMH 52, CCE 26, CDX 23, IP 21, COC 14, HOU 14, FZ 10, QGU 10, DYE 6. (Aug.) W1DYE 28, CCE 18, YHI 6.

VERMONT — SCM, Robert L. Scott, W1RNA — SEC: SIO. PAM: RPR. RM: OAK. The VTPN meets on 3860 kc. at 0900 Sun. only; the VTN on 3520 kc. at 1830 Mon. through Sat.; the c.d. nets both at 1000 to 1100 hours Sun. on 3993 and 3501.5 kc.; the GMN Mon. through Sat. on 3860 kc. at 1200 to 1300 hours. Net Controls of VTN Mon. through Sat. are IT, ZNM, DAZ, OAK, BNV, and KKM, respectively. AZO is a new member of the VTN. BARC officers from Oct. 1, 1955, to Oct. 1, 1956, are BRG, pres.; WPK, vice-pres.; CKO, secy.; CMY, treas. It looks like NLO is keeping the secretary's job in the family! At least he won't be able to say, "When I was doing it, such and such was done," and get away with it! Have any of the other clubs elected new officers? TEW is getting Section Net certificates out to all GMN members. More traffic reports would be welcomed along with news of your station activities. Traffic: W1OAK 104, AVP 84, UEQ 36, BJP 25, IT 24, RNA 23, AZO 17, KJG 7.

NORTHWESTERN DIVISION

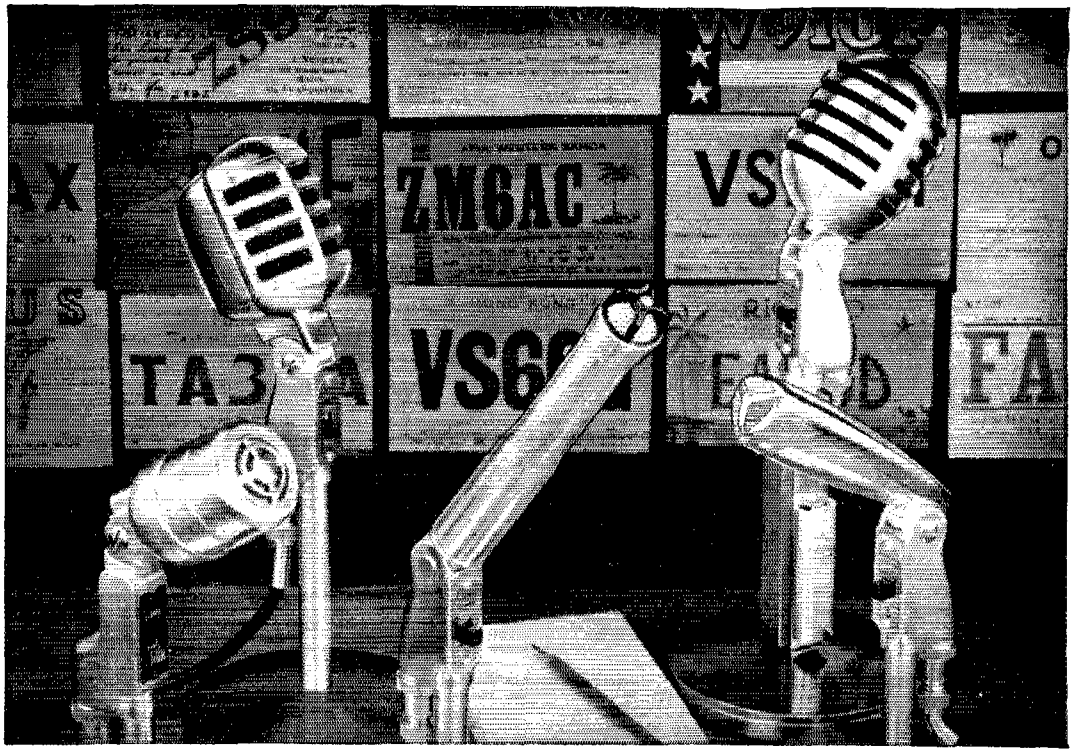
ALASKA — SCM, Dave A. Fulton, KL7AGU — ARY has a new 5100 and an 80-foot pole on top of which he hopes to get a beam. GO has left the Island of Kodiak and has settled in the Anchorage Area. PJ and CP both have blossomed forth with kilowatts. PJ says his rig is mostly for c.w. but will run some 'phone just for kicks. CP is working on the modulator for his kw. but is breaking it in on c.w. in the meantime. GN and family have left Cordova, and passed through Anchorage on the way to W-Land. Hope to see you back before too long, Dick. AEQ has installed a mobile and is working the bugs out of it; also Al is giving code instruction to some of the up-and-coming lads and lassies. It just goes to show you what can happen when winter comes and the motorcycles won't run anymore. The Anchorage Amateur Radio Club will be meeting in the Public Library from now on, same days, 1st and 3rd Fri.

MONTANA — SCM, Leslie E. Crouter, W7CT — Amateurs in Great Falls and Billings were fortunate in having A. L. Budlong, 1BUD, from Headquarters as a special guest and speaker at meetings held in both cities. Those who were able to attend and hear his talk on the forming of the League and the trials of early-day operating, enjoyed meeting him and hearing his talk very much. Thanks lots, Bud, and we hope you can do it often. TKB made a recording of Bud's talk to take back to the gang at Miles City. There were 42 at the meeting at Billings and about the same number at Great Falls. QGJ has been prospecting for uranium the past few months. TTC is teaching school at Joliet and will be on 75-meter 'phone. ZEK is a new ham in Roberts. RDM has his 304TL rig completely enclosed in a metal cabinet. SMY joined MARS recently. LBK has twin noise squelch on his receiver for monitoring the net during the day. AYG is building a new s.s.b. rig. CT is putting the finishing touches on his new home in Helena and will be on the air and digging into his SCM work. COH, with UKT, JIZ, NEG, FIS, NCS, CJB, FAG, FYU, KN, EXV, VUF, and RHB, and WNs VTR and ZDN did a great job at the Missoula County Fair exhibit. COH extends his thanks to *all* who helped. Work with the HT-9 and SX-43 was outstanding. Traffic: W7ZEK 25, LBK 21, TTC 3, QGJ 2, RDM 2, SMY 2.

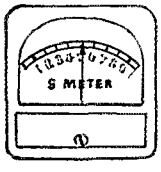
OREGON — SCM, Edward F. Conyngham, W7ESJ — AQK has increased OSN checking by reporting in frequently. VBF, although QRL with college, finds some time for hamming and reporting. JRU is suffering with some very strong QRM. KAB still is working nights. WAT is attending school and has added a second jr. operator, another boy. 6WT paid a call in Portland for eyeball QSOs. PRA, in addition to OSN, has been clearing RN7 and OEN. UHC missed some hamming in order to assist in fighting the forest fire in the Klamath Area. PQJ still is functioning as OO and advises that there are lots of second harmonics on and near 7400 kc. With regret we report the passing of WL to Silent Keys. Traffic: W7QKU 150, PRA 61, THX 28, BLN 24, TIR 24, BVH 23, HDN 22, BDU 6, VBF 1.

WASHINGTON — SCM, V. S. Gish, W7FIX — Attention all Washington ARRL Members: This issue of *QST* calls for nominations of eligible members for the office of Section Communications Manager. All clubs are requested to make nominations of their choice for this office. See operating news for details. OEX resigned as EC for Seattle. A volunteer is requested for this important AREC job. PGY, BA, VAZ, and AHV made BPL, the latter on originations. A new traffic net has been started, Northwest Traffic Net (NTN), on 3920 kc. at 0630 PST Mon. through Sat. Traffic is handled on either 'phone or c.w. Washington Section Net Channel Baker (1988 kc. at 1930 PST Mon. through Fri.) again is in operation for the winter season. PKR is building a DX-100. KKY is going mobile exclusively. HDT is trying to make 2-meter contacts from Clarkston. The Royal Order of Hoot Owls meets each Sat. midnight on 50.4 Mc. CZY now has an s.s.b. rig, Transitron

(*Continued on page 148*)



A good microphone can improve your results as much as a high gain antenna



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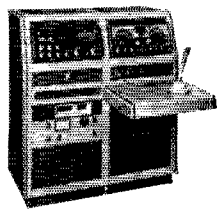

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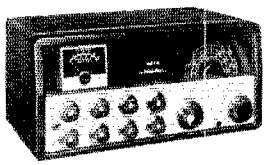

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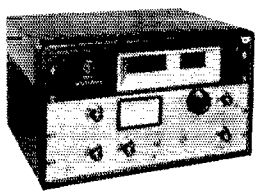

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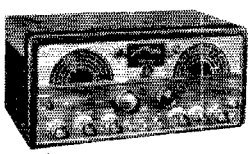

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(*Continued from page 140*)

final, 500 watts, but has only used it on c.w. so far. ZU is building a new home on Mercer Island and is off the air. EHH spent some time in the hospital but now is back on the air when health permits. K6BDF/7 has his long wire up 80 feet now with a noticeable difference in reports. LVB finally got his 814 rig loaded. EVW is more active now that fall is here. TIQ is operating about 35 hours per month on nets. WQD wants information on RTTY. The majority of reports say, "No news this month." Surely there must be something doing somewhere. Not a single club report was received. Your SCM can't write up this column without your news. Traffic: (Sept.) W7PGY 819, BA 797, VAZ 504, AHV 161, KZ 133, OE 128, UIN 76, USO 67, K6BDF/7 50, W7HKA 40, RXH 30, APS 21, AIB 18, EHH 17, FIX 17, LVB 17, EVW 11, TIQ 10, TGO 8, PQT 6, WQD 6, FZB 4, HDT 1. (Aug.) W7KZ 110, K6BDF/6 82, K7WAT 50, W7UIN 21, PQT 11.

PACIFIC DIVISION

HAWAII — SCM, Samuel H. Lewbel, KH6AED — George Dixon, jr., BMT, is the latest appointee. He is now an OBS. You can listen to the latest Official Bulletins on 7270 kc. every Mon., Tue., Thurs., and Sat. at 1215 HST. OS, ZD, and LD remain the mainstays on 2 meters but EE has just gotten started. Trans-Oahu tests on 2 meters have been very successful. Watch for two 2-meter antennas which will appear on the rim of Diamond Head. OO Keefer, KS, reports a cordial reception of his reports and his offers for further checks have been taken up in most cases. Traffic: KH6AJF 1624, QU 701, KP6AK 104, KH6AUJ 10.

NEVADA — SCM, Ray T. Warner, W7JU — ECs: PRM, TVF, and ZT. OPS: JUO, ORS: VIU, OBS: BVZ. Appointees, please note. Several appointments have been cancelled because appointees did not send in certificates for yearly endorsement. Remember, gang, a monthly activity report is an indication of continued interest and will help this column. VK3KM was the guest of OXX in Las Vegas, who conducted him through that mighty hunk of concrete known as Hoover (Boulder) Dam. WN7BGU is Boulder City's latest Novice and has assembled a Viking Adventurer kit. 6PWE has a halfwave on 75 meters in the air and is now radiating from Boulder City. EC PRM made plans for the Simulated Emergency Test. BVZ continues to grind out his Official Bulletin copy on 40 meters.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — Asst. SCM: Roy E. Pinkham, 6BPT, SEC: NVO. The SCCARA hosted a meeting on Oct. 4th at which 1BUD gave information on League growth during the last thirty years. HC, Pacific Division Director, attended the Southwestern Division Convention in San Diego, reporting over 850 registered. CFK, columnist for the local paper, has been invited on a TWA press tour covering many countries in Europe. WGO now is supervisor of the Teletype and Mobile Telephone Installation and Repair Department of Pacific Tel. and Tel. in the San Jose Area. The San Mateo Club meeting was given over to a display of gadgets of the local members. MKM has a new 4-65A rig. CLS furnished three engines for outfitting the yacht *Yasme*. K6HSU did more antenna installing at CLS and also installed the mobile rig. DDC and his XYL visited K6CQV in San Mateo. While not busy keeping 40 meters hot CQV works at opening and closing the San Mateo Bridge. K6LTS is back in Burlingame High School along with K6JXS, who has just dropped the "N" from his call. OWQ is working 14 Mc. with the aid of CLS's old three-element beam, having moved from 3.8 Mc. VQZ and MKM are doing FB on the TVI committee in San Mateo. CUB is QRL going to Stanford. A radio code and theory class has been started at the Carlmont YMCA for teenage boys and their fathers. K6BAM still is looking for contacts in the New England States for WAS. K6EPA painted and modified two 45-ft. masts and will build a vertical for 14 Mc. ZRJ installed a new ground system for his antenna. EXX says the new power ruling on 420 Mc. is making it tough on that band. YHM has returned from Alaska and is remodeling the shack. WLI missed the F.M.T. because of giving the Novice Class exam. K6BBD is building a 6146 rig. OWD is radio operator aboard an Army B36. Traffic: W6ZRJ 234, K6GID 73, W6HC 55, AIT 54, BPT 33, YHM 26, CUB 9, K6EPA 2.

SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — Asst. SCMs: William T. Nakahara, 6GHI, and Fred H. Laubscher, 6OPL. James Stultz, of Ampex Corporation, spoke on "History, Theory, and Applications of Magnetic Tape Recording" and gave a demonstration of stereophonic sound reproduction at the San Francisco Radio Club meeting in September. The San Francisco Naval Shipyard Club reports full cooperation on the private QTH meetings held once every month. There is lots of activity on 6 meters by the HAMS. AHH came in first at the September Hidden Transmitter 29er Hunt. JWF and GGC were lucky winners at the Tamalpais Club meeting. Nomination of officers took place at this meeting. The Marin Amateur Radio Club held its first after-summer meeting and OPL and many others joined the membership list. New calls in the Sonoma County Radio Club are KN6LWB, KN6MIE, and KN6KEW. KN6CZK and KN6HTC dropped the "N" from their calls. ZKM is the

(*Continued on page 144*)

newly-elected vice-president. K6CLV has moved from the area. ZKM also will handle all TVI complaints, replacing LOU. The after-summer session found a large group at the monthly breakfast at Perkins, Redwood City, held by the Mobileers. The Central California Radio Council met at the QTH of PCN for the Ladies' Club's turn at entertaining the group. The weather was ideal and all attending enjoyed being brought up to date on activities for the coming National Convention to be held in San Francisco July 6-7-8, 1956. WB, the chairman, has reserved the Civic Auditorium for the Convention, with the Hotel Whitcomb as headquarters. All club representatives voted to have all local clubs participate even if they are not active members in the Central California Radio Council. Congratulations to HC on his reëlection as Director for this section. Thanks to K6HTC for sending in club news. Fresno's loss was GGC's gain when FEA and WJF moved to the San Francisco section. QMO holds a daily sked at 1100 each morning for San Francisco traffic. CBE prepared rigs and antennas for the SS and DX contests. GQA looks for more activity this fall. MXJ and K6EEV added Trudy Ann to their family Aug. 2nd. PHW and Bea hit the jack-pot with Robin Hope and Jonathan Marks arriving to join the family recently. Congratulations to the parents and the babies. BIP worked 290 contacts in 60 ARRL sections in the last CD Party. K6LEL is the proud holder of a General Class ticket. K6KFS has completed a crystal converter for 6 meters. URA is back on 40 meters. ACN, GGC, and his XYL enjoyed breakfast at DUP's QTH. Ray, his YL, and XYL invited all the Mission Trail Net gang attending the ARRL Convention in San Diego to be their guests at a get-together held on Sun. Oct. 1st. Traffic: W6FEA 101, QMO 55, GGC 22, BIP 17, WJF 8, GHI 6, GQA 2.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — The Tehama Club sent thanks for the wonderful A.R.R.L. films. TMP is working on 2 meters after returning from school in Oklahoma. K6BH is leaving the shack for the winter. PYE has been ill. SYY has a nice DX record. FXQ still is dreaming of s.s.b. SIA moved to Red Bluff. OEY was on vacation for two weeks. OCX is working the rig over for OUZ. LJ still is at golf. EYL will be on 15 meters as soon as the rains set in. SBH is enjoying the new barbecue. OYO is buried under a dozen TV sets. K6FAV is doing a very fine job in traffic work; the same for CNE and CMA. K4AQQ/6 is up on traffic this month. JEQ, the SEC, and JDN attended a dinner given by the Golden Empire Radio Society and, as Chico is to be one of the headquarters of c.d., a talk was given as to the working of c.d. and what would be expected of the amateurs. MWR is busy with c.d. in the Chico Area. 1LZ says that he will become a traveling man and forsake the filling station. Let's try and have more reports, fellows. I seem to be somewhat in the dark as to what is going on. Traffic: W6CMA 169, K4AQQ/6 118, K6ASX 17.

SAN JOAQUIN VALLEY — SCM, Ralph Saroyan, W6JPU — Merry Christmas to all. The civil defense gang has moved to Chandler Field in Fresno and is holding code classes for Novices and General Class licensees. They are using the control tower for a radio shack. Check-in time is 7:30 P.M. Mon. on 3995 kc. K6GOX is on 6 meters. The Taft radio gang has been placed in charge of one of the new California Mobile Com Centers, and rightly proud too! K6BGO has an all-band linear for s.s.b. MSU is running 600 watts to a pair of 813s. UWY has a new ham shack. KOK has a new SX-96. The Trowel Radio Club's call is W6TV. PDD has a new DX-100. SSL is heard on 75 and 40 meters. Ex-W6SSO now is K6LTQ. LTO is back on 75-meter mobile with an FB signal. The Fresno 2-meter repeater is ready to go. JPS, DVL, and party went deer-hunting opening day. PPO and his XYL are back after two months in Europe. PPO is the skipper of the USS *Bald Eagle*, a reefer. GEG has moved down to Los Angeles and is working for Hughes Aircraft. While in the Tulare Hospital, JUK was on 2 meters through the courtesy of the Fresno Radio Club, using one of the Gonset Communicators with great success. Traffic: (Sept.) W6EBL 25, K6CQT 7, W6JPU 3. (Aug.) W6ADB 153.

ROANOKE DIVISION

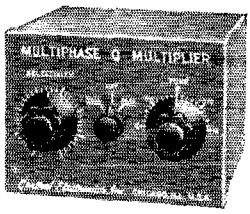
NORTH CAROLINA — SCM, Charles H. Brydges, W4WXZ — SEC: ZG. PAM: ONM. RM: VHH. September was another windy month with Hurricane Ione lashing the coastal areas badly. GNF, CVQ, HUW, YPY, TLA, and K4BIC did NCS work with almost everyone doing a good job of staying off the net frequency. FKT has his new DX-100 on and started things off by working a VK9. A gruesome trip was taken to Mt. Mitchell by BUD and TNF. The rig used was a Viking II and the receiver was an NC-183D. Contacts were made on 10 and 75 meters. GCJ is plowing up 40-meter c.w. with 6.8 watts. Five states were worked in two days with good reports. LEV, the Camp LeJeune station, made BPL again. This is number three in a row for the Marines. A nice report was received from MDA on 2 meters. SGD has been appointed custodian of the YLCC award issued by the YLRL. If you are interested in joining the AREC (Amateur Radio Emergency Corps) send your application to the Section Emergency Coördina-

(Continued on page 146)

NEW MULTIPHASE "Q" MULTIPLIER

- Peaks Desired Fone or CW Signal
- Nulls Out Interfering Carrier up to 50 DB. No Loss in Speech Intelligibility
- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor

MODEL AQ



MODEL DQ

MODEL B SLICER

CONVERTS MODEL A SLICER

Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired $29.50
Kit $22.50

FOR AM, CW, SSB OPS

Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

Wired $29.50
Kit $22.50

BUILT-IN "Q" MULTIPLIER

Upper or lower sideband reception of SSB, AM, PM & CW. For use with any receiver having 450-500 KC IF.

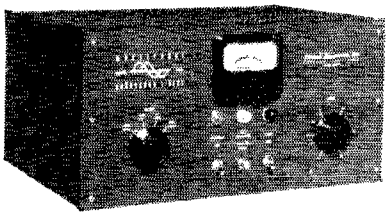
Wired $99.50
Kit $69.50

MODEL A SLICER

Same as Model B but less "Q" Multiplier

Wired $74.50
Kit $49.50

A NEW CONCEPT IN LINEARS



MULTIPHASE 600L

BROAD BAND LINEAR AMPLIFIER

NO TUNING CONTROLS!

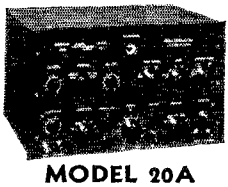
SINGLE KNOB BANDSWITCHING 10-160 METERS

- Single 813 in Class AB_2. Approx. 2 watts effective or 4 watts peak drive for 500 watts DC input.
- New band-pass couplers provide high linear efficiency: 60-65%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
- Exclusive metering circuit reads grid current, watts input, RF output, reflected power from mismatched load — switch to any position while on the air!
- Completely shielded — TVI suppressed. Free of parasitics! Low intermodulation distortion.
- Choice of grey table model (17⅝"W, 8¾"H, 13"D) or grey or black rack model.

Wired, with tubes $349.50

MULTIPHASE EXCITERS

Check These Features



MODEL 20A

- **20 Watts P.E.P. Output SSB, AM, PM and CW**
- **Bandswitched 160 — 10 Meters**
- **Magic Eye Carrier Null and Peak Modulation Indicator**

Choice of grey table model, grey or black wrinkle finish rack model.

Wired and tested $249.50
Complete kit $199.50

NOW IN BOTH MODELS

- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch, with 40 DB. suppression.
- New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
- Talk yourself on frequency.
- Calibrate signal level adjustable from zero to full output.
- New AF Input Jack. For oscillator or phone patch.
- CW Break-in Operation.
- Accessory Power Socket.

MODEL 10B

- **10 Watts P.E.P. Output SSB, AM, PM and CW.**
- **Multiband Operation using plug-in coils.**

Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.

Wired and tested $179.50
Complete kit $129.50

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

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tor, ZG, 780 Pine Valley Road, Winston-Salem. For the information of the ECs this is Roy's new address. Every community that has a group of amateurs should have an Emergency Coördinator. If YOU are interested in becoming an EC, drop either the SEC or SCM a line to let us know you are interested. Some stations in the State are interested in starting the traffic net this year. The time and frequency of this net will be announced at a later date. The net will be called the North Carolina State Traffic Net (NCSTN). There also has been some talk of a c.w. traffic net. How about some comments on this? Traffic: (Sept.) W4SGD 20, GHS 16. (Aug.) W4LEV 938, BUW 4, ACY 2.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — DYP is ORS and is on the South Carolina Net using a Heathkit DX-100. South Carolina hams are now displaying full-size ham auto license plates for the first time. 1TNO/4 is on 80-meters c.w. and other bands from Shaw AFB using a Viking Ranger. Activities reported in this column are based on reports received from amateurs in this section. In order to be listed, activities must be reported to the SCM. Few reports were received this month. This probably will be my last report since an election for SCM is being conducted. I wish to thank the hams of South Carolina for their splendid coöperation and support during my last two terms as SCM. You have responded to every call and the feeling of support is ample payment for the large amount of work involved in the SCM job. The Highway Department reports 260 South Carolina ham auto licenses were issued for 1956. The following nets are now operating: South Carolina 'Phone Net, Mon. through Fri. at 7 P.M., Sun. at 8:30 A.M. and 3:30 P.M. 3930 kc.; South Carolina C.W. Net, Mon. through Fri. at 7 P.M., 3795 kc.; South Carolina Mobile Roundup, Sun. at 2 P.M., 3930 kc. Traffic: W4HDR 128, FFH 73, ANK 15, K4ADQ 6.

VIRGINIA — SCM, John Carl Morgan, W4KX — SEC: RTV. Ubiquitous RTV tops the section in the September Virginia QSO Party. Hughes operated mobile in New Kent and Charles City, plus the rig at his home QTH. Second place went to IHN; ULM was third. Only one Novice was known to have participated, KN4EBW in scarce Washington County. Details appear in the *Virginia Bulletin*. VFN and VN were manned and ready throughout the Hurricane Ione emergency. The Fredericksburg Area gang coöperated with c.d. in operating ONV/4 from the Fair. TYC is signing /3 from Washington where he's at school, but finds time for VN. TFX also is at school in D. C. LW is QRL skippering a Navy tanker. SHJ is kept from much activity by Navy "tin can" duty. BLR is seeking W4 YLs who'll admit to being licensed before 1930. Kay's OM, BVB, had to go mobile to get on the air. OFR says the CVARC had two successful transmitter hunts. YE and YZC are getting set up in their new Fairfax QTH. UMF finds Falls Church a good v.h.f. QTH. BRF now is an OTC member. Welcome, Brother "Foggy." JUJ was the first W4 to receive a WASM certificate. VQZ is monkeying with transistors and is succeeding in de-chirping ARC-5s. DQI demonstrated ham radio at a PTA meeting. BYZ handled a message so urgent the Danville Gendarmes delivered it. Thanks to clubs for the lists of officers. They will be useful in the SCM files. New mobiles are reported by OFR, DQI, and YVG. The SCM had a visit from veteran BPLer 3QQE, of W4PFC. If you're not on the mailing list for the *Virginia Bulletin*, drop a line to Ye Editor and Asst. SCM, UBC. Traffic: W4PFC 1086, K4ASU 124, W4BLR 117, ONV/4 105, FV 99, K4CDA 54, W4RJW 44, AAD 36, CGE 34, TFZ 33, CZB 22, OGX 22, YVG 22, BYZ 20, FKP 20, BGX 18, K4DBC 17, BBR 10, W4IS 10, IA 8, TYC/3 8, JUJ 7, OFR 6, SHJ 6, KFC 4, KX 4.

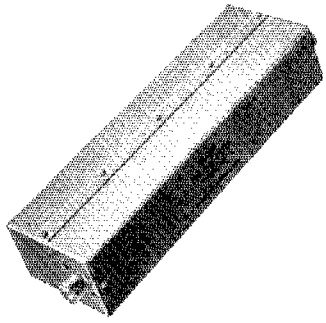
WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — SEC: GEP. PAMs: GCZ and FGL. RMs: DFC, GBF, HZA, and JWX. DDK works lots of DX. The Princeton Club has a drive on to increase ARRL membership in order to become affiliated. It is hoped that this goal will be achieved. KDQ will enter service in the Army soon. Best of luck, Ed. JBE has a new DX-100 rig. YMN has a new antenna tower. KVO is a cadet at Greenbrier Military School. ZOJ has a good hefty signal on 75 meters. RGE is planning high power. WN8DEY is quite active in Charleston. 4VCH/8 is located in Parkersburg with the CAA and may become active on the c.w. net. We all hope so. A c.w. outlet is badly needed there. IXG has a Ranger in operation now. NYH visited 4JPV and attended the Lexington and Kingsport Hamfests. PJI has a Globe Scout rig with 50 watts on 'phone, 65 watts c.w., and works all bands. The 'phone and c.w. nets are having very good turnouts but could stand additional activity. The c.d. RACES station at the Capitol Bldg. now has an NC-300 receiver and Viking KW. It should be on the air soon. The amateur bands will be operated also. More activities information would be appreciated from the active hams in this section. Traffic: W8HZA 50, PJI 39, JWX 26, BWK 22, IXG 20, NYH 14, TGL 14, IXG 3, WN8DEY 2.

ROCKY MOUNTAIN DIVISION

COLORADO — Acting SCM, Carl L. Smith, WØBWJ — SEC: MMT. RM: KQD. PM: IUF. It is with deep regret that we announce the passing o 1DK on Sept. 24th. Atten-

(Continued on page 148)

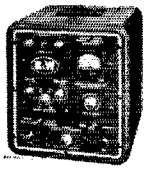
QUALITY PRODUCTS BY B&W



LOW PASS FILTERS

You reduce unwanted harmonics and spurious radiations causing TVI by a minimum factor equal to 17,780 to 1 . . . without tuning or any adjustments . . . with B&W low pass filter. A minimum of 85 db attenuation is achieved throughout the TV band, and more than 100 db on Channel 2. The Wave Guide principle employed in the design of the filter permits a novel type of multi-sectional construction providing greater attenuation in less space, at lower cost.

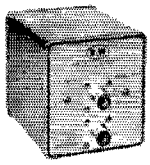
SINGLE SIDEBAND GENERATOR



The 51SB generator offers sparkling SSB performance with your present B&W, Collins, or Johnson transmitter, on 80 through 10 meters with the output frequency control presently in your transmitter.

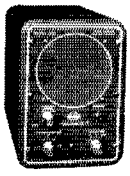
ALL OF THESE FINE B&W products are available at leading distributors' everywhere.

AUTOMATIC T - R ANTENNA SWITCH



Fully automatic electronic antenna changeover from receiver to transmitter and *vice-versa* — suitable for all power applications up to the legal limit. Model 380 is ideal for voice operated SSB — AM phone and break-in CW —all with one antenna.

SINGLE SIDEBAND RECEIVING ADAPTER

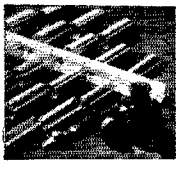


Truly selective band-pass type adapter converts any receiver with an IF between 450 and 500 kc for true single-signal CW reception, selective sideband AM reception, superb performance on SSB.

AUDIO PHASE SHIFT NETWORK

Model 2Q4 splits any audio signal from 300 to 3000 cps into two equal amplitude components 90° ±1.5° out of phase with respect to each other . . . for SSB operation.

MINIDUCTORS



Highly efficient miniature coils offering extremely low losses and real space saving economy. Ideal for compact, high frequency circuits, mobile and portable rigs. Diameters from ½" to 1", standard lengths of 2" or 3". Choice of 4, 8, 16, or 32 turns/inch.

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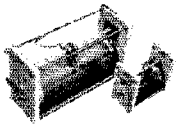

A practical method for continuously varying inductance over the entire coil range. Available in two sizes for powers up to 1000 watts. Quality construction for long, trouble-free life.

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tion all traffic-handlers, the following nets are in operation and welcome your participation: High Noon on 3945 kc. at 1200 Mon. through Sat.; Slow Speed (CSSN) on 3570 kc. at 1715 Mon., Wed., and Fri.; Weather on 3945 at 0800 daily; and Emergency Phone Net on 3890 kc. at 0830 Sun. Newly-licensed hams are especially urged to check in to the CSSN to gain traffic-handling experience and increase areas of coverage. New appointments made are KQD as TCC Director for Pacific Area (congratulations to Irene for the fine work in traffic management), KØWBB as ORS and OPS, and MYX as RM in charge of CSSN (Mac probably has earned the title of "Busiest Man on the Air in Colorado"). MYX advises that the new "harmonic" has upset his old routine. Communication assistance during the Continental Divide Rally was provided for the American Sports Car Club by WØs AGU, NWJ, and WJR. The Sky-Hi Radio Club has resumed fall meetings; TMP is operating the club station on 40-meter c.w. The Denver Radio Club elected BWJ, pres.; HXP, vice-pres.; CXW, secy.; and BON, treas. KØWBB and KQD made BPL. Hope everyone had a good time in the SS Contest, and best wishes for a Very Merry Christmas. Traffic: (Sept.) KØWBB 659, WØKQD 548, EUL 31, AGU 20, IUF 20, SWK 13, BWJ 10, IA 9, HOP 4. (Aug.) WØHOP 11.

WYOMING — SCM, Wallace J. Ritter, W7PKX — The Wyoming Weather Net received a certificate of appreciation from the U. S. Dept. of Commerce, Washington, D. C., for its activity during the flood at Torrington, Wyo., on June 26, 1955, and also for the furnishing of off-airways weather reports daily from the Net. HDS received an individual certificate for her part as net manager. The YO C.W. Net will be in operation soon on 3620 kc. Mon., Wed., and Fri. Those interested, listen for announcement on the Pony Express Net. YKL visited the SCM and got acquainted in person. TZK is very busy with ranch work but is making schedules first rate. YJG is permanently located at Cheyenne. CAK is active again with a good-sounding mobile. NII is rebuilding to higher power. LLP is on the West Coast giving W6 stations QRM for a change. KFV still is making his Viking act like a Collins. ACG is taking over his new SEC duties in fine shape, with IDO giving him moral support. HX is back in operation in good form again. NVX is having trouble with the voice control. IIC and NMW report in regularly from Upton. Your SCM would appreciate more news concerning local club activity, etc. Traffic: W7PKX 70, HDS 61, YSF 32, AXG 31, TZK 31, ZUC 25, VCP 20, IIC 3.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Joe A. Shannon, W4MI — SEC: TKL. PAM:WOG. RM: KIX. Appointments not renewed at the proper time will be cancelled. COU is operating from a new basement location. YRO, in his new home, is having antenna problems. NZM is running 600 watts to 813s with a quad for 20 meters. WOG has the B&W back in shape after his freak accident. ZSQ's backyard shack has a new paint job. HKK is doing a good job with the T-90 in a new Chevvy. AVX is working on power increase and a multitude of gadgets for the shack. ZSH has CP-15 w.p.m. and is meeting AENB and RN5. TXO also is trying his hand on c.w. and AENB. CNU is portable in Auburn. HFU, also in Auburn, hopes to have the new homebrewed 100 watts going there. K4BSV is mobile with a new Elmac. NKX has taken over the reins of the Huntsville Club as GEQ has moved to New York. WAZ has upped the power to 350 watts. W1IW is active on MARS. K4ACL is at Veterans Hospital, Birmingham, but operating from his bedside with a Globe Scout and an S-40. The antenna was put in by DTT, AVX, and EBD. More news from Mobile and the Chattahoochee Valley Area would be most welcome. Traffic: (Sept.) W4WOG 134, ZSQ 85, KIX 65, YRO 64, HKK 62, RLG 47, DTT 41, AVX 38, ZSH 33, EJZ 30 OAO 27, TXO 17, VIY 16, K4AOZ 15, W4CNU 10, DGN 10, HFU 10, DXB 5, K4BSV 3, W4TKL2. (Aug.) W4COU 360, YRO 66, UHA 44, NZM 33, YAI 22, BMM 12, K4AOZ 6.

EASTERN FLORIDA — SCM, Arthur H. Benzee, W4FE — SEC, IYT, and his XYL, GGQ, spent part of their vacation at New York and Headquarters. ZB is back on the air after spending the summer in Virginia and Pennsylvania. EGY now is running a DX-100. HTA and K4AAJ are now Technician Class. RWM was an instructor at Civil Defense Staff College at Florida State University. ZUS is operating in VO2-Land. Traffic: W4ZIR 143, WEO 77, IYT 57, WS 45, AHZ 21, WEM 11, YNM 11, BWR 7, WHF 4, IM 1. (Aug.) W4WEO 102, LAP 74, ELS 56, WEM 12, ZUS 9.

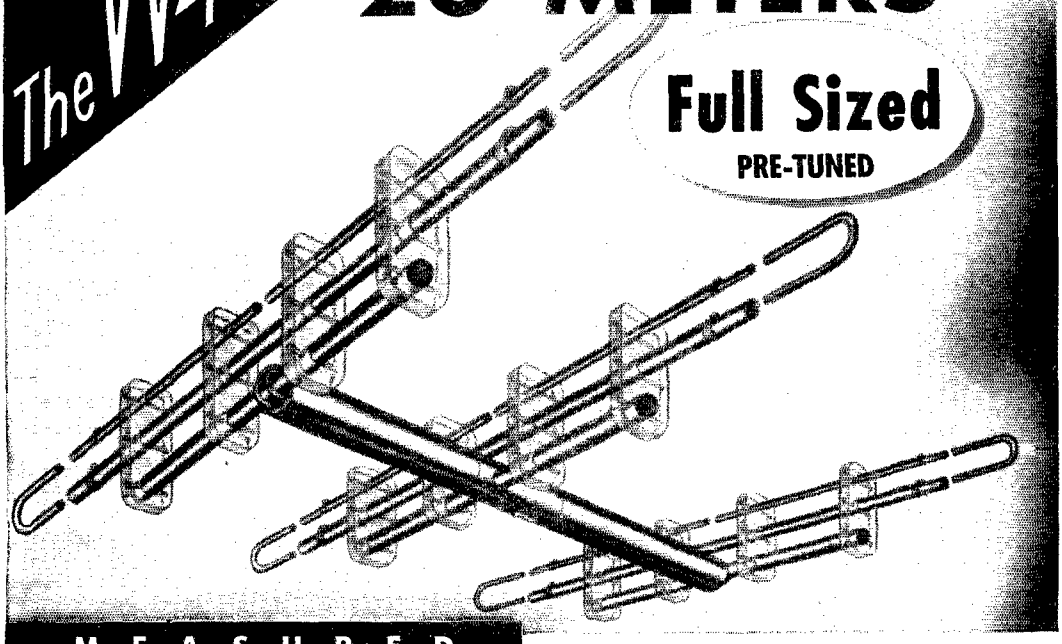
WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/W4RE — SEC: PLE. ECs: MFY and HIZ. FHQ has a new sideband slicer and holds 100 per cent QSOs. CCY is really pulling in the DX with a new 75A-4 receiver. YES keeps things humping with a DX-100. DAO/DEF is active on the 75-meter nets. HJA has a new receiver and is listening to s.s.b. BIJ has received orders. K4AH is still shopping for the ideal rig. UCY is all smiles with 10 meters doing so well. GMS reluctantly leaves the 15-meter beam and returns to college. QK has a neighbor of five years

(Continued on page 150)

The W4GL All Driven Rotary Antenna

20 METERS

Full Sized
PRE-TUNED



M E A S U R E D
FORWARD GAIN
11.8 DB

FRONT TO BACK RATIO
40 DB *OR BETTER*

- **Impedance match — 52 ohms**
- **Element length — 33 feet max.**
- **Boom length — 24 feet**
- **Weight — 85 lbs. approx.**
- **All aluminum construction**
- **Stainless steel hardware**
- **1 inch thick plexiglass insulation**
- **Pretuned for 14,250 Kc.**
- **S W R — 1:1 at resonance**
  1.3:1 at band edge 14,000—14,400
- **Quick rig assembly**

ALSO AVAILABLE: Shortbeam — Multiband — Short Dublets. WRITE for Catalog EN20 for Shortbeams and Catalog 4GL for 4GL Beam.

"Designed for the Ham Who Demands the Best"

Radio Specialties, Inc. proudly presents the greatest development in rotary antennas. This is the result of 20 years of development and research by S. E. "Dick" Adcock of Miami, Florida who has designed and perfected this most revolutionary antenna ever to be used by the Amateur. The ultimate in engineering design and the finest of materials are combined with precision workmanship to create a product unexcelled in the antenna field.

The extremely low vertical angle of radiation will provide the BEST in DX reception. Extraordinary front to back ratio guarantees minimum QRM. Exceptionally high forward gain assures outstanding reports. On the air tests by W4GL over a period of many years have proved that this all driven array has outperformed any parasitic antenna as to forward gain, front to back ratio and a desirable radiation angle. W4GL'S outstanding signal using the all driven array has been heard the world over with excellent reports.

- **Model No. 3DA20** Amateur Net $350

W4GL's ALL Driven Antenna is now available for immediate delivery through your Distributor.

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who didn't know he was a ham. Hi. KN4AGM is awaiting Tech. Class license. BGG is having antenna location trouble. KN4ECP has an Adventurer all ready to go. UUF is back on 75 meters. MUX burns up bugs with him. The Pensacola High School Radio Club is perking up again. KN4ADY is married and living in a trailer in Tallahassee. NN is heard making the boys wish they had a similar rig. MEN is showing interest again. JPD meets the Sunday 10-meter Net. PAA has new tower, new beam, and new TVI. Hi. AXP keeps up his usual c.w. activity. MS is enjoying solid 20-meter QSOs on s.s.b. BFD is QRL port-hole radio. NJB is reading up on s.s.b. OOW is up and around again after an illness. ZPN keeps skeds perking. UC is getting parts for the gang. PQW is QRL work. The Pensacola Amateur Radio Club is looking forward to a big season with the approach of cooler weather. Traffic: W4AXP 8.

GEORGIA — SCM, George W. Parker, W4NS — SEC: CFJ. PAMs: ACH and LXE. RMs: MTS and OCG. Nets: Georgia Cracker Emergency Net meets on 3995 kc. Sun. at 0800, Tue. and Thurs. at 1900 EST; Georgia State Net (GSN) 3590 kc. Mon. through Fri. at 1900 EST. ZD is fast acquiring a family of operators, his XYL is KN4GCT, his daughter is KN4GCF. KN4GCK is the XYL of MV, and KN4GCL is the XYL of ZUF, all of Atlanta. Other new Novices, all graduates of the Atlanta Radio Club classes conducted by ZD and MTS, are KN4s GCJ, GCN, GCI, and GCG. UNG has a new Minibeam at his new QTH and is active on 20 meters. K4CZR, the XYL of CFJ, now has Technician Class license. KN4DKM, of Quitman, has an AT-1 and a 560-ft. long wire and has 32 states confirmed toward WAS. ZPQ/DL4PH has returned from DL4-Land and is going to college in Pomona, California. PMJ has moved to Reynolds and is active on s.s.b. VWO, in Hawkinsville, now is active on 75 meters with a DX-100. FWM has moved to Ringgold. KN4GBQ is a new Novice in Ringgold. New officers of the Athens Club are FGU, pres.; OTA, vice-pres.; RSO, secy.-treas.; DLJ, act. mgr. On Sept. 20th RSO, OTA, and NRS participated in a radio program devoted to amateur radio over WRFC in Athens, LXE is recuperating from an extended illness. Congratulations to our Director, ZD, who was reëlected without opposition. Traffic: (Sept.) K4FED 1260, WAR 584, W4CFJ 426, OCG, 375, PIM 174, DDY 134, HYV 68, ZUF 37, NS 22, ZD 20, MTS 18, BXV 8, IMQ 4. (Aug.) K4WAR 606, W4DDY 95, MTS 14.

SWEST INDIES — SCM, William Werner, KP4DJ — SEC: JM. DV and WR are MARS AH2BT and AH2BX. WQ's XYL is KP4ABY and WR's XYL is KP4ABZ. ABX is a judge in Aguadilla and uses a Viking II and an HQ-129X. KV4BA raised the base of the vertical 6 feet off the ground for greatly increased signals. ZW put up a 41-foot radar tower for the new 20-meter three-element beam and has a new 'phone patch. ADO, a new ham in San Juan, is ex-KH6 and is Airway Traffic Controller. RD installed a Telrex 20-meter beam on a 60-foot pole. ABU is on 75 meters with an Eldico 813 rig. Twenty-five hams and their families attended the PRARC picnic at Luqillo Beach. DV, CX, and QV were there with mobile rigs. The new radio club, formed by students of Colegio San Jose in Rio Piedras, has a Globe King, an NC-240, and a Heathkit transmitter. W4VQN now is KP4ADB at Ramey AFB. WQ and AQ have new 20-meter beams. AAW is a new station at Aguada. NT is rebuilding the five-element 20-meter beam. The Antilles Net, KP4YX NCS, was alerted during the passing of Hurricanes Ione and Janet gathering weather reports from the Islands to the south for USWB. BU and WD bought electronic keys. Traffic: KP4WT 123, UH 6, ZW 5, DJ 4.

CANAL ZONE — SCM, Roger M. Howe, KZ5RM — CZARA president, JD, has left the Canal Zone for YV-Land. Sis, AE, is acting president. Danny Weil, VP2VP, going around the world in the 40-foot sloop *YASME*, was met at Cristobal by MN, EM, and LB. Danny gave a very interesting talk at the last CZARA meeting. He is house guest of MN while here. PL is back from her vacation to California and Hawaii. WA and XYL are on a vacation trip to the States and Hawaii. DG entertained the QRMarys with a very interesting report of her visit to the YLRL Convention in California. LM is Stateside on a short vacation. BE checks into TXN daily. The Club received another very interesting letter from Yehudi and acting president AE read it to the club. Our offer still stands on that associate membership. Traffic: KZ5WA 152, VR 73, FA 65, DG 62, BR 33, RV 23, GD 12, BE 2.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, William J. Schuch, W6CMN — Asst. SCM: Albert F. Hill, jr., 6JQB. SEC: QJW. RMs: K6DQA and W6BHG. Clubs: Please forward information on code classes. Many queries are received at this office and the listing is incomplete. The Whittier gang is going great guns on 420 Mc. K6IAV is QRL college in Oregon. UED has rebuilt the station and is back in business. K6KJN and K6BEQ are both mobile. BUK is vacationing East. K6EA also is in WØ-Land for the winter. BES sports a new 75A-4. K6HBA got into the Minnesota QSO Party. How many would like to have a section QSO party here?

(Continued on page 152)

FOR COMMERCIAL USE

F-6 SERIES 1000 KC to 60 MC

Wire mounted, plated crystals, for use in commercial equipment where close tolerances must be observed. All units are calibrated for the specific load presented by equipment.

Holders: Metal, hermetically sealed.

Calibration Tolerance: ±.0025% of nominal at 30° C.

Tolerance over Temp. Range: ±.005% from −55° to +90° C. ±.002% from −30° C to +60° C.

Circuit: As specified by customer. Crystals are available for all major two-way equipments. In most cases the necessary correlation data is on file.

Drive level: Maximum—10 milliwatts for fundamental, 5 milliwatts for overtone.

F-605	F-609	F-612
Pin dia. .050	Pin dia. .095	Pin dia. .125
Pin lngth. .230	Pin lngth. .445	Pin lngth. .820

Pin spacing on each of above is .486

highest quality . . . lowest cost

ONE-DAY SERVICE

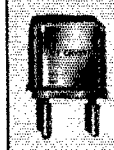
from

International

FOR AMATEURS and EXPERIMENTERS

ONE-DAY PROCESSING **.01% Tolerance**

FA-9 **Spot Frequencies 1500 KC to 75 MC** **.01%**



FA-9

.01% TOLERANCE—Crystals are all of the plated, hermetically sealed type and calibrated to .01% or better of the specified frequency. See specifications below:

Holders: Metal, hermetically sealed, available in .093 dia. pins (FA-9) or .050 dia. pins (FA-5).

Calibration Tolerance: ±.01% of nominal at 30° C.

Temperature Range: −40° C to +70° C.

Tolerance over temperature range from frequency at 30° C ±.01%.

Circuit: Designed to operate into a load capacitance of 32 mmf on the fundamental between 2000 KC and 15 MC. Designed to operate at anti-resonance on overtone modes into a grid circuit without additional capacitance load. Write for recommended circuits).

Orders for less than five crystals will be processed and shipped in one working day.

FA-9 PRICES

RANGE	TOLERANCE	PRICE
Fundamental Crystals		
1500-1799 KC	.01%	$4.50
1800-1999 KC	.01%	$3.90
2000-9999 KC	.01%	$2.80
10000-15000 KC	.01%	$3.90
Overtone Crystals		
(for 3rd overtone operation)		
15 MC—29.99 MC	.01%	$2.30
30 MC—54 MC	.01%	$3.90
(for 5th overtone operation)		
55 MC—75 MC	.01%	$4.50

PRINTED CIRCUIT OSCILLATOR

for Generating Spot Frequencies with Guaranteed Tolerance 200 KC to 60 MC

Since the operating tolerance of a crystal is greatly affected by the associated operating circuit, the use of the FO-1 Oscillator in conjunction with the FX-1 Crystal will guarantee close tolerance operation. Tolerances as close as .001 percent can be obtained.

FO-1 for Fundamental Operation 200 KC to 15,000 KC

FO-1—Oscillator Kit (less tube and crystal) $3.95

FO-1A—Oscillator, factory wired & tested with tube (less crystal) $6.95

FO-1B for Overtone Operation 15 MC to 60 MC

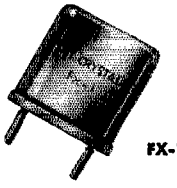
FO-1B—Oscillator Kit (less tube and crystal) $3.95*

FO-1BA—Oscillator, factory wired & tested with tube (less crysal).... .....$6.95*

***Includes coil in one of five ranges: 15-20 MC, 20-30 MC, 30-40 MC, 40-50 MC, or 50-60 MC, specify when ordering. Extra coils 35c each.**

FX-1 CRYSTAL

Companion to the FO-1 Oscillator



FX-1

The FX-1 Crystal is designed for use only with the FO-1 Oscillator. For tolerances of .01% and .005%, any FX-1 Crystal can be used with any FO-1 Oscillator.

For tolerances closer than .005% the Oscillator and Crystal must be purchased together. The Oscillator is factory wired and the crystal custom callibrated for the specific oscillator.

For crystal prices consult table below:

TOLERANCE	1500-1999 KC	2000-9999 KC	10,000-15,000 KC	15 MC-29.9 MC	30 MC-60MC
.01%	$ 3.75	$ 3.00	$ 3.25	$ 3.00	$ 4.00
.005%	$ 4.50	$ 3.50	$ 4.00	$ 5.00	$ 6.50
(For .0025% and .001% tolerances see footnote)					
.0025%	$ 5.25*	$ 4.50*	$ 4.75*	$ 6.50*	$ 8.50*
.001%	$ 6.50*	$ 6.00*	$ 6.00*	$10.00*	$15.00*

*** Prices are for crystal only. To insure tolerances closer than .005% crystal must be purchased with oscillator factory wired and tested. For total price add $6.95 to price of crystal desired.**

Write for prices on frequencies **200-1499 KC**

HOW TO ORDER: In order to give the fastest possible service, crystals and oscillators are sold direct. Where cash accompanies the order, International will prepay the postage. Otherwise, shipment will be made C.O.D.

Send for FREE Catalog covering International's complete line.
Crystals available from 100 KC to 100 MC

International CRYSTAL Mfg. Co., Inc.

18 N. Lee OKLAHOMA CITY, OKLA. Phone FO 5-1165

K6ELX has a 90-ft. 14-Mc. beam. The Frank Wiggins Amateur Radio Club, YAS, has new officers as follows: Herb Case, pres.; K6JUZ, vice-pres.; Jim Davis, secy.; Ell Biles, treas. K6BWD reports a new Viking and a VFO and is working 75 to 15 Mc. K6GUZ's 14-Mc. quad fell down. TDO is on 144 Mc. K6EXQ worked ten states in two hours on 10 meters recently. The Tri-County Amateur Radio Assn. had a swell booth at the county fair under the call K6AGF. BHG still is QRL many skeds. GJP is sporting a new V37 antenna. K6HMB is looking for skeds on 420 Mc. Your SCM was very glad to see so many of the Los Angeles gang in San Diego. Thanks for the glad hand, folks. VZA moved to Flintridge. K6HVB and HJV are proud owners of brand-new General Class tickets. Congrats. The Southern California Net needs help. It meets on 3600 kc. at 1930 Mon.-Fri. Let's support the section net. With school started many of the boys are missing from the air these days. From all reports the gang had a swell time at the San Diego Convention and a goodly bunch came home with swell prizes. AM visited BZE in San Diego and worked some DX from there. K6COP has a QSL from VS2DQ. Yours truly is back on the air and proud of it. Traffic: (Sept.) K6HOV 505, W6GYH 336, LYG 295, QGX 224, USY 222, WPF 193, BHG 143, K6DQA 107, KCI 102, W6CAK 80, TDO 71, K6GUZ 65, COP 57, W6CK 48, CMN 36, K6IYF 36, BWD 16, EA 16, IQF 9, DDO 8, W6CBO 5, YAS 5, AM 4, ORS 3, K6ELX 2, HBA 2, W6NJU 2, (Aug.) K6FCY 624, W6LYG 152, WPF 81, K6DQA 55, W6CK 33, MBW 18, ORS 11.

ARIZONA — SCM, Albert H. Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH, and Dr. John A. Stewart, 7SX. SEC: VRB. PAM: KOY. Arizona 'Phone Net: Tue. and Thurs. 7 P.M. MST, 3865 kc. Arizona C.W. Neb: Tue. and Thurs. 8 P.M. MST, 3690 kc. The outstanding event of September was the simulated emergency enacted by the Yuma County Emergency Net, which consists of 28 stations, including 5 Novices. Under the guidance of OFA as net control and ANB as asst. net control, the following stations participated: ACN, BAIC, EYT, JNY, KSL, LEE, RIP, TJT, WBG, WNO, WRP, WSY and WUE, and WNs ZTA and ZZT. The Southern Arizona Hamfest was held over Labor Day at Fort Huachuca with about 100 present. Sorry to report that at press time no information regarding those present had been received. The committee in charge was AAM, CMC, FCP, KOF, KOL, MES, UMK, and VAU. The AARC had an election of officers with the following results: MWQ, pres.; QZH, vice-pres.; KOY, secy.; QZX, treas.; YGF, publicity; OUE, membership; UDI, program. New calls: Transfers — BFC (ØKAS), BFE (ØCDQ), and WN8WMM. Conditional Class — AFF and ZSE. General Class — RWI. Novice Class — ACB, AZB, BBC, and YJJ. Technician Class — AMH. Silent Keys: Gus Batchis, YLT, and Ken Caldwell.

SAN DIEGO — SCM, Don Stansifer, W6LRU — IAB is now OPS and ORS. BKZ is a new OO. GHT spent time in the hospital recently, but is up and about now. K6AWZ now sports a Communicator, and is active on 2 meters. BZE has a new six-element Telrex on 14 Mc. and is up to 207 countries. K6DVF is active on 75-meter 'phone mobile. GBG has a new three-element 14-Mc. beam. BAM, an old-time DXer, was heard working XW8AB. YDK recently received a letter of thanks from the sheriff in Rawlins, Wyo., for providing communications after an accident there. K6BTO and other South Bay Area hams are active on 420 Mc. K6APG has left the area for sea duty, and is especially missed by the 10-meter AREC gang. BQP is a new member of the FCC staff in Santa Ana. Ney Landry, ex-FCC representative in San Diego, passes his regards and thanks to all who made his stay here so enjoyable. JSU is a new member of the Coronado Club. K6DWV is back from Europe. The entire San Diego DX Club turned out for the DX breakfast during the ARRL Convention, and met many friends and competitors. The breakfast was handled by BZE, and master of ceremonies was AM. SEG lost his stacked beams in a recent wind but is now back in business chasing DX. CAE spent five weeks in the East on business. K6CTQ worked his first European on 21 Mc. during a recent opening. YXU has joined the ranks of s.s.b. VOP moved to Los Angeles. Recent activity on 10 meters has many locals hunting for tubing and information on 10-meter beams. ZWK worked ZS3BB and ET2US on 20-meter 'phone, long path. GBG is sweating out cards for DXCC. Traffic: (Sept.) W6YDK 3322, IAB 2098, K6DBG 58, W6GBG 2, (Aug.) W6IAB 1864.

SANTA BARBARA — SCM, William B. Farwell, W6QIW — SCM Bill Farwell still is laid up although he is home from the hospital and able to be on the air a limited amount daily. Taking part in fire-fighting in the Santa Ynez Mountains near Santa Barbara were ENJ, WOU, K6JUN, EGQ, EUM, NBI, W6DOB, and many others. The Santa Barbara Amateur Radio Club reports the best way to make a profit on raffles is to give bigger and better prizes. K6BJ spoke before the Santa Barbara Club in July and the Ventura County ARC of Oxnard in September. K6KPU, the SEC, is building a new ham shack. The Ventura County Fair held Oct. 5th through 9th was a big success, with the Ventura ARC represented by NTF/6 on 75-, 40-, and 2-meter 'phone. ZKL has left Oxnard for

(Continued on page 154)

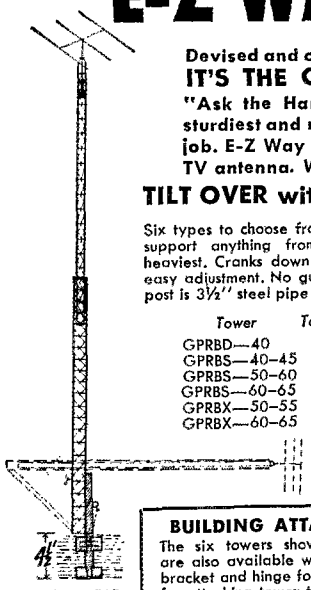
E-Z WAY TILT OVER TOWERS

(Patent applied for.)

Devised and created by E-Z Way over 5 years ago. Often copied but never equalled.

IT'S THE ORIGINAL **TESTED AND PROVEN**

"Ask the Ham who owns one." More than 15,000 satisfied users. One of the sturdiest and most versatile towers in the industry. Don't send a boy to do a man's job. E-Z Way Towers are *designed* to support Rotary Beams—not just a lightweight TV antenna. We *invite comparison.*



GOOD OLD TERRA FIRMA

TILT OVER with Ground Post

Six types to choose from—40 to 65 ft. Built to support anything from a Mini-Beam to the heaviest. Cranks down and tilts over for quick, easy adjustment. No guy wires needed. Ground post is 3½" steel pipe or larger.

Tower	Tower Hgt.	Price
GPRBD—40	38 ft.	**$120.00**
GPRBS—40–45	38 ft.	**$160.00**
GPRBS—50–60	48 ft.	**$210.00**
GPRBS—60–65	58 ft.	**$260.00**
GPRBX—50–55	48 ft.	**$325.00**
GPRBX—60–65	58 ft.	**$385.00**

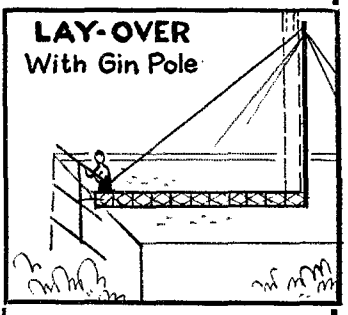
BUILDING ATTACHED

The six towers shown above are also available with a wall bracket and hinge for the base for attaching tower to the side of a building. Crank up and down.

BARBD—40	**$ 95.00**
BARBS—40–45	**$130.00**
BARBS—50–60	**$170.00**
BARBS—60–65	**$210.00**
BARBX—50–55	**$265.00**
BARBX—60–65	**$325.00**

Three types to choose from—40 to 60 ft. Ideal one-man installation for flat roofs or porches. Cranks up and down and lays over for easy antenna adjustment. No guy wires needed. Tower is locked in a V-bracket at top of gin pole.

GINRBD—40 **$125.00**
GINRBS—40–45 **$165.00**
GINRBS—50–60 **$215.00**

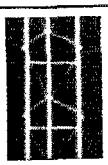


Provisions to mount rotor inside top of tower. Bearings at A and B relieve all strain from rotor.

Add 10% to prices shown for West Coast orders. All E-Z Towers have heavy dip-coated Goodyear Pliolite S-5 (rubber base aluminum enamel). Hot dipped galvanized available at extra charge. ⅛" aircraft cable 2000 lb. test used on D-40 towers. All other cable is 5/32 aircraft 2600 lb. test.

BUILD IT YOURSELF

Go as high as you like with 20 ft. sections. 320 ft.?



C-10

Width 10" Max. Height 120 ft. Guy Spacing 27 ft. Weight per ft. 4¼ lbs. Price (approx.) $2 per ft.

C-15

Width 14" Max. Height 200 ft. Guy Spacing 40 ft. Weight per ft. 8 lbs. Price (approx.) $3.50 per ft.

C-25

Width 25" Max. Height 320 ft. Guy Spacing 60 ft. Weight per ft. 20 lbs. Price (approx.) $9 per ft.

Used extensively for VHF and UHF communication antennas. Two other sizes available. When maximum height and guy spacing are not exceeded, these towers will withstand a 40 lb. wind load.

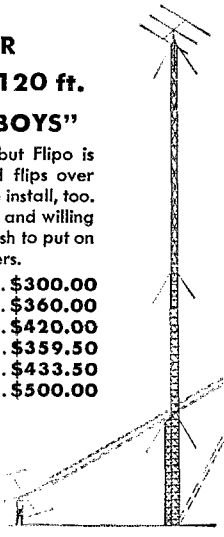
FLIP OVER 80-100-120 ft.

"FOR THE HIGH BOYS"

Gets you up in the air but Flipo is easily cranked down and flips over to adjust antenna. Easy to install, too. A real sturdy brute ready and willing to carry any load you wish to put on it. One of our finest towers.

FORBS—80	**$300.00**
FORBS—100	**$360.00**
FORBS—120	**$420.00**
FORBX—80	**$359.50**
FORBX—100	**$433.50**
FORBX—120	**$500.00**

E-Z WAY TOWERS ARE MADE IN FLORIDA TO WITHSTAND WINDS OF HURRICANE FORCE.



Write Dept. T for Catalog

When writing, please specify type of tower in which you are interested, height and expected antenna load, (make and model number if possible). This information is necessary to give you accurate advice.

E-Z WAY TOWERS INC.

5901 E. BROADWAY PHONE 4-3916
P. O. BOX 5491 TAMPA, FLORIDA

MSTS duty as radio operator. GRB is back in the Air Force en route to Germany. QIW was able to attend the Fair with the help of hams. Traffic: K6KPU 16, W6FYW 4.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM. PAMs: PAK and IWQ. RMs: PCN and QHI. VOII announces a new harmonic. The Central Texas Amateur Radio Club held code classes in Aug. at the club house in C.D. Hq. There were 20 students. Now there are 25 licensed amateurs in Brownfield; 15 are ARRL members. WN5BDH is on 2 meters in Slaton. SNX, Slaton, worked EEK in Sweetwater on 2 meters. CZW is getting on 2 meters. HRN reports the Mineral Wells Amateur Radio Club will complete the club house by Christmas. Call ABF; a listening watch is maintained with Weatherford on 3980 kc. OIS has a new DX-100. The East Texas Amateur Radio Club also has purchased one and it is being assembled by the president, WIJ. ACK burned out his transformer just as he made contact with KG4AA. HHK now has his General Class license. SMK meets the Dixie, Yankee, AF MARS, and NTO Nets. AHC has a 15-meter ground-plane antenna. The Northern Texas section now has 458 AREC members. NFO and IGU are net control stations for NWTEN on 3950 kc. at 0800 hours Sun. OGK and KRZ are net control stations for NTEN on 3930 kc. at 1800 hours Sun. RHP and GZU are net control stations for NETEN on 3970 kc. at 0800 hours Sun. It is now my time to sign 30. I want to express my appreciation to the hams who have coöperated in the organization of the Northern Texas section for the past two years; to thank them and to express my desire that you continue to aid in making it the best section in the nation. Traffic: K5FFB 950, W5DTA/5 743, KPB 334, BTH 189, AHC 167, BKH 102, SMK 66, ASA 52, TFP 34, PAK 28, ACK 19, CF 14, OCV 3.

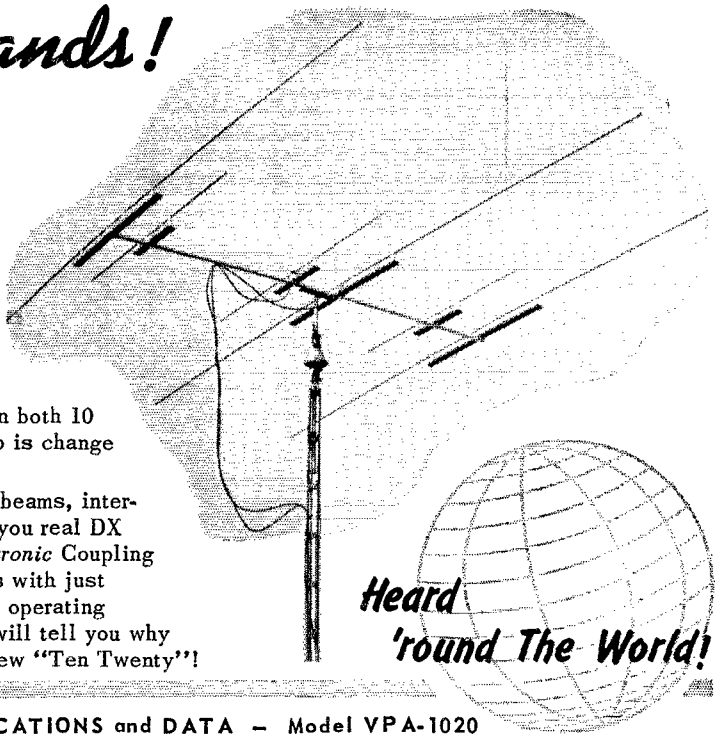
OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: KY. RM: GVS. PAMs: PML, SVR, and ROZ. Your SCM's term of office is drawing to a close so it is time to start thinking about a successor. RST certainly will not be a candidate to succeed himself. When the time comes to propose a candidate for the job a petition signed by at least five ARRL full members should be sent in to Headquarters and the candidate must have been an ARRL member for at least one year and a licensed amateur for at least two years immediately preceding the receipt of his nomination. The present Asst. SCM, GIQ, of Stillwater, has agreed to become a candidate for the office. A good many Oklahoma hams killed two birds with one stone by taking in the O.U.-Texas football game and the Dallas Fair Hamfest. Dad, CF, tells me they had a very large registration. It sure is fine to have a Director who is on the local band (75 meters) and can be contacted for a ragchew. AF MARS held a picnic on Oct. 9th with good attendance, and gave away surplus gear of all kinds. KN5BPX took his General Class exam at Dallas but doesn't know the results yet. Traffic: (Sept.) W5GVS 231, HTK 96, FEC 52, CBY 40, ADC 34, SWJ 23, PNG 20, REC 19, SVR 19, ZKK 19, CFG 18, GXH 14, QAC 12, MFX 11, PML 11, RST 11, EHC 2, UCT 1.

SOUTHERN TEXAS — SCM, Morley Bartholomew, W5QDX — SEC: QEM. Asst. SECs: NMV and RKI. New officers of the Galveston County ARC are DJD, pres.; WN5JSV, secy.; and AUN, treas. The GCARC is now an ARRL affiliate. The San Antonio Radio Club has a new group heading it. They are JHH, pres.; LUU, vice-pres.; VPQ, secy.; FND, treas.; and DKF, sgt. at arms. Transmitter-hunting activity is rapidly picking up with cooler weather. The Corpus Christi, San Antonio, and McAllen groups all report good hunting. FSC attended the v.h.f. meeting in Indiana. IHS won first prize for the most activity in the 144 and Up Club. The resignation of AET as EC has been regretfully accepted. Bill is unable to continue because of other commitments. AUO has taken over the job. BWT spends every other week end in Corpus Christi, mobile. ZWR has a new DX-100 and reports lots of 15-meter activity in Brownsville. VPE has completed his rig and two-element beam. TFY has a 170-foot-long wire for 40 meters, and is keeping 20-meter traffic schedules. Helen, the XYL of QEM, is now KN5COZ and daughter, Doris Ann, is KN5CPA. The Lamar ARC held its first meeting Sept. 20th. APN is pres.; HJL, vice-pres.; and ZVU, secy. AUO, BSO, KSW, CRA, and AET assisted the weather bureau station in Brownsville when regular means of communication went out. Traffic: (Sept.) W5TFY 66, ZWR 41, MN 11, RKI 5, KN5BYV 2. (Aug.) W5TFY 53, ZWR 7.

NEW MEXICO — SCM, Einar H. Morterud, W5FPB — RM: JZT. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700-0830 MST; the NM C. W. Net meets on 3633 kc. daily at 1900 MST. AKR rebuilt the mobile transmitter and is looking for Delaware on 40 meters. BXS and his XYL won a two-week trip to Nassau as leading Pontiac Sales Manager in the zone. K5CBS is the XYL of ETF. K5CDL, Dorothy and CDM, Howard, are new hams in Anthony. DWI, Alan, is a new ham in Los Alamos. KWP has been working 6 meters

(*Continued on page 156*)

2 DX Bands! with the mosley "Ten-Twenty"



TRUE BEAM PERFORMANCE on both 10 and 20 Meters . . . and all you do is change bands *at the transmitter!*

Two *peak-pretuned* 3 element beams, interlace mounted on one boom, give you real DX action! The Exclusive *Auto-Lectronic* Coupling —that permits feeding *both* beams with just one coax line—means Unequalled operating convenience! The story, below, will tell you why Your Best Beam Buy ... is the New "Ten Twenty"!

SPECIFICATIONS and DATA — Model VPA-1020

Forward Gain (over full size dipole): 7.5db.

Front-to-Back Ratio: 28db.

S W R: 1.5/1, or better, at resonant frequencies.

(Performance data essentially the same for both ten and twenty meter operation.)

Elements: 61ST6 Tubular Aluminum. Maximum length, 22½'.

Boom: 1½" OD 61ST6 Aluminum. 12' long.

Wind Surface Area: 11.4 sq. ft.

Wind Load: 228 lbs.

Weight (Assembled): 57 lbs.

Tuning: FACTORY PRETUNED to three resonant frequencies in each band. Drilled and color coded element sections.

Model VPA–1020, complete with "V–P" Coils, Auto-Lectronic Coupling Yoke, all necessary hardware and full instructions. Less mast, rotor and coax line.
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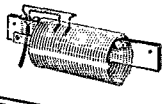

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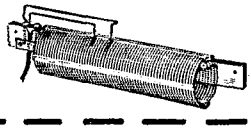
40 Meter Coil
Net Price $7.95



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and is listening for 430-Mc. signals from Albuquerque. MKF has phasing type s.s.b. exciter. POI is operating mobile on 75 and 40 meters. His son, ZLF, has enlisted in the Air Force. ARRL Secretary Budlong and West Gulf Division Director Cowan addressed a joint meeting of the Albuquerque V.H.F.-U.H.F. Club, the Amateur Radio Caravan Club, and the Sandia Base Radio Club on Sept. 28th. Fifty amateurs attended the meeting. Traffic: (Sept.) K5FEF 15, W5BZB 13, NQG 8, JZT 5, RFF 2. (Aug.) K5FEF 81, W5ROH 2.

CANADIAN DIVISION

MARITIME — SCM, Douglas C. Johnson, VE1OM — Asst. SCMs: Fritz A. Webb, 1DB; Aaron D. Solomon, 1OC. SEC: RR. A new appointee is WL, EC for Halifax. Exercise "Fan-Out," the recent c.d. evacuation of three districts of Halifax, saw the following Halifax and Area amateurs taking part: ED, HJ, PT, WD, WL, OM, DQ, FQ, PQ, HC, AW, KY, EK, NR, AV, LY, GC, DB, NP, and SF. 50 and 144 Mc. were used for short-haul work, and 3.8 Mc. 'phone was used in contacting provincial centers. Mobiles on 3.8 Mc. played a big part as well. Members of the Maritime Net are to be commended for their splendid coöperation during the excercise. AEB is working on an all-band folded dipole. WF has his 'phone ticket, and is building a DX-100. PF is active with a 75-meter mobile set-up. VO1H was a recent visitor to Halifax. UW and AAJ are students at N.S. Tech. VO6U has worked 124 countries to date. Doug's XYL, VO6AM, gets in her hamming while the OM is at work. W7SNR/VO6 was transferred to KH6-Land. C.w. men are invited to call in on the TRN traffic net which meets daily except Sun. on 3535 kc. at 8:45 P.M. and 10:30 P.M. AST. This is a Maritime-Quebec-Ontario Net, and VEIs and VOs are needed. Please give it your support. Traffic: (Sept.) VE1FQ 274, WK 74, UT 39, VO6U 34, VE1AV 26, VO6AH 26, VE1ME 22, KZ 17, OC 11, LY 9, JP 6, AEB 4, DB 3, OM 2, PF 1. (Aug.) VE1OC 10.

ONTARIO — SCM, G. Eric Farquhar, VE3IA — Because of vacation this section's August report reached Headquarters too late for appearance in November *QST*. While it is the first miss in five years, we deeply apologize. AAS was winner of the hidden transmitter hunt at a very successful combined family picnic of the Quinte ARC and the North Shore Club. AZH now is located in Hamilton. BNQ was very active during Hurricanes Connie and Diane. TO and VL were televized during a discussion on "Ham Radio in Emergencies." Both say it was the longest eight minutes ever. Hi. QTH, of AJR, has been a busy one this summer. Her guest register shows visitors from Michigan, Indiana, Kentucky, and VE3-Land. The Welland ARC is now an ARRL affiliated club. Welcome. BDS moved to Belleville. DN is a new OBS appointee. CCG, using a drainpipe for an antenna, puts out a good signal. CAB desires contact with stamp collectors of Newfoundland and Canada issues. He reports increased activity on 430 Mc. AJR, while on vacation through the Smoky Mountains, worked mobile from Clingman's Dome 6643 feet and reluctantly left that QSO paradise. APL added a VFO to his rig. VZ has completed a fine portable rig. Traffic: (Sept.) VE3VZ 142, GI 67, BUR 58, NO 50, KM 48, DIL 46, DPO 44, AJR 30, DQX 29, TO 20, PH 12, AVS 8, DH 7, APL 3. (Aug.) VE3VZ 145, NO 75, BUR 73, AUU 70, DPO 61, KM 56, AJR 51, BNQ 44, DQX 30, PH 12 TO 9 .DH 6, AVS 4, DGW 2, DLC 1.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — PAM: OD. RM: XG. The Northern Alberta Radio Club elected the following officers at the September meeting: WO, pres.; VG, vice-pres.; KF, secy.; SN, treas. FB has his mobile working. HM and his XYL are on an extended trip to Eastern Canada. WL reports that Calgary amateurs took part in Operation "Lifesaver." AL has returned to the air after an absence of several months. GE reports the formation of the Central Alberta Radio League (club) at Lacombe with the following officers: Roy Hirsch, pres.; SX, vice-pres.; GE, secy.; John Rusinko, treas. EY is building a new frequency meter. PV has been away on vacation. MJ has a new job with WCB. CP has worked some nice DX on 14 Mc. YE still is holding forth as a one-man chamber of commerce for Jasper. Keep those monthly reports coming, gang, as they are very much appreciated. Traffic: VE6HM 201, YE 36, AL 19, OD 14, VE7HD 11, VE6TG 10, WL 10, MJ 9.

BRITISH COLUMBIA — SCM, Peter M. McIntyre, VE7JT — With the fall and winter months coming upon us everyone is busy putting the finishing touches to antennas and beams for the DX that is starting to be heard. And with the better weather on the way out the bands are getting more populated and the QRM is piling on. As usual the few faithful ones have reported the activities. During the first week of October the amateurs participated in a forum-type radio question period over a North Vancouver radio station. YQ, president of the VARC, acted as the moderator, answering questions telephoned into the station by the public. We would appreciate the names of all the radio clubs, along with their executives and the time and place of their meetings, as quite often we are asked for this

(Continued on page 158)


Season's
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information. Traffic: VE7ASR 147 JT 35, AUF 13, ZV 13, FS 12, DH 10.

MANITOBA — SCM, John Polmark, VE4HL — OO:RB. RG is new on 75-meter 'phone. HC has a new operator. IF had a nice gang over to raise the new four-element beam. DS is running the legal limit with a very nice signal. New appointments in the Manitoba section are GE as PAM and KG as OBS. There still are openings for appointments as ORS, RM, and EC. Thanks to the gang who took part in the S.E.T. for a very nice show. WS picked up a Viking Ranger on his trip to the States. Congratulations to ML on his new venture. 7BV dropped in on his way to Toronto, and expects to make VE4-Land his home QTH after learning all about microwave. MN, what's wrong with that modulator? RC was down to Benton Harbor and picked up a hi-fi outfit. Traffic: VE4AI 28, GE 22, KL 16, VE5DS 14, VE4QD 8, JW 7, XP 7, YR 7, NW 6, KG 4, AN 2, RB 2, XW 1.

Flood

(Continued from page 18)

In New York City, W2GTE, affiliated with the Red Cross, was activated by a five-man team of the New York Radio Club, led by W2JXH.[36] This station was most active during the early days of the disaster and was instrumental in obtaining much vital information from the affected areas.

Epilogue

What else is there to say? We had an emergency, amateurs rose to serve as usual, the emergency is over and this is the story of what we did. Inevitably, a few amateurs who participated have not been mentioned. Others who were mentioned in reports have gotten lost in the shuffle as to their exact time and place.[37] Our purpose is both to tell the story and give full credit to all participants.

Enough said. It's over, and we are glad. If it happened again tomorrow, we'd be better prepared to cope with it, from the lessons we've learned. But let's hope it doesn't happen again — at least not for a long, long time. There are easier, less painful ways to learn.

[36] Also including *W2s* RGP CYK ATT and K2BQI.

[37] But due credit for participation also belongs to the following: *W1s* FDB NLE DUZ RMZ RRE STT TIJ TUZ WHR ZLF ZYZ ZR K1USA; *W2s* AEQ CCS RUT; *K2s* KDG KGB; *W3s* AXA EDV PHF PNL VSQ VTR WBR YUI; *K4s* BXY AF.

FEED-BACK

In the cut caption for the "Simplest Converter," page 28, October *QST*, C_2 and C_7 are, as stated, 100-$\mu\mu$f. fixed capacitors. C_7 that follows C_5 later in the list should be deleted.

In the circuit diagram of the power supply for W8ETU's transmitter, printed on page 19 of the October issue, the filament voltage for the 866s should, of course, be 2.5 and not 5 as shown on the schematic.

In the circuit diagram for the 500-watt 2-meter amplifier described by W7JIP in September, 1955, *QST*, there should be a grounded center tap on the filament transformer, T_2. VE2AX caught the omission.

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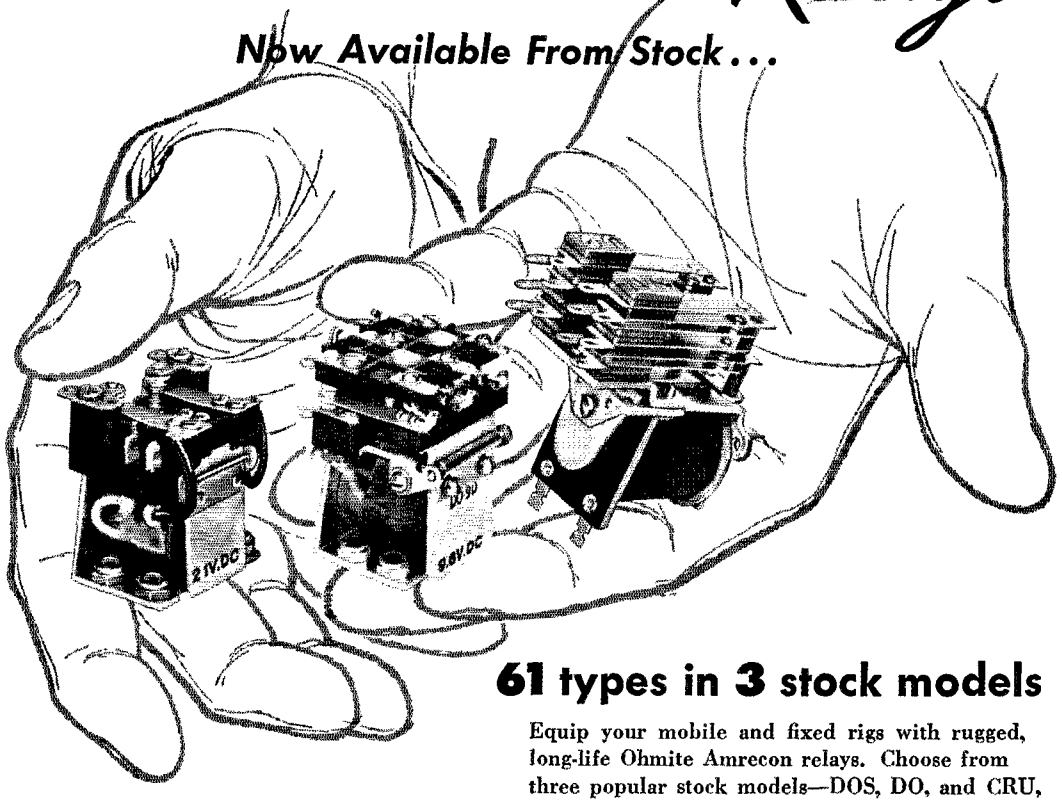

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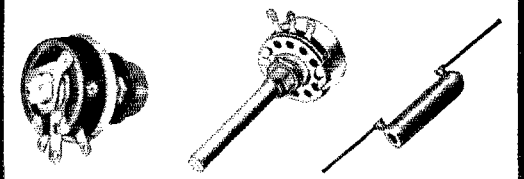

RHEOSTATS POTENTIOMETERS RESISTORS

Multimatch Antenna

(*Continued from page 25*)

Multimatch Vertical

We have also done some experimental work with a quarter-wavelength vertical equivalent of the W3DZZ antenna. This is equivalent to one half of the horizontal antenna, and is worked against several buried radials. Although this antenna has been in operation but a short time, it appears to work well, even though it should show high-angle characteristics on 10 and 15.[2] Telescoped sections of 2-inch, 1¾-inch, 1½-inch, and a short section of 1¼-inch aluminum tubing make up the bottom 32 feet of this antenna. The 1¼-inch section forms the outer conductor for the trap capacitor. The top 22 feet is made up of 1-inch and ¾-inch tubing plus a solid whip at the top. The 1-inch tubing serves as the inner conductor of the trap capacitor. Polyethylene strips are used for the capacitor insulation as described previously.

Those who have been accustomed to struggling with the complications of more conventional antenna systems covering several bands will be amazed at the simplicity of this antenna, once it has been installed and adjusted. Using a B & W 5100 bandswitching pi-tank coil, we can change bands and be in QSO within 40 to 60 seconds!

Our best record yet for a series of QSOs, one on each of the five bands, is 21 minutes. In each case, we took time to exchange signal reports and explain the nature of the tests we were making.

[2] This could, of course, be remedied by inserting additional traps for 10, 15 and 20 meters, as suggested in the article of Footnote 1 in the description of the parasitic beam antenna. —Ed.

Test Set

(*Continued from page 81*)

function switch to c.w. and the meter switch to s.w.r. Adjust the fine attenuator to give full-scale meter reading. Connect the antenna transmission line to be tested to the line jack and adjust the range switch and frequency control knob to the approximate frequency of the antenna. When set to this frequency there should be a decided drop in the meter reading when the line is connected. Next, adjust the frequency control for the lowest reading on the meter. The frequency indicated is that at which the antenna is resonant.

To calibrate the meter for s.w.r. readings, connect fixed carbon resistors (better break one open to be sure) of twice, three times, four times, etc., the value of the Z_0 resistor across the line post and read the meter. A curve may be drawn of the value of these readings plotted against the ratios of the several resistors to Z_0. For high values of Z_0 — i.e., 300, 450, etc. ohms, and particularly at the higher frequencies — it may not be possible to obtain a full-scale reading with the fine attenuator at maximum because of the losses in the bridge and the relatively

(*Continued on page 162*)

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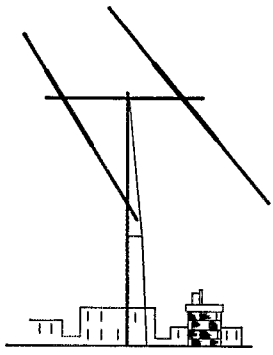

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(See Page 89, Nov. QST for details)

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(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

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low power available. Naturally, the accuracy of s.w.r. readings under these conditions will not be as great as when a full-scale reading can be obtained. They will serve, however, to give an indication of the resonant frequency and relative values of s.w.r. On the other hand, more accuracy is available at the lower frequencies and lower values of Z_0. By advancing the fine attenuator control to maximum after the line has been connected, greater sensitivity is available.

This test set may also be used as a very convenient and more accurate form of grid-dip meter. The increased accuracy results from the elimination of pulling of the oscillator. A pick-up device may be made from a piece of coaxial line, six or more feet long, equipped with a coaxial connector on one end and having at the other end a loop made by connecting the bare center conductor to the shield at a point about eight inches from the end. This is connected to the line jack, and when the loop is placed near the coil of a tuned circuit, the resonant frequency may be found by tuning the oscillator to that frequency which shows the greatest dip on the meter. Since there may be a small harmonic content in the output of the signal generator, do not be led astray by a small dip when the oscillator is tuned to half, one third, or one fourth the frequency of the tuned circuit. It is likely that a dip will be observable at these frequencies, but it will be much less pronounced than the dip which occurs when the oscillator is set to the fundamental frequency of the tuned circuit.

Other uses for the bridge will occur to those familiar with the circuit. With the power switch turned off, the pick-up loop may be used to measure relative power in a tuned circuit of a transmitter, by observing the maximum reading on the meter with the loop held in a fixed position near a tuned circuit. Used in this manner the circuit is not frequency conscious since there is no tuned circuit in the bridge.

Before closing, it may be well to insert a word of caution. Although the output level of the bridge is well below that of any transmitter we may use, it could radiate enough power to cause interference within a few miles. At the higher frequencies, under favorable transmitting conditions, the signal from a high-gain beam antenna connected to the line jack could cause interference at a great distance. It is therefore desirable to make only momentary checks to determine the point of resonance of an antenna system if it is outside the amateur bands.

You will find this test set one of the best investments you can make in test gear. The signal generator covers all frequencies needed for alignment of i.f. and r.f. circuits down to ten meters. The bridge meets the need for s.w.r. and frequency measurements on antennas. The loop will enable you to tune transmitter and receiver circuits on frequency before plate power is applied, and if no output meter is available you can take relative power output readings. Best of all, you can buy it in kit form and keep your out-of-pocket investment down.

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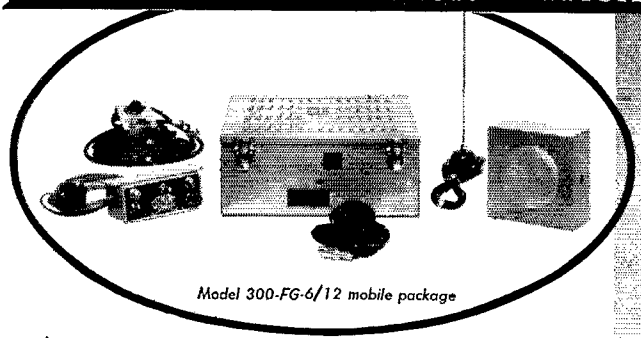

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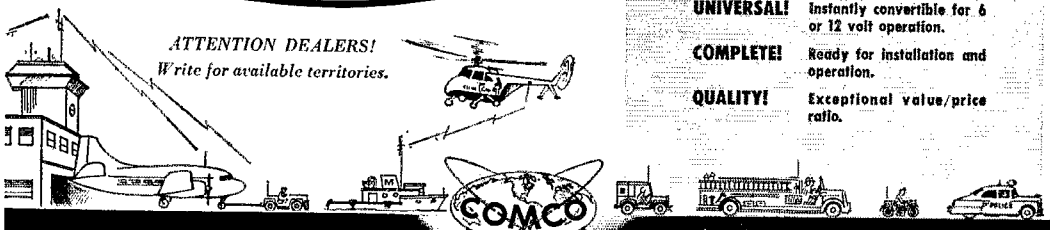

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144-Mc. Converter

(*Continued from page 34*)

it is advisable to reduce component lead length to a minimum, and to use No. 16 tinned wire wherever possible. Approximately 3 feet of RG-58/U cable is required for the coax leads shown in Fig. 1. This cable is more conveniently handled if the insulated outer covering is stripped off the entire length of the leads. Belden type 8885 shielded wire is used for the power leads to P_1.

Testing

Power requirements for the converter are approximately 150 volts at 17 ma. and 6 volts at 0.6 ampere (or 12 volts at 0.3 ampere). Information on obtaining this power from a car b.c. receiver is given in a previous article.[2] If an external dropping resistor is used to limit the converter input to 150 volts, it should have a resistance of approximately 60 ohms for each volt to be dropped.

A receiver capable of tuning to 1500 kc. should be coupled to the converter by a short length of coaxial cable and the receiver adjusted for normal operation at this frequency. If a signal generator is to be used, it is connected to the input jack, J_1, and if a generator is not available, the converter should be coupled to a low-impedance antenna system such as a 19-inch whip fed with 52-ohm cable.

If preliminary testing is to be done with noise, the converter and the receiver are turned on and the converter output coil, L_5, adjusted until the noise level is at maximum. At this point, it is safe to assume that the oscillator and the mixer plate voltages are correct so long as the 0B2 glows when high voltage is turned on.

The low-frequency oscillator should now be adjusted by means of L_7 until a further increase in noise level is heard. C_6, the h.f. oscillator padder, should also be adjusted to produce maximum receiver output and this should occur with the padder adjusted to approximately half capacitance.

It is now necessary to introduce a test signal, and it is helpful if the signal can be set at 146 Mc. With C_7 at half capacitance, C_6 is adjusted until the test signal is heard. It is advisable to check the frequency of the high-frequency oscillator at this point to make sure that it is adjusted to the low-frequency side of the input mixer circuit. C_1, L_3, L_5 and L_7 should be tuned for maximum converter sensitivity. The variable inductors of the original model resonated with the tuning slugs about halfway in. The frequency and stability of the crystal-controlled oscillator can be checked by tuning the range around 12.9 Mc. with an all-band receiver.

The converter bandspread can be adjusted by changing the L/C ratio of the first oscillator, by altering the spacing between turns of L_6. C_6 must be reset each time the inductance of the coil is varied.

The 14.4-Mc. trap is adjusted by tuning the

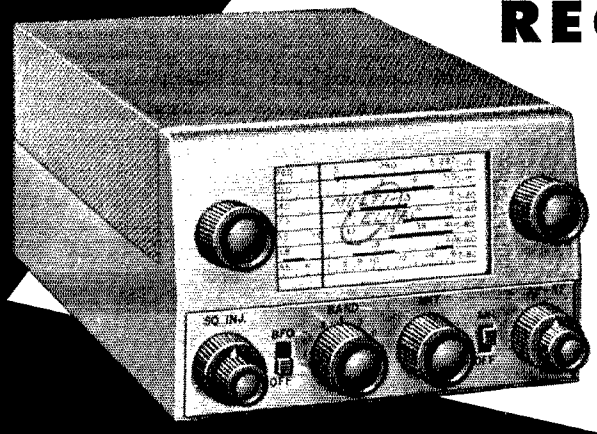
(*Continued on page 166*)

NEW

MULTI-ELMAC

PMR-7

RECEIVER



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converter to the high side of the test-signal frequency until the image is heard, and then adjusting L_4 until the image response is attenuated to the greatest degree.

Tight coupling between L_1 and L_2 improves the performance of the converter and makes frequent retuning of C_1 unnecessary. The coupling adjustment should be made with the converter installed and connected to the mobile whip. Coupling will probably be optimum with L_1 completely meshed between the last two turns of L_2.

VFO Design

(*Continued from page 89*)

ing a standard variable capacitor — usually by removing plates from one initially too large.

In the Lampkin circuit P may also be selected arbitrarily or found by Equation (7) if L is initially chosen. The required value of variable capacitance is then

$$\Delta C = \frac{\left(\frac{f_2}{f_1}\right)^2 - 1}{(2\pi f_2)^2 L}.$$

Estimating Q

The factor whose value remains to be estimated is Q. An average oscillator coil of good construction will have a Q somewhere between 100 and 300. The Q in the formula is actually the oscillator circuit Q, including all loading effects. In a well-designed circuit which is not required to deliver power (except that consumed by the grid) the circuit Q will very nearly equal the coil Q.

If the Q of a coil using the proposed construction cannot be estimated closely from prior knowledge, a trial value of Q can be assumed and used in finding L. The coil may then be wound and its Q measured. If the measured Q differs from the assumed Q, a new calculation for L can be made using the measured value of Q. With similar construction the Q of the second coil will be very close to the measured Q of the first.

In case facilities for measuring Q are not available, its value should be estimated on the conservative side. This will ensure oscillation, and after the oscillator is constructed the

(*Continued on page 168*)

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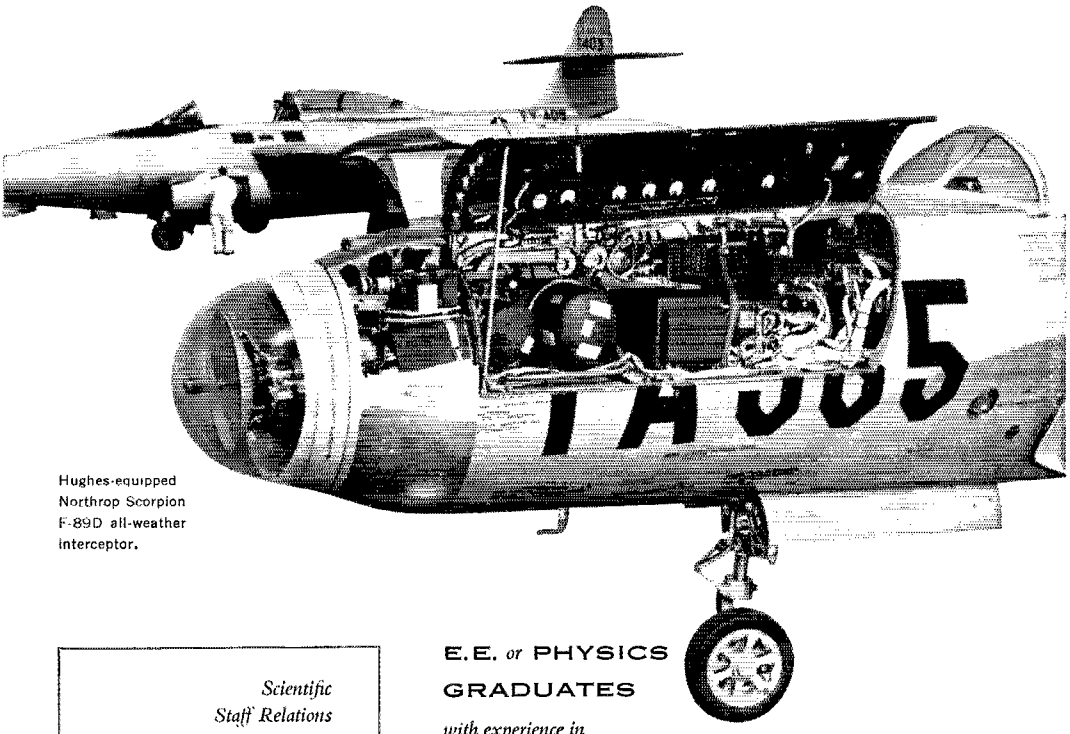

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capacitances of C_2 and C_3 may be increased to the point where the largest usable value of P is reached, if desired.

Grid Capacitor and Resistor

In the actual construction of the oscillator an RC grid-leak combination must be selected. The value of the grid capacitor should be made much larger than the input capacitance of the tube so that the voltage across C_2 will actually appear between grid and cathode of the tube. R_g should be made as large as possible to minimize the effective grid loading on the resonant circuit. However, if the time constant of the RC combination becomes too large, intermittent oscillations will result. As an initial compromise, C_g is usually made about 10 times the input capacitance of the tube. R_g is then selected so that the time constant of R_gC_g is 10 times the period of the highest operating frequency. That is:

$$R_g = \frac{10}{f_2 C_g}$$

After the oscillator is working properly the resistance R_g is raised to as high a value as is possible without causing intermittent oscillation.

Concluding Remarks

The design procedure for VFOs outlined in this article is one which minimizes the effects of vacuum tube instabilities on the oscillator frequency. While the short-term stability of an oscillator depends to a great extent on vacuum-tube fluctuations, long-term stability is a function of several other factors. Among them are attention to mechanical detail and the effects of temperature on the oscillating circuit constants.

It is not difficult to achieve short-term stabilities of a part in 10^5, or better, with the vacuum tubes currently available. In contrast with this we find that the average VFO has a mechanical resetability of about one part in 10^3. Normal temperature variations cause frequency drifts of about one part in 10^4 even in "temperature compensated" VFOs. In a well-balanced design the ratio between the long-and short-term stabilities should not exceed ten. With the present state of the art this balance can be achieved only by paying meticulous attention to mechanical design and construction, and to temperature compensation. Ponder awhile on this fact before you begin the design of a VFO to obsolete all other VFOs.

Appendix

From impedance considerations in the oscillator loop it can be shown that when a Clapp oscillator is designed for some specific frequency f, and C_1 is varied, the loop gain increases as the frequency of oscillation decreases. In the Lampkin oscillator the reverse is true. Therefore, to insure that oscillations will exist over the entire frequency range, the Clapp oscillator should be designed around the upper frequency f_2, and the Lampkin around the lower frequency f_1.

(Continued on page 170)

When this is done the value for P in the Clapp oscillator is given by

$$P = \frac{1}{2}\left[\left(\frac{f_2}{f_1}\right)^2 - 1\right]\left[K + H\sqrt{(K+1)^2 + \frac{2Qg'_mK}{\pi f_2 \Delta C\left[\left(\frac{f_2}{f_1}\right)^2 - 1\right]}}\right]$$

For the Lampkin oscillator, P is given by

$$P = \sqrt{\frac{Qg'_mK\left[1 - \left(\frac{f_1}{f_2}\right)^2\right]}{2\pi f_1 \Delta C}} - (K+1)$$

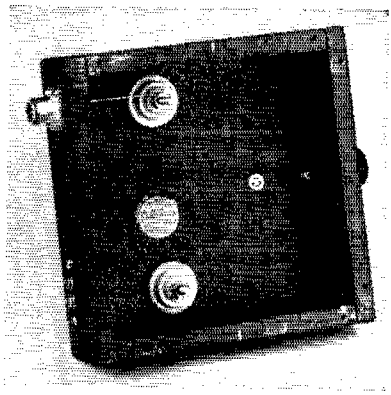
The latter equation shows that there is a possibility of obtaining a negative value for P in the Lampkin oscillator. This possibility occurs when the impedance of the resonant circuit dictated by ΔC, f_1 and f_2 becomes too low to support oscillation. If this occurs the value of ΔC should be reduced until P becomes positive.

"EZ-Couple"

(Continued from page 40)

height, etc. The tests described here were made with an antenna approximately 25 feet above ground.

If you are able to get any of the antenna outside the building, by all means do so — you'll have a better chance of making contacts. Bring the shack end of the antenna to the output terminal of the coupler. If an r.f. ammeter is available, connect it in series with the end of the antenna and the output terminal. Otherwise, a



Bottom view of the coupler showing the input and output terminals. If the smaller type coax is used, a shielded phono jack can be substituted for the more expensive coax socket.

No. 44 or 46 dial lamp can be connected in series with the antenna and used as an output indicator. If the antenna end approaches a current loop, the light bulb will light up. If the end is near a voltage loop, a neon bulb can be used as an indicator. If you find that the dial lamp burns too brightly, connect another lamp in parallel with

(Continued on page 172)

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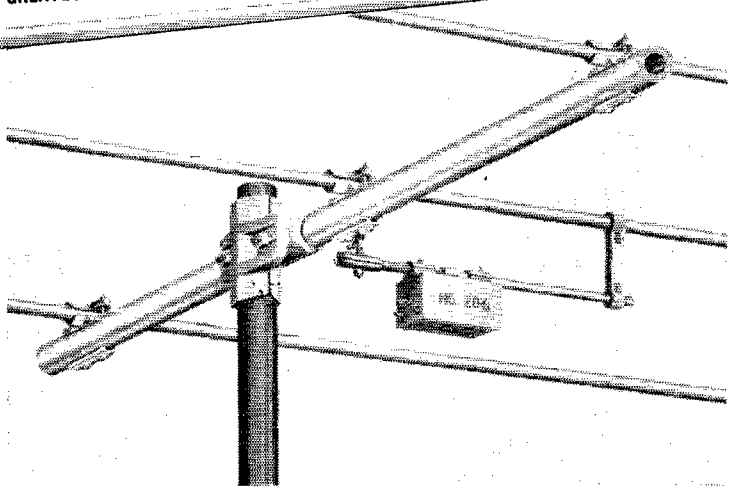

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No. 6L-1520RG—6 Element Beam—3/21 mc - 3/14 mc	17,-½"	57	75	165 00
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TABLE I

Ant. Length	*80 (Turns)*	*40 (Turns)*	*20 (Turns)*	*15 (Turns)*	*10 Turns)*
100′	18½	7½	6½	4½	2½
90′	18½	9½	4½	4½	2½
80′	18½	11½	3½A	4½	2½
70′	18½	15½	5½A	4½	1½
60′	18½	21½	8½A	4½	1½
50′	18½	15½	6½A	4½	1½
40′	18½	11½	5½A	4½	1½
30′	26½	2½A	6½	4½	1½
20′	26½	7½	6½	4½	1½

(A) Indicates stator of C_1 connected to input side of L_1.
All unused turns are shorted out.

the first, or shunt the lamp with a 6-inch length of small wire.

The tune-up procedure consists of resonating the final amplifier of the rig, and then adjusting C_1 and the tap on L_1 for maximum output as shown by the indicator used. The amplifier tuning should be rechecked for resonance after each adjustment is made on C_1L_1. And the input must be held to the same value if the output indications are to be compared.

If a good connection to an earth ground is available, it can be connected to the ground terminal. This may be of help in keeping metal objects in the shack from getting "hot" with r.f.

The important point to remember is to work for maximum output (at constant input) as shown by your output indicator. Under certain conditions, a good deal of power can be lost as heat in the coil if improper settings of C_1L_1 are used.

As mentioned earlier, the system may not be as good a performer as more elaborate installations but it will produce contacts. One last point — it may be that because of circumstances beyond your control an objection would be raised to any wires or aerials around or near your shack. W6ZMZ wrote an excellent article on the use of "Invisible Antennas" in February, 1949, *QST*. You might swipe a copy from some amateur friend, or get one from Headquarters, as it is required reading for hams with an uncoöperative concierge.

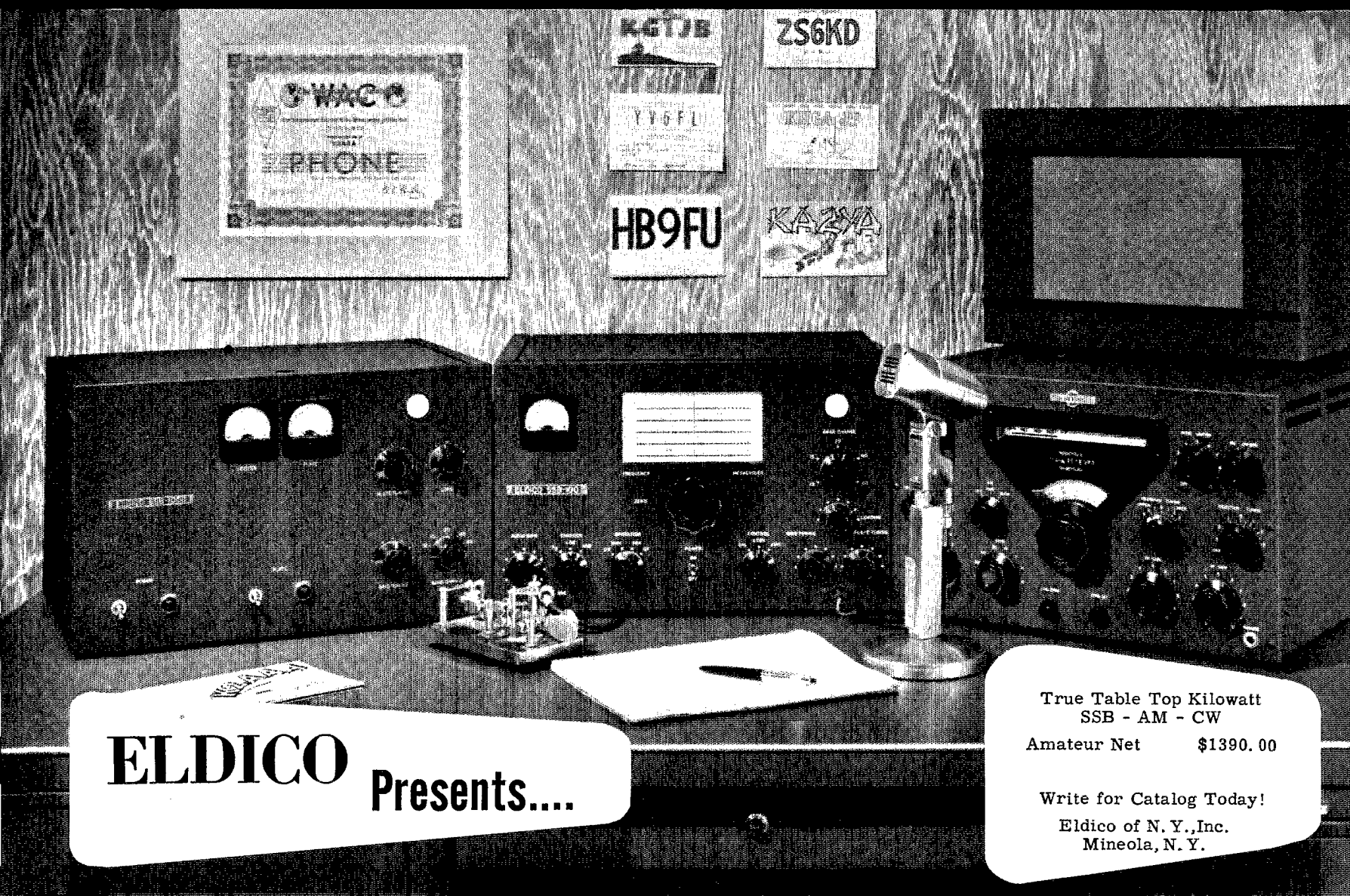
Tuning A.M. 'Phone

(Continued from page 44)

ated in the first mixer or converter to be amplified by the i.f. These two sources of noise are almost constant regardless of the manual gain setting. So if the r.f. gain is reduced enough to keep fairly strong signals at a satisfactory level at the second detector, as compared with the b.f.o. level, weak signals may disappear into this residual noise.

Signals and noise can practically always be brought into their proper relationship, regardless of the r.f. gain control setting, by operating the first tube in the receiver "wide open" — that

(Continued on page 174)



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is, at full gain all the time. In most cases all this requires, in the way of circuit changes in the receiver, is to disconnect the bottom side of the first-stage cathode resistor from the manual gain-control line and ground the resistor.

If it occurs to you, as it probably will, to ask why the manufacturer of the receiver didn't do it that way in the first place, the answer is that he was more concerned with another problem — preventing overloading and cross-modulation from strong signals, under all sorts of conditions. This requires reducing the signal level at the earliest possible point in the receiver. You can still have that overload protection by putting in a s.p.d.t. toggle switch to select either type of operation. The whole circuit is shown in Fig. 3.

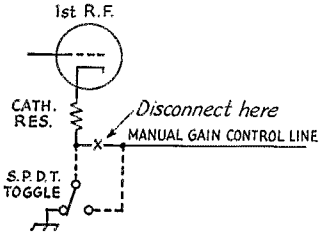

Fig. 3 — **The simple change indicated by the dashed lines will improve the signal-to-noise ratio of many receivers when using the manual r.f. gain control at low-gain settings.**

A somewhat better scheme is to install a separate gain control on the first stage, which will allow using just as much gain in the first stage as conditions will permit without running into overloading effects, but this is merely a refinement.

Incidentally, before starting to unsolder connections in the receiver, take a look at the circuit in its instruction book. Although most receivers use the simple gain-control circuit mentioned, some have more elaborate systems which may require different treatment to accomplish the same end. And before tackling *any* receiver, make this simple test: Set up the receiver for c.w. reception using as much r.f. gain as you can without having signals "block" or "mush up." Tune in a weak signal, set the audio volume at maximum, and then back off on the r.f. gain until the signal is no longer audible. If the noise disappears at the same time, you don't need to worry about the signal-to-noise ratio of your receiver. But if there is a lot of noise left when the signal has gone, you've got room for improvement. It is to be understood, of course, that the noise we're talking about is that generated in the receiver, not noise picked up on the antenna. Pick a quiet time, when there isn't appreciable static, for this test.

Another point: This method of reception depends a great deal on receiver stability for best-quality audio output. Although the received signal will be thoroughly intelligible even though the tuning is such as to result in an error of 100 cycles or more in the "inserted" carrier frequency, the voice does not sound quite natural with such tuning. (The effect is exactly the same as with a slightly mistuned s.s.b. signal.) The ap-

(Continued on page 176)

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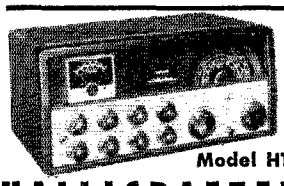

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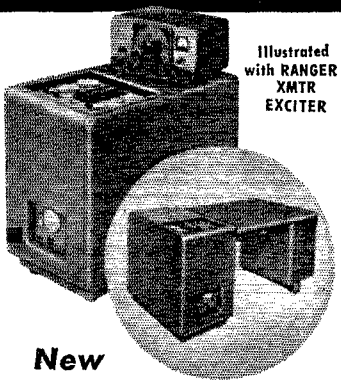

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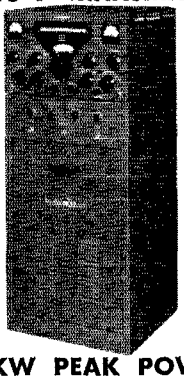

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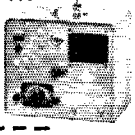

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pearance of the beat note when the receiver drifts off the incoming carrier is warning enough that it is time to touch up the tuning, but this can be avoided if the receiver stability can be improved. A bit of temperature compensation on the high-frequency oscillator and b.f.o. may help, if drift is annoying.

The receiver should have a good strong b.f.o., since the b.f.o. signal at the second detector wants to be several times as strong as the strongest incoming carrier. In many receivers the b.f.o. is definitely on the weak side. This is evidenced in c.w. reception by a "blocking" or "limiting" effect when r.f. gain is run up. C.w. signals should sound clean, without any mushiness on strong signals. If a v.t. voltmeter is handy, measure the rectified voltage across the diode load resistor in the second detector circuit with the b.f.o. on and the r.f. gain down. It should be at least 10 volts and it doesn't hurt to have 25 or 30

The b.f.o. signal can be increased in various ways, the simplest probably being to increase the voltage on the b.f.o. tube by using lower values of dropping resistance to the plate (and screen, if used). An alternative method is to use a larger value coupling capacitance between the b.f.o. and the detector circuit. In some cases it may even be necessary to couple the b.f.o. voltage to the grid of the last i.f. stage and thus take advantage of the amplification in that stage, although usually this has the undesirable feature that the actual b.f.o. voltage at the detector diode then depends on the r.f. gain control setting. A little experimenting with various methods may be needed if you find your b.f.o. to be too weak, but it will pay off in cleaner reception on both 'phone (by the s.s.b. method described above) and c.w. In fact, all these things are aimed at making a better c.w receiver, which is essentially what must be done if better 'phone reception is to be realized.

Your receiver may or not be as good as it could be, and simple checks of this sort will help you find out. But it doesn't cost anything except a little time to try the method itself. After trying it, you may decide that the extra freedom from QRM isn't worth its price of getting used to a new method of tuning, and you may prefer to go back to the BCL variety. That's up to you, but you will at least do so knowing a bit about some of the possibilities of better communication that have been at your finger tips all along.

Strays

TV programs devoted to amateur radio made their debut in Mississippi recently when WLBT at Jackson presented two programs. Amateurs in operation and "how to become" were the productions, three weeks apart, arranged by W5RDA, W5PFC and W5CQJ with others of the Jackson club group in important roles. See further details in the Mississippi section report elsewhere in this *QST*.

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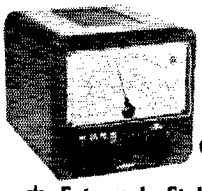

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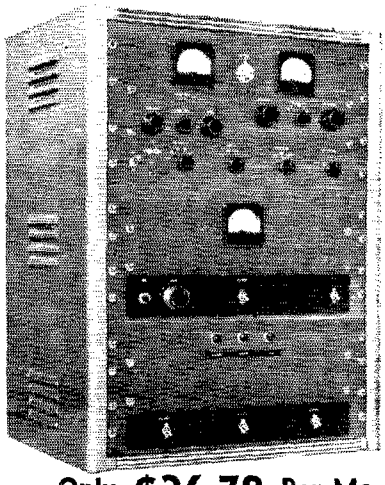

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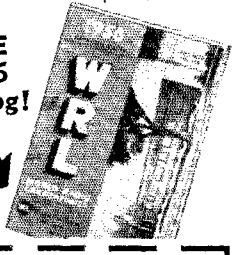

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Strays

The Coronado Radio Club has compiled a handy directory of the calls, names, addresses and telephone numbers of amateurs in San Diego County. Also included are lists of traffic nets, clubs and other material. For those who would like more information, write to Coronado Radio Club, P. O. Box 277, Coronado, Calif. The price of the directory is one dollar.

—···—

W3ODU reports that on March 24, 1949, he made his first Vermont QSO with W1RMX. He states that he made out a QSL to him pleading for his card to add to a slowly accumulating WAS. Here is the final report: On September 2, 1955 — six and one-half years later — the card was returned by the postoffice at Trenton, New Jersey (of all places!), marked insufficient postage.

—···—

On August 26, 1955, W6DLI and W6PMS "Picnics My Specialty," logged their 5000th mutual contact. They started in March, 1948, when the mother of Raymond Ogborn, W6DLI, was suffering from a broken hip. Andrew Anderson, W6PMS, relayed messages to Ray at Forest Home in the San Bernardino mountains. Ray's mother, now 95, still exchanges messages with them.

The twosome, with contacts twice daily, has drawn in many amateurs at various times, and the group has acquired the colorful name of "Knuckleheads." Altogether, several hundred have participated. A picnic, termed a "kilo-contact," is held at every 1000th QSO, and often in between.

—···—

Woodrow W. Williams, W8WEG, has submitted a clipping from his home newspaper describing activities of the Oldtimer Telegraph Club at its dinner meeting. This item states: "Most of the 100 members are expected to take part in the table talk, part of which will be carried on in *Morris Code*, with keys and sounders especially set up for the affair." W8WEG now inquires as to whether or not the group might have been seated in *Morse* chairs!

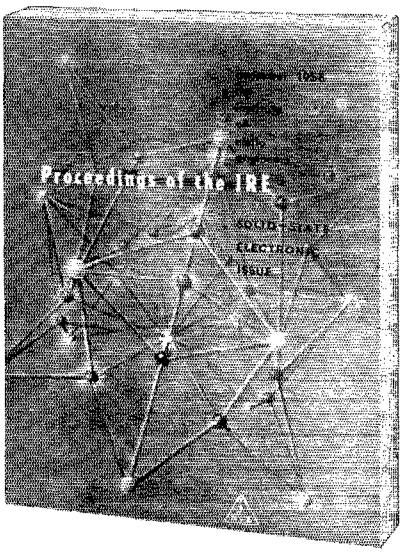
—···—

W4SBI reports that he now has in operation an antenna system that is installed partially in each of two states. With one tower on each side of the river bordering West Virginia and Kentucky, the antenna is center-fed from the middle of the river. His shack is located 190 feet from the river's edge and 395 feet of coaxial installation is necessary to reach the center of the antenna, 40 feet above the water level of the river.

—···—

A latest type of interference is noted by W4GMI, Chattanooga, Tennessee, who reports "gurgles" in his receiver created by an electric water heater. What, no hot- and cold-water taps on the transmitter?

What is "solid state electronics"?



You have already received great services from "Solid State Electronics"... but much more is coming your way!

This side of radio science is both old and new. It started with the galena detector which gave you signals you could hear. In phosphers that glow in response to electronic bombardment, it gave you, first, a picture tube—and now, full color television.

Ferrites that store and repeat electronic signals—the memory elements of the computer—are the next stage in this radio engineering. Tomorrow, "steareatronics" (as Cornelius Ryan calls it in Collier's) will provide silicones and other solid state materials which will store heat and power from the sun to serve you.

A working summary of this science is offered to you in the December issue of "Proceedings of the IRE"—from background data to the newest research. This one issue, some 300 pages, is the word count equivalent of a 600-page text book... useful, up-to-the minute. It is a history-making issue you will treasure for years.

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Recent Equipment

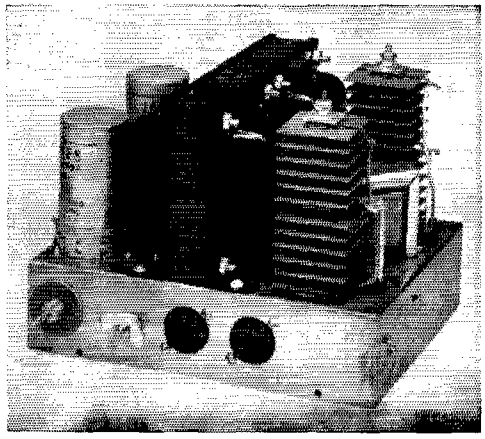
(*Continued from page 68*)

line. A socket at the rear of the receiver permits operating the receiver from batteries or a vibrator supply. This socket also provides two leads to the Receive-Standby switch, for remote operation of one's transmitter or other circuit. In the receiver, the Standby position of the switch throws a high bias on the tubes controlled by the Sensitivity control (see Fig. 1). Since this lead is also brought out to the power socket, it becomes an easy matter to provide for silencing of the receiver in voice-controlled break-in operation, without the need for digging into the receiver wiring.

The James C-1050 Vibrator Power Supply

THE James (James Vibrapowr Co.) C-1050 vibrator power pack should be of special interest to mobile hams, since it has some features not usually found in units of this type.

The pack is made up of two identical vibrator-transformer-rectifier units connected in series. A separate connection is brought out from the junction of the two units, providing a low-voltage tap. A relay, designed to operate from the send-receive switch, is provided in the chassis so that this low-voltage tap may be switched from the transmitter exciter to the receiver. Thus, the



The James dual vibrator power unit.

single power supply may be used to serve both purposes. Provision is also made for powering a VFO with the relay in the receiving position for frequency spotting.

The unit is adapted to either 6- or 12-volt operation by a simple change in terminal-board connections. Each transformer secondary is tapped to provide two output voltages, so various combinations of output voltage may be obtained. Selenium rectifiers are used in both sections.

(*Continued on page 182*)

The low-voltage tap is provided with a capacitor-input filter that reduces the ripple voltage to a maximum of 0.15 volt r.m.s. The other section is furnished with input capacitor only. Without additional external filtering the output ripple at the high-voltage tap has a maximum of 6 volts r.m.s. Hash and r.f. filtering are included in both sections. Each section has an individual fuse. Octal output connectors are provided for all external connections except for the battery.

Nominal simultaneous voltage and current ratings for normal intermittent service are as follows:

High Tap	*Low Tap*
450 volts, 200 ma.	225 volts, 100 ma.
375 volts, 200 ma.	150 volts, 100 ma.
375 volts, 200 ma.	225 volts, 100 ma.
300 volts, 200 ma.	150 volts, 100 ma.

The components are mounted on an 8 × 6½ × 2-inch chassis, and both top cover and bottom plates are furnished. The over-all height is approximately 7 inches.

The unit comes in wired (C-1050) or kit (C-1051) form. *D. M.*

How's DX?

(*Continued from page 113*)

DXcursion this summer . . . . . KB2ZT discovered that 3.5-Mc. specialist VK5YL is ex-G3KFA and a former op at G3HWF. He's out to renew friendships with the many 80-meter pals recorded in his G loggery.

South America — Current LU-Z suffix data thanks to LU5AQ: *South Orkneys*, calls ending in A G and M; *South Shetlands*, C I and O; *Antarctica*, B D E F H J K L N P Q R and W. QSLs may go via Radio Club of Argentina . . . . . While on the subject of Antarctic stations, inquiries are regularly received concerning the ARRL DXCC Countries List status of such actives as VK1AWI, VP8s and LU-Zs. Because so many territorial claims and boundaries down that way remain arbitrary and officially unrecognized, the whole continent goes as a single. Inspection of any up-to-date map of the area easily will demonstrate the necessity of this expedient.

Hereabouts — Our old friend XF1A, otherwise known as XE1A and XE2N, is on the prowl again. Every time Juan uses his XF label our postbox bulges with queries . . . . . "I've been amused by the defensive action indulged in by some of the boys at the top of the [DXCC] heap. 'If you can't find a new one, then tie up the rarest ones you can find.'" K2BZT observes thus and adds that the rare quarry doesn't seem to appreciate the idea . . . . . W4VE reached 170 on the ladder and then moved to Hot Springs, Ark., where he'll use his old W5MY moniker once more. W1WPO undoubtedly will be logging Fred's W5 DXCC application in due time . . . . . Regretfully we note the passing of W2AFO, DXCC member with 131 confirmed . . . . . Indiscriminate and ill-timed calling is W9VBQ's pet peeve on DX bands. There's nothing much more ridiculous than repeatedly calling a DX station while the latter is transmitting. Drift and QSB can cause this, of course, but too many jokers never seem to use their tuning or gain controls once they're in a pile-up . . . . . VP1FL is stalking Me., Vt. and N. H. for you-guessed-it. Frank has been sticking with 20 but plans a big 15- and 10-meter offensive . . . . . The band was crammed with jolly QRM when sixty DX men gathered at San Diego's Cafe del Rey Moro during the ARRL Southwestern Division Convention. W6AM emceed. You usually can spot an Honor Roll man at these shindigs by the rather worried expression around his ears. He may be missing a new one, you know . . . . . W6MUR heads up the arrangements committee for the gala 1956 annual Fresno fling of the Northern and Southern California DX Clubs, January 14th–15th. The eye of this hurricane will center on the Hacienda Motel, about three miles north of the city. Check signals with W6MUR, *now* . . . . . Once rarer than leghorn bicuspids, Martinique lately is a pushover on most DX bands. W6YY's log shows FM7s WD WF WN WP and WQ readily available . . . . . W6OAY now signs KL7BPK with a Viking-II on 80 and 15 c.w., 10 and 15 'phone.

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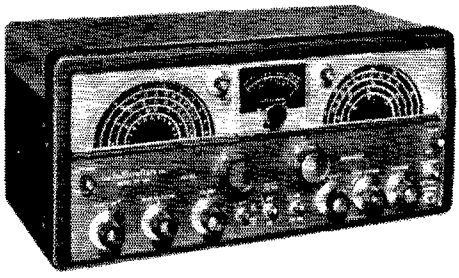

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IARU News

(*Continued from page 108*)

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Netherlands Antilles (Aruba): Postbox 80, San Nicolas, Aruba
Netherlands Antilles (*Curacao*): Postbox 383, Willemstad, Curacao
Netherlands East Indies: Hr. C. Loze, PK1LZ, Burg. Kuhrweg, 47 Bandoeng, Java
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington C1
Nicaragua: YN1RA, Apartado #926, Managua
Northern Rhodesia: N.R.A.R.S., P.O. Box 332, Kitwe
Norway: N.R.R.L., P.O. Box 898, Oslo
Okinawa: O.A.R.C., APO 331, % Postmaster, San Francisco, Calif.
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Panama, Republic of: L.P.R.A., P.O. Box 1622, Panama
Paraguay: R.C.P., P.O. Box 512, Asuncion
Papua: P.O. Box 107, Port Moresby
Peru: R.C.P., Box 538, Lima
Philippine Islands: Elpidio G. DeCastro, Philippine Amateur Radio Assn., 2046 Taft Ave., Pasay City
Poland: Polski Zwizek Krotkofalowcow, P.O. Box 320, Warsaw
Portugal: R.E.P., Travessa Nova de S. Domingos, 34-1, Lisbon
Roumania: A.R.E.R., P.O. Box 95, Bucharest
Salvador: YS1O, Apartado 329, San Salvador
Siam (*Thailand*): Frank Speir (W6FUV), Saha Thai, 4th Mansion, Raja Damnoen Avenue, Bangkok, Thailand
Singapore: P.O. Box 176, Singapore, Malaya
South Africa: S.A.R.L., P.O. Box 3037, Capetown
Southern Rhodesia: R.S.S.R., Box 2377, Salisbury
Spain: U.R.E., P.O. Box 220, Madrid
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V.H.F. Contest Results

(*Continued from page 104*)

K2HXL/2 (W2IPX, K2s HXL LJF JDY) 4508-161-28-AB
K2IEJ (W2s HJM JZT, K2s DEO IEJ) 3600-180-20-B

N. New Jersey

W2PRF....9075-275-33-AB
W2RGV...8029-203-37-ABC
W2DZA....4284-113-34-ABC
W2WKL...2832-118-24-AB
W2PWX...2178-121-18-B
K2ICE.....1760-110-16-B
W2PEV.....1080- 60-18-AB
K2HOD.....855- 45-19-B
W2MM.....686- 49-14-B
W2OHJ.....516- 43-12-B
W2CBB.....345- 23-15-B
W2GDN.....297- 27-11-B
W2ENY.....270- 27-10-A
W2OAE.....207- 23- 9-B
K2AIO.....162- 27- 6-B
W2FWT/2 (W2s CRJ OZU, K2s IPF JNK JNQ, KN2s LUG MIU MKV OMC) 3780-180-21-AB

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W0CUV.... 234- 39- 6-B
W0EMS.... 231- 33- 7-B
KN0BAN... 54- 18- 3-B
W0CZ..... 9- 9- 1-B

Kansas

W0IFR.... 65- 13- 5-B
W0HAJ.... 50- 10- 5-B
W0MOX/0. 6- 3- 2-B

Missouri

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W0HXH... 56- 14- 4-B
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W1SPX....2640-110-24-AB
W1YDM...2525-101-25-AB
W1KBI....2070-115-18-B
W1WHO...1648-103-16-B
W1ANI....1452-121-12-B

(*Continued on page 186*)

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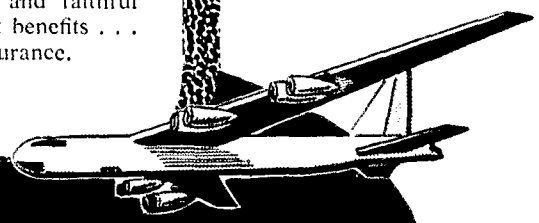

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W1BDI[4].. 876- 73-12-B
WN1EYF[4].. 741- 57-13-B
WN1EYJ... 600- 60-10-B
W1URC.... 550- 50-11-B
W1QAK.... 400- 40-10-B
W1CIV.... 290- 29-10-B
W1ULY.... 192- 32- 6-B
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W1EIA (W1s EDA BIH YNC FTX BDI JMV) 297- 33- 9-B
W1AW[4] (W1s QIS WPR) 296- 37- 8-AB

Maine

W1HDQ/1..3741-129-29-AB
W1KID/1..1995-133-15-B
W1TWJ.... 165- 33- 5-A

E. Massachusetts

W1OOP....6308-151-38-ABC
W1AQE....3575-143-25-AB
W1JSM....1806-129-14-B
W1QXX....1365- 91-15-B
W1AHE....1302- 93-14-B
W1PLX....1035- 69-15-B
W1AAI.... 726- 66-11-B
W1NCO.... 648- 72- 9-A
W1LJN.... 507- 39-13-B
W1DJ..... 495- 55- 9-A
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W1LUW.... 324- 36- 9-AB
W1TUM.... 252- 42- 6-A
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W1SAD.... 108- 36- 3-B
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WN1DZE[4].. 70- 35- 2-B
W1LHV.... 63- 21- 3-B
W1VYS.... 48- 16- 3-B
WN1COL... 24- 12- 2-B
W1ZHA.... 10- 10- 1-B
WN1CQB... 6- 6- 1-B
W1VZQ/1[3] (W1s VZQ ZOC) 9576-217-42-ABCD
W1ORV/1 (W1s ORV TMO) 4140-180-23-AB
W1CVW/1 (W1s ZLY SNK SNW)...1660- 83-20-AB
W1VSV (W1s VSV UPU) 770- 77-10-A

W. Massachusetts

W1RFU....9307-214-41-ABC
W1VNH....4983-141-33-ABCD
WN1FVT/1[4] 1820-130-14-B
W1ZWL/1..1800-120-15-A
W1UNB/1..1168- 73-16-B
W1CJK.... 684- 57-12-B
WN1GME.. 550- 50-11-B
W1RO..... 481- 37-13-AB
WN1FAB... 350- 50- 7-B
W1RRX.... 216- 27- 8-B
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W7NGW.... 92- 23- 4-AB
W7TZP/7.... 2- 2- 1-B
W7SEZ/7 (W7s SEZ RET DIS) 330- 66- 5-AB

Washington

W7IEE.... 220- 44- 5-AB
W7SRL.... 129- 43- 3-B
W7KO..... 90- 30- 3-AB
W7ALU.... 72- 24- 3-B
W7AXS.... 72- 23- 3-ABC
W7JHX.... 72- 18- 4-AB
W7YJE.... 48- 24- 2-A
W7PRW.... 42- 21- 2-A
W7LHL/7 (W7s LHL PUZ, WN7AUG) 395- 79- 5-AB

PACIFIC DIVISION

Hawaii

KH6AED... 7- 7- 1-B
KH6EE/KH6 7- 7- 1-B
KH6OS.... 4- 4- 1-B

Nevada

W6PIV/7... 22- 11- 2-B

Santa Clara Valley

W6ENX....1100-110-10-ABD
K6DTR.... 400- 80- 5-B

East Bay

W6UTX.... 132- 44- 3-B

San Francisco

W6AJF....1666-104-14-ABCD

Sacramento Valley

KN6KDU... 300- 50- 6-B
K6HTZ.6 (W6BHS, K6HTZ) 125- 25- 5-AB

San Joaquin Valley

W6NDP.... 255- 51- 5-B
W6GQZ.... 224- 28- 8-AB
KN6LFF... 37- 37- 1-B
W6OVR/6 (W6s OVR LRS) 250- 50- 5-B

ROANOKE DIVISION

North Carolina

W4CVQ.... 675- 45-15-AB
W4SOP.... 456- 38-12-B
W4NHW.... 200- 40- 5-B
K4AMX/4 (W4s YLU YJG YSB CPI, K4AMX) 1680- 80-21-AB

Virginia

W4UMF...5053-158-31-ABC
W4JCJ....3300-165-20-AB
KN4BLC...1920-120-16-B
W4IKZ....1632- 96-17-B
K4BRK/4..1290- 86-15-A
W4WSF/4..1134- 81-14-B
W4VVE.... 612- 49-12-BD
W4TNQ.... 192- 32- 6-B
W6LON/4.. 112- 16- 7-B

West Virginia

W3PZK/8..1045- 95-11-B
W8EP..... 390- 30-13-B
W3BGF/8.. 80- 16- 5-B
W8TDJ.... 32- 8- 4-AB

ROCKY MOUNTAIN DIVISION

Colorado

KØCIQ/Ø.. 8- 8- 1-B

Utah

W7QDJ.... 12- 6- 2-AB

SOUTHEASTERN DIVISION

Alabama

W4TLV.... 72- 12- 6-B

Georgia

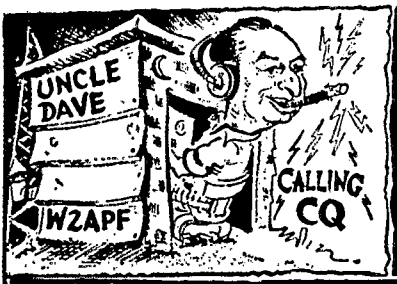
W4GIS.... 72- 18- 4-B
W4FWH.... 27- 9- 3-B
W4EGX.... 2- 2- 1-B

SOUTHWESTERN DIVISION

Los Angeles

W6EMM/6[5] 1148-153- 7-ABDE
K6CEO.... 216- 72- 3-B
W6SDW/6.. 78- 26- 3-AB
W6BWE.... 42- 21- 2-A
W6PFE.... 22- 16- 2-B
K6QEE/6 (W6s VIX JMY NGN, K6s GMV HXM MBL HYY)..5785-421-13-ABCDE

(Continued on page 188)



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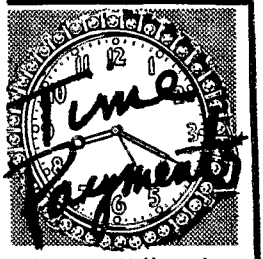
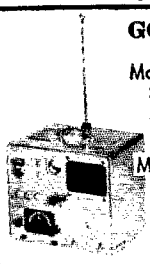


Ask Tiny Miller about our easy payment plan that gives you up to 18 months to pay after the down payment. Life insurance included at no extra cost.

Write Dept. D. for our newest list of used equipment and specials! Big Buys!



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Model 3025 $229.50 6V-120V 2 meters
Model 3049 $229.50 6V-110V 6 meters

VFO for 2 mtrs $ 84.50
Linear amplifier for 2 meters 149.50

HALLICRAFTERS
HT-31
SSB - AM - CW
LINEAR POWER AMP.
$395.00

GONSET
G-66
6 BAND RECEIVER
6V DC - 12V DC - 115V AC
BUILT IN SPKR.
WRITE FOR PRICE AND LITERATURE

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20A Single Sideband exciter kit	$199.50
20A w/t	249.50
10B kit	129.50
10B w/t	179.50
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w/t	74.50

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REDUCED PRICES

10, 11, 15 Meter	
VPA1015-2 Bm.	39.89
VP1015-2 Coil	14.95
VPA1015-3 Bm.	59.68
VP1015-3 Coil	22.95
20 Meters	
VPA20-2 Beam	44.73
VP20-2 Coil	14.95
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VP20-3 Coil	22.95

HALLICRAFTERS
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SSB - AM - CW
TRANS. EXCITER w-VFO
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$495.00

Write Uncledave W2APF with your needs and problems.

We've got just about EVERYTHING a ham needs or wants. ask us!

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WE SPECIALIZE IN FOREIGN TRADE

San Diego

W6ZOP/6..	798-	133-	6-AB

Santa Barbara

W6NJU/6..	40-	10-	4-B
K6HEB....	36-	12-	3-B

WEST GULF DIVISION

Northern Texas

W5SNX....	6-	3-	2-B

Oklahoma

W5PZ.....	18-	9-	2-B

New Mexico

W5ECS....	12-	12-	1-B
W5FPB....	11-	11-	1-B
W5QWG....	11-	11-	1-B

CANADIAN DIVISION

Maritime

VE1QY....	494-	38-	13-AB
VE1EF....	24-	8-	3-A

Ontario

VE3DIR...	2235-	149-	15-B
VE3BQN...	1755-	131-	13-ABC
VE3AIB...	1210-	121-	10-AB
VE3BGI...	918-	102-	9-AB
VE3AGW..	576-	64-	9-AB
VE3BNU..	552-	92-	6-B
VE3DSU...	504-	72-	7-B
VE3AET...	462-	66-	7-AB
VE3BOW..	455-	91-	5-B
VE3BPB...	285-	57-	5-B
VE3DER..	238-	34-	7-AB
VE3AEZ...	183-	61-	3-B
VE3DDA..	172-	43-	4-B
VE3DUU...	165-	55-	3-B
VE3ATB...	136-	34-	4-B
VE3KM....	99-	33-	3-B
VE3BWE..	66-	33-	2-B

Quebec

VE2AOK...	140-	20-	7-B
VE2FF....	72-	18-	4-B

British Columbia

VE7FJ.....	48-	16-	3-B

[1] Novice award winner. [2] Technician award winner. [3] Multioperator award winner. [4] Hq. Staff, not eligible for award. [5] W6MMU, opr.

ARRL thanks these amateurs for submitting their logs for checking purposes: W1FTF W3s JW KSM, W8GWA.

REPORTER'S WIFE SUES FOR DIVORCE

Framingham, Mass., Nov. 23 (U.P.) — James Robbins, W1VJE, United Press district reporter, was brought before Judge C. W. Bug in Superior Court today by his wife, who sued for divorce on grounds of desertion for two Sweepstakes week ends, assault and battery on her ears by code signals, and alienation of affections by a blonde BC-457 and a brunette Super-Pro.

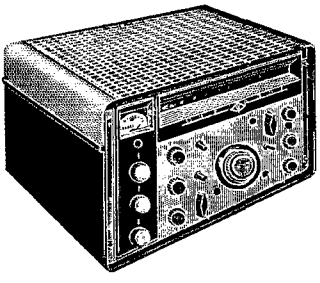
When the clerk read these charges, Judge Bug startled the courtroom by gathering his robes about him in horror and rapping out a sharp didididit didit with his gavel. Then he roared: "How dare you keep His Honor, the Judge, off 20 meters on a day when the DX is rolling in, for a ridiculous case like this? Madam, you'll find that I'm an OT from way back and it will go mighty hard with any XYL who brings her OM before this court to rattle off any such QRM as this. A child could tell you that it's much better to have the OB at home playing the ARRL Sweepstakes than at the track playing the four-legged ones.

"Madam, your face should be as red as the plate of an overloaded 807 for charging your husband with desertion, when you were the one who deserted him by not standing by with pots of hot coffee during the contest. Why, your OM didn't even put in the full 40 hours he could have spent on this worth-while activity!"

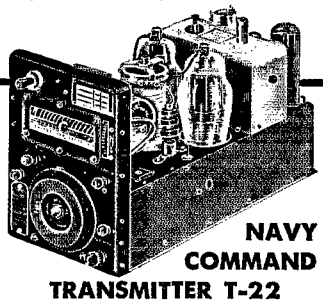
While the abashed plaintiff hung her head lower than a ten-meter beam after a New England hurricane, Judge Bug banged out a few more "hi's" with his gavel and sternly intoned the verdict: "I find you in contempt of court and sentence you to six months' probation during which time you will report weekly to the probation officer on your code-speed progress until you pass the Novice exam. If and when you get your ticket I'll dismiss the contempt charge. We've got to stamp out this wave of feminine delinquency before it spreads. The OM is the master of the household and we want no revolution in our social system. If the XYLs want to interrupt these serious pursuits, let them give their husbands a rig for the family car as a Christmas present, and then learn to keep the log. Next case!"

"Oh, Oh, I must have left that new receiver from Walter Ashe at the wrong house."

There's no mistaking Walter's "Surprise" Trade-In Allowance on used (factory-built) test and communication equipment. So for real money-saving and solid satisfaction, get your trade-in deal working today. Wire, write, phone or use the handy coupon.



NEW NATIONAL NC-300
Less speaker.
Net **$349.95**



NAVY COMMAND TRANSMITTER T-22

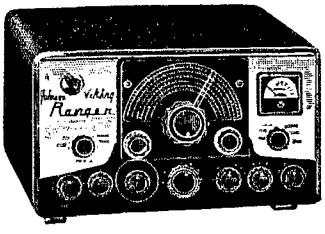
Navy version of BC-459. 7-9.1 MC. Conversion instructions included. Brand new. With tubes and case. Net **$9.95**

Stancor P-6469. 25-volt filament transformer for T-22. Net $2.88

NATIONAL NC-98
Less speaker.
Net **$149.95**

HALLICRAFTERS SX-100.
Less speaker.
Net $295.00

JOHNSON VIKING RANGER TRANSMITTER-EXCITER KIT.
Net $214.50
Wired and tested
Net $293.00



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FREE CATALOG! Q-12-55

WALTER ASHE RADIO COMPANY
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☐ Rush "Surprise" Trade-In Offer on my_____

for_____
(show make and model number of new equipment desired)

☐ Rush New 1956 Catalog.

Name_____

Address_____

City_____ Zone____ State_____

Send for your copy today

Field Day Results

(*Continued from page 64*)

W3CYU/3	Sylvania Amateur Radio Club; Warren County Emergency Radio System	258-	B-15-	1548
W6TPN/6	Mountain View Radio Club	217-	AB- 5-	1533
K2DIE/2	Cowanesque-Canisteo Amateur Radio Assn.	145-	A- 6-	1530
W9NGG/9	Livingston Co. Emergency Corps	254-	B-14-	1524
W3VV/3	McKean County Radio Station	321-	AB- -	1503
W1DDD/1	Blackstone Valley Amateur Radio Club	385-	BC-25-	1491
K4DXZ/4	Valley Amateur Radio Club	231-	AB-19-	1482
K6EBE/6	Napa Valley Amateur Radio Assn.	222-	B-16-	1482
W9AWE/9	Western Illinois Radio Club	244-	B- 8-	1464
W8CCO/8	North East Amateur Radio Club	283-	BC- -	1449
W8JTB/8	(nonclub group)	237-	B- 8-	1422
W1MB/1	Satuit Amateur Radio Club	165-	AB-11-	1416
W1ZMM/1	(nonclub group)	172-	AB- 4-	1386
W1VXL/1	Cranston Radio Assn.	275-	AC-30-	1384
W7MBH/7	(nonclub group)	176-	AB- 8-	1374
W2FFY/2	(nonclub group)	277-	AB-10-	1359
WØBLK/Ø	Black Hills Amateur Radio Club	141-	A-25-	1269
W7SON/7	Pocatello Amateur Radio Club	186-	B- 6-	1266
W3SUC/3	(nonclub group)	183-	B- 9-	1248
W1ILV/1	Waterbury Amateur Radio Club	137-	A-15-	1233
W2LUX/2	Queens Radio Amateurs	182-	AB- 6-	1231
W8ASL/8	Van Wert Amateur Radio Club	292-	BC-12-	1204
WØLUI/Ø	El Dorado Amateur Radio Club	316-	B- 9-	1194
WØOKA/Ø	Ottawa Radio Emergency Club	171-	AB- 3-	1185
W1YFA/1	Walpole Amateur Radio Club	137-	AB-10-	1134
W7ACX/7	Skagit Amateur Radio Club	161-	B-15-	1116
W5DCA/5	(nonclub group)	119-	AB- 3-	1104
W1HJL/1	(nonclub group)	172-	AB- 3-	1101
WØLGO/Ø	Council Bluffs Radio Operators Club	291-	BC-16-	1098
K4FDT/4	MARS Radio, Donaldson Air Force Base	183-	B- 8-	1098
W3LTK/3	Radio Association of Erie	183-	B-25-	1098
K4DPZ/4	Gainesville Amateur Radio Society	156-	B- 7-	1086
KH6AWA/KH6	Leeward Oahu Amateur Radio Club	176-	AB- 8-	1083
W5HMF/5	Oil Capitol Mobile Club	175-	ABC-12-	1056
W7TRU/7	Harlo Radio Club	146-	B- 9-	1026
VE1GM/1	Yarmouth Amateur Radio Club	88-	A- 8-	1017
W1KVI/1	Portland Amateur Wireless Assn.	87-	A- 8-	1008
VE1CW/1	Truro Amateur Radio Club	140-	AB- 9-	990
VO1T/2	Newfoundland Radio Club	131-	B-12-	936
VE7NM/7	Totem Amateur Radio Club	128-	B- 8-	918
W9HGC/9	CAA Radio Amateur Club	148-	AB- 7-	891
W9UGH/9	Johnson Co. Amateur Radio Club	165-	ABC- 8-	882
K5AXA/5	San Angelo Amateur Radio Club	145-	B-20-	870
KL7YG/KL7	(nonclub group)	118-	B- 6-	858
KØANO/Ø	QSO and QRM Society of Iowa	151-	ABC-10-	804
W9MKS/9	Starved Rock Radio Club	116-	B-12-	798
K2MRE/2	Kings Radio Club	87-	A-11-	783
W5SXA/5	Shawnee Radio Club	124-	AB- 6-	777
W4OXQ/4	Gaston Amateur Radio Club	320-	AB- 7-	776
W5ES/5	El Paso Amateur Radio Club	212-	BC-11-	717
W8CQG/8	Hiawatha Amateur Radio Assn.	157-	BC- 9-	705
VE6IV/6	(nonclub group)	67-	AC- 4-	676
KP4ID/KP4	Puerto Rico Amateur Radio Club	81-	B-21-	636
W4MI/4	Tuscaloosa Amateur Radio Club	75-	B- 4-	600
W2DYM/2	UHF Club of Jamaica	233-	AB-10-	593
W3NRU/3	Crawford County Amateur Radio Assn.	98-	B-15-	588
W1TIC/1	Canaan Unit of Connecticut Amateur Radio Assn.	72-	AB- 9-	528
W2BRK/2	Astoria Radio Club	63-	AB- 3-	450
WØELJ/Ø	Grand Island Amateur Radio Society	91-	ABC-15-	435
K4FEP/4	Robins Amateur Radio Club	64-	AB-18-	420
W4AB/4	Broward Amateur Radio Club	65-	AB-12-	390

(*Continued on page 192*)

LAFAYETTE Leads the Field in TRANSISTORS

Circuits Kits & Components

Argonne TRANSISTOR TRANSFORMERS

AT LAST A COMPLETE LINE OF QUALITY TRANSFORMERS FOR EVERY TRANSISTOR APPLICATION AT A PRACTICAL PRICE!

2.75 each Lots of 10 Assorted

2.95 Singly, each

- Nickel-Steel and Silicon Steel Laminations
- Wound on Nylon Bobbins
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Have you been experimenting with transistor circuits? And have you been forced to make-do with compromise transformers or improvised units? And have you had to pay from $6.00 to $12.00 for them? The Argonne line brings you a wide variety for experimentation as well as for replacement. Efficiently designed to meet the needs of miniaturization and engineered to provide more power handling capacity and improved frequency response with minimum distortion. All are nickel-steel laminations except asterisk which are silicon steel. Average net weight 1¼ oz, average shipping wt. 4 ozs.

Argonne Number	Type	Impedance Primary Ohms	Impedance Secondary Ohms	Unbalanced Current Pri. D.C. MA	D.C. Resistance Pri. Ohms	D.C. Resistance Sec. Ohms	Overall Size
AR-100	Input	200,000	1,000	.0	3600	90	1"x¾"x¾"
AR-101	Input	100,000	3,000 CT	.5	3600	60	1"x¾"x¾"
AR-102	Input	100,000	1,500 CT	.5	3600	40	1"x¾"x¾"
AR-103	Driver	20,000	2,000 CT	1.	400	50	1"x¾"x¾"
AR-104	Driver	20,000	1,000	.0	400	50	¾"x⅝"x⅝"
AR-105	Driver	20,000	400	1.	600	20	1"x¾"x¾"
AR-106	Driver	16,000	4,000	1.	620	350	¾"x⅝"x⅝"
AR-107	Driver	15,000	200	1.5	1000	20	1"x¾"x¾"
AR-108	Driver	10,000	3,000 CT	.0	200	100	¾"x⅝"x⅝"
AR-109	Driver	10,000	2,000 CT	.0	500	50	¾"x⅝"x⅝"
AR-110	Output	10,000	25	2.	600	2.5	¾"x⅝"x⅝"
AR-111	Output	5,000	100	1.	600	10	¾"x⅝"x⅝"
AR-112	Output	3,500	200	1.	120	25	1"x¾"x¾"
AR-113*	Driver	3,000 CT	1,000	9.	100	60	¾"x⅝"x⅝"
AR-114	Output	2,500	11	10.	50	.1	¾"x⅝"x⅝"
AR-115	Input	2,000 CT	8,000 CT	.0	150	660	1"x¾"x¾"
AR-116	Output	2,000	200	4.	120	20	1"x¾"x¾"
AR-117	Output	500 CT	30	.0	20	1.5	¾"x⅝"x⅝"
AR-118	Output	500 CT	16	.0	20	1.5	¾"x⅝"x⅝"
AR-119	Output	500 CT	3.2	.0	20	.3	¾"x⅝"x⅝"
AR-120*	Output	400 CT	11	1.	20	.9	¾"x⅝"x⅝"
AR-121*	Output	300 CT	3.2	.0	20	.25	¾"x⅝"x⅝"
AR-122*	Output	250 CT	3.2	.0	11	.3	1"x¾"x¾"
AR-123	Input	200	2,000 CT	2.	11	50	1"x¾"x¾"
AR-124*	Output	200 CT	16	.0	20	1.3	¾"x⅝"x⅝"
AR-125	Input	3	4,000	.0	.14	50	¾"x⅝"x⅝"

RAYTHEON TRANSISTORS SALE!

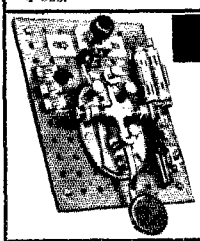
RAYTHEON TRANSISTOR CK722 P-N-P **99¢**

New Price!

RAYTHEON TRANSISTOR **CK-760** (2N112) **4.65**

TRANSISTOR TYPE 2N107 P-N-P **$1.25**

TRANSISTOR CODE PRACTICE OSCILLATOR KIT



For those interested in mastering the international code, an audio tone oscillator is essential. The circuit of this transistorized feedback oscillator has the simplicity of the neon glow, the signal strength of the vacuum tube, and requires only two penlite cells for weeks of service. It may be used for solo practice, or two may send and receive with the same unit. Kit comes complete with Transistor, Telegraph Key, Resistors, Condensers, Masonite Board, etc., and Schematic Diagram.

KT-72 ..... Net **2.99**

Cannon ECI—Single Headset ..... Net **1.13**

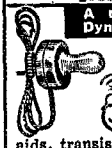
2 TRANSISTOR POCKET RADIO KIT

Packed into a 2½"x3½"x1¼" plastic case. This Two Transistor plus crystal diode radio kit offers many surprises, utilizing a regenerative detector circuit with transformer coupled audio stage, gives you high gain and excellent selectivity. Pulls in distant stations with ease with more than ample earphone volume. Kit comes complete with two transistors, crystal diode, loopstick, Argonne transistor audio transformer resistors, condensers, plastic case, etc. Including schematic and instructions.

KT-68A Complete Kit less earphones. Net **11.80**

MS-260 New Super Power Dynamic Earphone, ideal for Transistor Circuit Imp. 8000 ohm, D.C. 2000 ohm **3.95**

A new light weight Dynamic Ear Phone.



Fits right into the ear. Excellent sensitivity of 65 db. Ideal for use with miniature sets, hearing aids, transistor pocket radios. DC resistance 2000 ohm, impedance 5000 ohm with 3 ft. of plastic cord.

MS-72 .....Net **1.95**

MS-100 Impedance 8 ohm for Silent Radio or TV viewing.

Net..... **1.95**

MINIATURE CRYSTAL MICROPHONE

Here's a typical Lafayette special for the experimenter, student or dealer. An extremely sensitive and small crystal microphone used in hearing aids and other small apparatus. Can be used as lapel mike—miniature transmitter mike for concealed locations, etc. Its size and performance gives it joint versatility. Brand new. Size only 1⅜" Diam. x 5/16" deep. Imported to save you money.

MS-108 .....Net **1.95**

STUDIO CRYSTAL MICROPHONE

- DUAL CRYSTAL CARTRIDGES
- ALL DIRECTIONAL
- FINE QUALITY
- HIGH OUTPUT

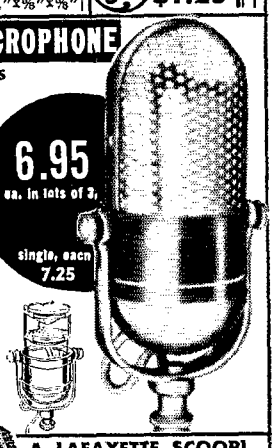
Here is a microphone with a 360° pickup, and the added power and sensitivity of two individually shock mounted and phased crystal cartridges. This arrangement assures you of maximum pickup from all sides. Swivel mounted to give fuller flexibility. Case is chrome plated. Standard ⅝"-27 thread. Overall size 7" H x 3" W complete with 4 ft. cable. Shpg. wt. 4 lbs.

PA-17—

In lots of 3, each. **6.95**

Singly, each..... **7.25**

6.95 ea. in lots of 3, single, each **7.25**



High Output Dynamic Microphone

List Price ~~$47.00~~ **$12.95**

High quality Dynamic microphone exceptionally fine for Public address recording, etc. Flat response 60-10,000 cps. Impedance 40,000 ±15% at 1,000 cps. output level −55 db. Die cast metal case equipped with 6 ft. of shielded cable. Shpg. wt. 3 lbs.

PA-19—in lots of 3 ..... 12.45

singly, ea. 12.95

A LAFAYETTE SCOOP!

Top Quality Crystal Mike **2.95**

New, attractively styled crystal microphone for all general applications — public address, home recordings etc. Frequency response 30 to 10,000 cycles. Completely equipped with 5 feet of shielded cable. Shpg. wt. 3 lbs. One of the best buys in the country.

PA-28 Each **2.95**

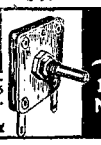
TRANSISTOR OSCILLATOR COIL

49¢

Supplies local OSC. energy to mixer stage. IF 455 KC. Use with 365 mmf cond. ⅝" x 1⅛" high.

MS-165 .....Net **49¢**

MINIATURE 365 mmf VARIABLE COND. only 3/16" Thick



Ideal for transistorized and miniature builders. Capacity 10 to 365 mmf. ½" square. 180° rotation. Bushing and shaft ⅛" long.

MS-215.....Net **69¢**

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Include postage with order.

Four Transmitters Operated Simultaneously

K2AA/2	South Jersey Radio Assn.	1112–	A–50–10,233		
W6MGJ/6	Helix Amateur Radio Club	919–	A–18–	8658	
W6PD/6	Foothill Mobile Net	1213–	AB– –	8040	
W9OFR/9	Joliet Amateur Radio Society	759–	A–20–	7056	
K2BC/2	Windblower V.H.F. Society	747–	A–15–	6948	
W8MRM/8	Motor City Radio Club	899–	AB–24–	6933	
W3VRZ/3	Beaver Valley Amateur Radio Assn.	846–	AB–18–	6717	
W3OK/3	Delaware-Lehigh Amateur Radio Club	718–	A–30–	6687	
W8RUM/8	Blue Ash Emergency Radio Club	697–	A–10–	6498	
W2KOJ/2	Watchung Valley Radio Club	667–	A–27–	6228	
W6NWG/6	Palomar Radio Club	667–	A–15–	6003	
W5PDO/5	Los Alamos Amateur Radio Club	794–	AB–15–	5982	
K6CXI/6	Hamilton High School Amateur Radio Club	623–	A–14–	5832	
W2DAY/2	Northern New Jersey Radio Assn.	613–	A–25–	5742	
W4TRC/4	Kingsport Amateur Radio Club	886–	AB–30–	5677	
W3AFM/3	Chesapeake Amateur Radio Club	706–	AB–13–	5162	
W6MHM/6	Bell Gardens Amateur Radio Assn.	528–	A–15–	4977	
W6TTN/6	Rio Hondo Radio Club	553–	AB– –	4956	
W7NTO/7	Lewis County Amateur Radio Club	510–	A–13–	4815	
W8DC/8	Grand Rapids Amateur Radio Assn.	730–	B–25–	4530	
W4DU/4	Jacksonville Amateur Radio Society	655–	AB–16–	4458	
W0ERG/0	Sioux City Amateur Radio Club	722–	ABC–15–	4458	
W5CF/5	Kilocycle Club of Fort Worth	696–	B–45–	4356	
W8RNF/8	Lake Geauga Radio Club	710–	B–20–	4260	
W4PAY/4	Amateur Radio Club of Falls Church	511–	AB–25–	4260	
W3FT/3	Baltimore Amateur Radio Communications Society	539–	AB–20–	4251	
W8TPW/8	Clarksburg Radio Club	447–	A–10–	4248	
W2GLO/2	Levittown Amateur Radio Club	631–	AB–33–	4119	
W8KGG/8	Huron Valley Amateur Radio Assn.	647–	B–15–	3972	
W6JBT/6	Citrus Belt Amateur Radio Club	440–	A– –	3960	
W2ZQ/2	Delaware Valley Radio Assn.	582–	AB–20–	3915	
W4GCW/4	Pickens County Amateur Radio Club	622–	B– 9–	3882	
VE1ND/1	Fredericton Radio Amateur Club	399–	A– 9–	3816	
W5RES/5	Hobbs Amateur Radio Club	610–	B–23–	3810	
W3PGA/3	Aero Amateur Radio Club	398–	A–16–	3807	
W1VPR/1	Hingham Amateur Radio Club	421–	A–12–	3789	
W0LII/0	WDAF-TV Amateur Radio Club	571–	B–12–	3576	
W4NVU/4	Dade Radio Club	566–	B–35–	3546	
W7YN/7	Nevada Amateur Radio Assn.	531–	AB–23–	3516	
VE3DJS/3	Niagara Peninsula Amateur Radio Club	380–	A– 8–	3420	
W3KWH/3	Steel City Amateur Radio Club	554–	B–16–	3324	
W0CET/0	Kaw Valley Radio Club	545–	B–20–	3270	
K6DDT/6	Oakland Radio Club	497–	AB– 4–	3258	
W9EIY/9	Hoosier Hills Ham Club	583–	AB–20–	2901	
W2DPQ/2	Huntington Radio Club	384–	AB–25–	2823	
K5FBI/5	Barksdale Amateur Radio Club	365–	AB– 5–	2724	
W0HWM/0	Tri State Radio Club	449–	B– –	2694	
W6ZOZ/6	Skyriders Radio Club	295–	A–15–	2655	
K4ACC/4	YMCA Radio Club	363–	AB–12–	2613	
W4NEP/4	Paducah Amateur Radio Club	431–	B– –	2586	
W1TKA/1	Stamford Amateur Radio Corps	319–	AB–13–	2577	
VE3DRT/3	Skywide Amateur Radio Club	318–	AC–20–	2571	
W4FX/4	Tennessee Valley 10 Meter Emergency Net	415–	A–13–	2502	
W5KA/5	Austin Amateur Radio Club	400–	ABC– 8–	2377	
W9LI/9	Elgin Amateur Radio Society	262–	A– –	2358	
W8AM/8	Coffee Dunkers of Detroit	299–	AB–11–	2313	
W3VPR/3	Anne Arundel Radio Club	360–	B–15–	2310	
VE6NQ/6	Calgary Amateur Radio Assn.	352–	B– 6–	2262	
W9MD/9	Illinois Ham Club	298–	ABC–10–	2196	
W4JP/4	Bluegrass Amateur Radio Club	359–	B–50–	2179	
K2IBC/2	Avenel Radio Club	267–	AB– 7–	2175	
W8ZZ/8	Detroit Amateur Radio Assn.	388–	ABC–23–	2154	
W1IA/1	South Shore Amateur Radio Club	349–	B– 6–	2094	
W5LTM/5	Panhandle Amateur Radio Club	341–	AB–28–	2085	

(Continued on page 194)

Over 100 Microphones In Stock At RADIO SHACK!

DYNAMIC MICROPHONE

NEW EXCLUSIVE Archer S1-D

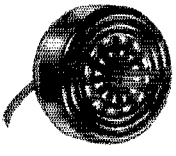
$10.95

Reg. $40

TECHNICAL SPECIFICATIONS: true dynamic microphone for recording and general use on stand or in hand; output — 56 db; high impedance (30K); semi-directional; frequency response 50-11,000 cycles per second; on-off switch built into microphone body; 12 ft. cable; cradle; net weight of the microphone itself is only EIGHT OUNCES. Ship. wt. 2 lbs. Full standard RETMA guarantee plus the assurance of Radio Shack's own ARCHER quality label. Now in stock for immediate delivery! Clearly and obviously the finest value in a slim dynamic ever to cross the horizon!

Order No. R-90849 ..... Complete, Only $10.95

REG. $6 CRYSTAL MIKE

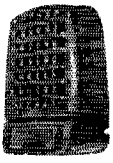


Exclusive $2.95

Super lightweight — only 5 oz. 100-6000 cps response; 4½ ft. shielded cable with prepared leads. Brown molded case 2⅛" dia. x ⅞" for hand, suspended or flat-rest use. Same element as in $6 microphones; original equipment with many recorders, etc. Ship. wt. ½ lb.

Order No. R-5134Q.

DELUXE CRYSTAL MIKE



$10.85 List $3.95

70-7000 cps response. Moisture-sealed crystal. Gray metal case, aluminum diaphragm, shock-proof mounting, wind and blast proof; output level —52 db. For hand, desk, or stand use — has standard ⅝"-27 thread adaptor. 6-ft. cord with strain relief. Ship. wt. ¾ lb.

Order No. R-5193Q.

CRYSTAL LAPEL MIKE

$20.00 List $3.95

ARCHER microphone "buy" of the year! Finish: TV gray, including 15-ft. cable. Features: swiveling attachment clip, cord strain relief, INDIVIDUAL sensitivity report giving figure for 200, 1000, 3000 cycles for each unit. 1¾x⅜". RETMA guarantee. Ship. wt. 8 oz.

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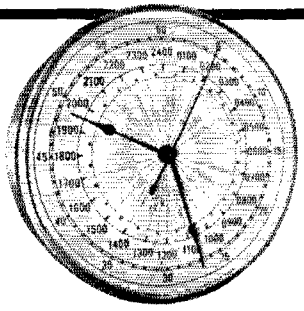

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$12.50 Plus $2.50 U.S. Tax

WITH HUGE 10" DIAL, SWEEP SECOND

Anyone can use it — hams, military personnel, scouts; can be used in club rooms, lobbies, schools, retail stores, displays, etc. AT A SINGLE GLANCE this fabulous clock tells the exact time in every zone of the world. Key cities and countries are shown on inner dial. 0100-2400 hours and 1-60 seconds are shown in separate bands! Gray metal with chrome-plated bezel. Self-starting. Convex crystal. A unique clock of time-proven quality at a moderate price that HASN'T risen with inflation!

Order No. 32-870F ..... $12.50 plus $2.50 F.E.T.

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BOSTON 8 — 167 Washington St. NEW HAVEN 10 — 230 Crown St.

"Mopping up" afterwards was easy at W7BXL/7 — the whole station fitted comfortably into a wheelbarrow. That's W7FL on the left, W7BXL right.

K6KHZ/6	Tehama County Amateur Radio Club.....	224-	A- 5-	2016
W4OLB/4	Smoky Mountain Amateur Radio Club.....	399-	ABC-11-	2013
W8COU/3	Elkton Amateur Radio Society.....	252-	AB-10-	1935
W4BMI/4	Tri-County Radio Club	411-	BC-14-	1875
K4ALI/4	Pensacola Amateur Radio Club.....	284-	AB-15-	1869
W7SGD/7	Benson Radio Club....	221-	AB- 5-	1854
W5TBV/5	Pampa Amateur Radio Club.....	235-	AB-12-	1795
W9BOM/9	Kenosha Radio Communications Society.	264-	B-11-	1734
W9MJL/9	Vermilion County Amateur Radio Assn.....	237-	B-12-	1572
W1NI/1	WTIC Radio Club....	215-	AB-4-	1518
W3TQU/3	South Philadelphia Amateur Radio Club	158-	A- -	1422
W6AF/6	Feather River Amateur Radio Club.....	237-	B- 8-	1422
W2RCX/2	Batavia Amateur Radio Assn.....	153-	A-15-	1377
W9OYR/9	Manitowoc County Radio Club.....	315-	BC-11-	1302
K6KHE/6	Yuba-Sutter Radio Club.....	214-	B-19-	1284
K4DTV/4	Huntsville Amateur Radio Club.....	192-	AB-26-	1215
W5IU/5	Kerrville Radio Club..	189-	B-13-	1134
WØHUL/Ø	Lake Region Radio Club.....	188-	B- 8-	1128
W8PIF/8	M & M Radio Club...	154-	B-18-	1074
W3WWG/3	Windsor Amateur Radio Club.....	163-	AB- -	1035
W6IKV/6	Silvergate Amateur Radio Club.....	108-	A-14-	972
W1PCC/1	Lowell Radio Operators Club.....	287-	AB- 6-	649
W3SL/3	(nonclub group).....	93-	ABC- 6-	507
WØTVB/Ø	Yampa Valley Radio Club.....	38-	AB- -	285
W1WOA/1	Rutland Radio Club...	91-	B- 8-	182

Five Transmitters Operated Simultaneously

W6CG/6	Royal Order of Suds...	1395-	A-20-12,816
W9PCS/9	York Radio Club.....	1382-	A-23-12,663
W9SWQ/9	Four Lakes Amateur Radio Club.....	940-	A-30-	8685
W2YKQ/2	Lake Success Radio Club.....	675-	A-20-	6327
W6LUC/6	Santa Barbara Amateur Radio Club.....	609-	A-10-	5706
W9BA/9	St. Clair Amateur Radio Club.....	835-	AB-30-	5700
W8ACW/8	Genesee County Radio Club.....	830-	AB-21-	5604
W2BVL/2	Nassau Radio Club....	675-	AB- -	5073
W3PIQ/3	South Hills Brass Pounders and Modulators.....	827-	B-40-	4962
K6LTA/6	Beachwood Amateur Radio Club.....	732-	AB-12-	4919
W5WIH/5	South Plains Amateur Radio Club.....	515-	A-39-	4824
W4MOE/4	Asheville Amateur Radio Club.....	749-	B-14-	4644
W9WFJ/9	Midway Radio Club...	537-	AB-15-	4305
VE3BSD/3	Quinte Amateur Radio Club.....	578-	AB-17-	3771
W1OSA/1	Pittsfield Radio Club..	567-	AB-25-	3675
W1OMI/1	El-Ray & Middlesex Radio Clubs.....	434-	AB-15-	3660

(Continued on page 196)

W9EIV/9	Western Electric Amateur Radio Club	581–	B–16–	3636
W3BTN/3	North Penn Amateur Radio Club	463–	AB–26–	3573
K6GV/6	San Fernando Valley Radio Club	400–	AB–16–	3297
W1MHL/1	Waltham Amateur Radio Assn.	337–	A–17–	3258
W8BLV/8	Dial Radio Club	542–	B– –	3252
W3NEW/3	Capitol Suburban Radio Club	465–	AB–12–	3132
W2AWF/2	Albany Amateur Radio Assn.	351–	AB–36–	3084
W1QA/1	Quannapowitt Radio Assn.	385–	AB– –	3078
K6HKE/6	Hughes Amateur Radio Club	390–	AB– 8–	3027
K6AGF/6	Tri-County Amateur Radio Assn.	485–	AB–17–	3002
W9PRD/9	(nonclub group)	452–	AB– 7–	2980
W2US/2	Suffolk County Radio Club	370–	AB–14–	2952
W4VTA/4	Confederate Signal Corps	423–	AB–18–	2838
W7NBR/7	Spokane Radio Amateurs	440–	B–17–	2790
VE3KCD/3	K-W Amateur Radio Club	493–	BC–20–	2427
WØILO/Ø	Red River Radio Amateur Club	402–	B– 8–	2412
K2AAN/2	Babylon Radio Club	384–	AB–20–	2385
W6LKF/6	Paso Robles Radio Club	281–	AB– 9–	2277
W1DGV/1	Great Bay Radio Assn.	327–	AB–11–	2076
WØFLN/Ø	St. Louis University Amateur Radio Club	300–	AB– 8–	2064
K2AML/2	Southern Counties Amateur Radio Assn.	332–	AB–25–	1734
W8JXX/8	Southeastern Michigan Amateur Radio Assn.	181–	A–23–	1629
W1RKF/1	Fort Hale Mobile Radio Club	215–	AB–15–	1509
W5ZCJ/5	Pioneer Radio Amateurs	238–	B–18–	1428
K5BLM/5	Bryan Amateur Radio Club	325–	ABC–25–	1331
W6LIE/6	Kern County Radio Club	219–	B–17–	1314
W3RQM/3	(nonclub group)	194–	AB–22–	1203
W1JJL/1	CQ Radio Club	180–	AB–13–	1137
W9LTW/9	Anderson Amateur Radio Club	109–	BC–35–	477

Six Transmitters Operated Simultaneously

W8KP/8	Amateur MARS Communicators Club	1216–	A–30–	11,169
W2VDJ/2	Lakeland Amateur Radio Assn.	1215–	A–25–	10,935
W9SW/9	Chicago Suburban Radio Assn.	1046–	A–31–	9648
W9OBB/9	Illinois Valley Radio Assn.	872–	A–14–	7848
W7DK/7	Radio Club of Tacoma	669–	A–35–	6246
K6CEF/6	Collins Radio Club	930–	AB–13–	6084
W2OW/2	Binghamton Amateur Radio Assn.	640–	AB–25–	5820
W3NKF/8	Naval Research Laboratory Amateur Radio Club	612–	A–16–	5733
K2LJM/2	Fordham Radio Club	765–	AB–34–	5514
W1GLA/1	Framingham Radio Club	505–	A–17–	4770
W6DVU/6	Corona Gang	442–	A– 6–	4203
W1NEM/1	Hartford County Amateur Radio Club	428–	A–35–	4086
W8FO/8	Toledo Radio Club	673–	B–75	4038
W2AEC/1	Westchester Amateur Radio Assn.	575–	ABC–30–	3534
W7NZA/7	Amateur Radio Association of Bremerton	349–	A– 8–	3366
W1GES/1	North Shore Radio Assn.	454–	AB–26–	3085
W1AAT/1	Yankee Radio Club	399–	AB–23–	2865
W6LS/6	Lockheed Amateur Radio Club	440–	AB–12–	2817
W8RBT/8	Tiffin Amateur Radio Club	445–	AB–20–	2586
WØERH/Ø	Johnson County Radio Amateurs Club	367–	AB–15–	2538
W7KYC/7	Portland Amateur Radio Club	303–	B–20–	1968
W8SG/8	Denison University Radio Club	260–	B– 9–	1560
W6RHC/6	Golden Empire Amateur Radio Society	167–	ABC–10–	993
KØBVX/Ø	Wheat Belt Radio Club	104–	AB–20–	873
W2KVG/2	Tryion Radio Club	250–	AB–17–	680

Seven Transmitters Operated Simultaneously

K6EBN/6	Westchester Amateur Radio Assn.	1175–	A–26–	10,800
W6OTX/6	Palo Alto Amateur Radio Assn.	1135–	AB–32–	10,233
VE3ZM/3	Guelph Amateur Radio Club	820–	A–24–	7605
W6BIP/6	San Francisco Radio Club	995–	AB–41–	6522
W1WKN/1	Old Colony Amateur Radio Club	645–	A– –	6030
W9FLP/9	West Allis Radio Amateur Club	589–	A–46–	5301
K6ER/6	Sacramento Amateur Radio Club	520–	A–35–	4905
K6FD/6	Sylvania Amateur Radio Club	466–	A–42–	4419

(Continued on page 198)

W6LMN/6	San Mateo Amateur Radio Club	553-	AB-	-	4353
W6LUF/6	Mt. Diablo Amateur Radio Club	589-	AB-20-		4002
W5ABD/5	Westside Amateur Radio Club	630-	B-15-		3930
W8GFO/8	Fort Hamilton Amateur Radio Assn.	554-	AB-19-		3828
K6GLS/6	L.A. Mobilers Radio Club	490-	AB-16-		3114
VE3AVU/3	North Shore Radio Club	251-	A-10-		2259

Eight Transmitters Operated Simultaneously

VE3JJ/3	West Side Radio Club of Toronto	1069-	A-32-	9846
W1ECO/1	Submarine Signal Amateur Radio Club	449-	AB-38-	3486

Nine Transmitters Operated Simultaneously

K6BAG/6	Pacifico Radio Club	2316-	AB-19-	20,184
W9AP/9	North Suburban Radio Club	1665-	A-54-	15,210
W1OC/1	Concord Brasspounders	1518-	A-25-	13,905
W6HS/6	Crescenta Valley Radio Club	1501-	A-32-	13,743
W3RCN/3	Rock Creek Amateur Radio Assn.	1171-	A-71-	10,764
VE3BRR/3	Nortown Amateur Radio Club	1027-	B-30-	6312
W6JCG/6	"Gophers"	243-	A-11-	2412

Ten Transmitters Operated Simultaneously

W2LI/2	Tri-County Radio Assn.	1987-	A-30-	18,108
W4FU/8	Ohio Valley Amateur Radio Assn.	1976-	A-35-	18,009
W9IT/9	Northwest Amateur Radio Club	1722-	A-37-	15,723
W6UW/6	Santa Clara County Amateur Radio Assn.	1693-	AB-42-	13,983
W5SC/5	San Antonio Radio Club	1199-	AB-20-	9189
VE3DC/3	Hamilton Amateur Radio Club	877-	AB-32-	7314
W6PMK/6	North Peninsula Electronics Club	533-	A-20-	5022

Eleven Transmitters Operated Simultaneously

W2GSA/2	Garden State Amateur Radio Assn.	1818-	A-	16,362
K6DTA/6	West Valley Radio Club	1263-	A-35-	11,538
W6TOI/6	Downey Amateur Radio Club	1380-	AB-50-	11,280

Thirteen Transmitters Operated Simultaneously

WØCKF/Ø	Minneapolis Radio Club	610-	A-60-	5715

CLASS B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the assisting operator is given following that of the amateur whose call was used. Figures following the call listings indicate number of contacts, power and final score.

One Transmitter

W3EIS/3	493-	A-6993	W1UJB/1	235-	B-1410
W4KFC			W1PBH		
W5VRP/5	401-	A-5751	K5FGI/5	230-	B-1380
W5EEK			W3HTK/3		
W2FBA/2	369-	A-5319	W3RXI	198-	B-1338
W2JBQ			W2DEN/2		
K5BLL/5	342-	A-4955	W2LPV	99-	A-1337
W9ESQ/9	331-	A-2979	W6NPO/6	147-	B-1323
W9IU			W7KKH/7	187-	B-1272
W9DSP/9	438-	B-2778	W5OLD/5	184-	B-1254
W9GDW			W7SBT/7		
WØAJA/Ø	167-	A-2592	W7QMK	110-	A-1215
W3SDW			W8OEQ/8		
W8VWY/8	156-	A-2444	W8HXB	173-	B-1188
W8HEC			W8BXW/8		
W2VAV/2	238-	A-2367	W8LCU	198-	B-1188
W2HJD			W4SIE/4		
W5PIZ/5	231-	A-2304	W4VCH	105-	A-1170
W5TJT			W5TCL/5		
W8NKI/8	215-	A-2160	W5RYX	59-	A-1134
W8MZA			K5ADQ/5		
W7CMQ/7	131-	A-2106	W5QVZ	81-	A-1094
W7PUA			W7OUV/7	53-	A-1053
K6DQA/6	318-	B-2058	W9FPA/9		
W5IER/5	197-	A-1998	W9GZR	173-	B-1038
W5TNV			K6GLF/6		
W6OLV/6	282-	B-1848	K6GLK	171-	B-1026
WØUB/Ø	288-	B-1728	W5ZVU/5	143-	B-1008
WØDSY			W5ZLM		
W6DTW/6	261-	B-1722	WØGCH/Ø	85-	A- 990
W7FVI/7	102-	A-1715	W6PFE/6	73-	A- 986
W5MTL/5	99-	A-1674	W1TPH/1	84-	A- 981
W5AJA			W2GSI/2	132-	B- 942
WØQJC/Ø	262-	B-1572	W4UWA/4	104-	A- 936
WØTZC			W4IAY		
W5CBT/5	201-	AB-1563	KN6LFD/6	104-	A- 936
W5VMH			W6EYI		
WØYWW/Ø	224-	B-1494	W3EAN/3	111-	A- 921
W2NDG/2	241-	AB-1476	W3ZBN		
K2DKD			WØVTF/Ø	75-	A- 900
W5HHT/5	240-	B-1440	WØSAK		
W5DHT					

(Continued on page 200)

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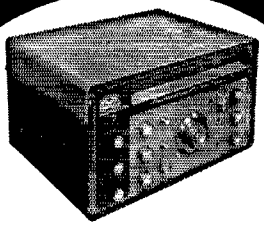
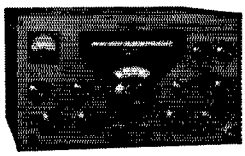
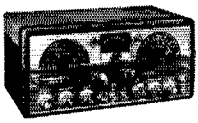
Available in stock
at VALLEY ELECTRONIC SUPPLY
Complete inventory of all receivers & transmitters



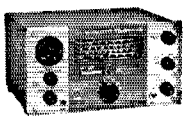
New! National NC-300
"Dream Receiver"
Amateur net: $349.95



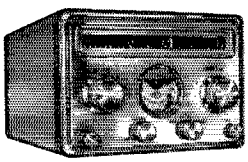
Collins 75A-4 Receiver
Amateur net: $595.00



New! Hallicrafters
SX-100 Receiver
Amateur net:
$295.00



New! Harvey-Wells T-90
Mobile Transmitter
Amateur net: $179.50



New! Gonset G-66 Mobile
Receiver
Amateur net: $169.50

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To Fill Your Order
Correctly

W6VBY W6QJI
W6VCR W6NKI
W6LD K6DPH
K6CRD W6YML
KN6JJM W6YPA
W6LTY W6OYD

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Phone Dickens 2-5143

Some prices slightly
higher west of the Rockies

W4ZBA/4	70-	A-	855
W6TDU/6	62-	A-	837
W6QEM	62-	A-	837
W8NOH/8	80-	AB-	822
W8PUV	80-	AB-	822
W8AAC/8	104-	B-	774
W8SFW	104-	B-	774
W7SVM/7	58-	A-	747
W7SSM	58-	A-	747
W3CHI/3[5]	119-	B-	714
W6MKS/6	50-	A-	675
W6KD	50-	A-	675
W4HLM/4	86-	B-	666
W4GJL	86-	B-	666
KØACK/Ø	222-	C-	666
W7VIU/7	108-	B-	648
WN7YNO	108-	B-	648
W6HUP/8	46-	A-	648
W3WFJ/3	78-	B-	618
W3ZFY	78-	B-	618
VE1WL/1	20-	A-	608
VE3DFM/3	45-	A-	608
W3JPR/3	99-	B-	594
W3OP	99-	B-	594
W7JHC/7	98-	B-	588
VE2PZ/2	63-	A-	567
W7LNG/7	92-	B-	552
W7SJS	92-	B-	552
W1HDQ/1	40-	A-	540
WØFDP/Ø	15-	A-	540
W3IEF/3	56-	A-	504
W3HMH	56-	A-	504
W5HUA/5	80-	B-	480
W5GVF	80-	B-	480
W9DOW/9	74-	B-	444
VE7XY/7	47-	B-	432
K4ABE/4	70-	B-	420
K4AIN	70-	B-	420
K4USA/4[6]	69-	B-	414
W4REK/4	40-	B-	390
W4WNV	40-	B-	390
W1ZDP/1	28-	A-	388
W7IWU/7	25-	A-	338
W7OTL/7	55-	B-	330
W7TYG	55-	B-	330
WØCPQ/Ø	52-	b-	312
WØIKZ	52-	b-	312
W4HRU/9	154-	B-	308
W9MIO	154-	B-	308
K8WBH/8[7]	34-	A-	306
W6CMN/6	22-	A-	297
KN4DKA/4	8-	A-	297
KN4BFW	8-	A-	297
W6MTJ/6	85-	A-	255
W1BDP/1	16-	B-	246
K2HXL/2	82-	A-	246
W2IPX	82-	A-	246
W6PZB/6	120-	B-	240
K6GSG	120-	B-	240
K2HMG/2	52-	A-	231
K2HMF	52-	A-	231
W7UFB/7	12-	B-	222
W7PSO	12-	B-	222
W7SOD/7	16-	A-	216
W8PYH/8	16-	A-	216
WN8WMS	34-	B-	204
W8PKU/8	34-	B-	204
WN8VLN	65-	B-	195
W4ZXX/4	65-	B-	195
W7FZB/7	88-	AB-	176
W9OHU/9	55-	B-	162
WØWWA/Ø	12-	A-	162
K2JWZ/2	52-	A-	156
KN2KBJ	26-	B-	156
W4FSB/4	22-	B-	132
KN2LLL/2	22-	B-	132
KN2LKZ	19-	B-	114
W4ZZ/4	19-	B-	114
W4EWR	26-	A-	78
W1MEP/1	26-	A-	78
W1NH	32-	AB-	74
W6IAH/6	5-	A-	68
W1CUT/1	4-	A-	54
KN6KRK/6	5-	A-	45
W9GBC/9	5-	B-	30
WN9MRA	5-	B-	30
W3TXL/8	13-	B-	26
K6CUX/Ø[8]	3-	B-	6
W6SWE/7	1-	C-	3

Two Transmitters

W6MUR/6	283-	A-	2547
W6MTY	283-	A-	2547
W6RSU/6	355-	AB-	2496
W6IYG	355-	AB-	2496
W6TIX/6	284-	B-	1866
K6BVV	284-	B-	1866
W4KCQ/4	156-	AB-	1602
W4KUX	156-	AB-	1602
W6FIC/6	201-	AB-	1410
K6KWW	201-	AB-	1410
W1UFT/1	76-	AC-	741
W1SOZ	76-	AC-	741
KN6KJP/6	22-	A-	423
KN6HNP	22-	A-	423
K2KGJ/2	31-	AB-	228
K2KGH	31-	AB-	228

CLASS C

Grouped in this tabulation are the scores of entrants in the mobile class. Figures following the call indicate number of contacts power and final score.

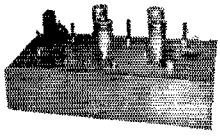
W8HFE/8	259-	A-	4914
W8QAV/8	217-	A-	4374
W4YI/4[9]	258-	A-	3821
W8ERA/8	172-	A-	3740
W8FKB/8	112-	A-	2930
W8GHO/8	110-	A-	2903
W8AJH/8	107-	A-	2862
W8AEU/8	81-	A-	2511
W8GMK/8	81-	A-	2511
W8INO/8	74-	A-	2417
W8PM/8	70-	A-	2363
W8MWE/8	68-	A-	2336
W8WZS/8	68-	A-	2336
W6ZOP/6	171-	A-	2309
W8INW/8	63-	A-	2268
W8BDZ/8	62-	A-	2255
W8KCD/8	62-	A-	2255
W8WAG/8	61-	A-	2241
W8OKI/8	60-	A-	2228
W8LHJ/8	58-	A-	2201
W8RAK/8	58-	A-	2201
W8VM/8	58-	A-	2201
W8NZC/8	58-	A-	2201
W8NNO/8	58-	A-	2201
W8NNC/8	58-	A-	2201
W8BPE/8	57-	A-	2187
W8OIU/8	56-	A-	2174
W8FTD/8	79-	A-	2160
W8MAE/8	52-	A-	2120
W6OLY/6[10]	118-	A-	1931
W8YPT/8	36-	A-	1904
W8AJT/8	30-	A-	1890
W8LEW/8	34-	A-	1877
W8LPZ/8	33-	A-	1863
W8IV/8	33-	A-	1863
W8BUQ/8	33-	A-	1863
W8ZEU/8	28-	A-	1823
W6ZVD/6	105-	A-	1782
W3HQJ/3	98-	A-	1661
W6EIG/6	95-	A-	1620
W8SRH/8	3-	A-	1458
W2MIU/2[11]	103-	A-	1391
W4LHS/4[12]	228-	B-	1368
W7MPH/7	65-	A-	1216
W6OAY/6	64-	A-	1215
W5RSD/5	123-	A-	1107
W6OLC/6	54-	A-	1067
W3VXN/3	53-	A-	1053
W3QKQ/3	51-	A-	1026
W3FDJ/3	50-	A-	1013
W3NIP/3	46-	A-	972
W6EKP/6	47-	A-	972
W2DMJ/2	43-	A-	918
K6BAY/6	66-	A-	891
W6TQB/6	65-	A-	878
W9YWF/9	65-	A-	878
W3PXY/3	37-	A-	837
W6HIR/6	35-	A-	824
VE2NI/3	30-	A-	743
W7SCW/7	55-	A-	743
W3CNO/3	30-	A-	743
W2LID/2	30-	A-	743
VE2CD/2	54-	A-	729
W9GFA/9	51-	A-	689
W3LNQ/3	25-	A-	675
W3UMK/3	4[13]-	B-	666
W3SAA/3	22-	A-	635
W3DOU/3	44-	B-	621
W3YJM/3	21-	A-	621
W9EZS/9	45-	A-	608
W3KNC/3	18-	A-	581
W6BGF/6	16-	A-	554
KN6LLY/6	41-	A-	554
W3SGR/3	16-	A-	554
W3SAI/3	16-	A-	554
W3QZO/3	15-	A-	540
W5DAH/5	33-	B-	531
W3VVS/3	14-	A-	527
W5JKD/5	32-	B-	513
W9MYI/9	37-	A-	500
W3YFV/3	12-	A-	500
W3QQH/3	12-	A-	500
W1YCH/5	37-	A-	500
W3DFJ/3	36-	A-	485
VE1NZ/1	34-	A-	459
W8ZSD/8	33-	A-	446
W3WNC/3	8-	A-	446
W3HYU/3	8-	A-	446
W3BBB/3	8-	A-	446
K6GYF/6	32-	A-	432
W3QZP/3	23-	B-	432
K6CSP/6	30-	A-	405
W1BDI/1	18-	B-	396
W9VPD/9	62-	B-	372
W1YAY/1	2-	A-	365
W8LVM/8	2-	A-	365
W8WDX/8	2-	A-	365
W8ZXL/8	1-	A-	351
W8YPE/8	1-	A-	351
W8FDC/8	1-	A-	351
W8ET/8	1-	A-	351
W8CZM/8	1-	A-	351
W7UGV/7	24-	A-	324
W9CSV/9	23-	A-	311

(Continued on page 202)

FOR THAT PERFECT CHRISTMAS GIFT... CHECK WITH ARROW'S HAM DEPT.!

Get Going on 6 QUICKLY! —or on 10-11, 15, 2 or 1¼

Your present receiver and one of these Tecraft crystal controlled converters will do the job—ably and economically!



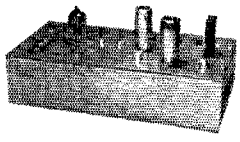
TECRAFT Model CC5

CC5-50	50-54 Mc.
CC5-144	144-148 Mc.
CC5-148	CAP intercom.
CC5-220	220-225 Mc.

Choose I.F. Frequency—6-10, 7-11, 8-12, 10-14, 12-16, 14-18 or for COLLINS, 26-30 Mc. Model CC5-220 with I.F. 14 to 19 Mc. only. These are Cascode models—4 db noise figure. (144 Mc.) (Tube) line up: 6BZ7, 2-6CB6, 2-6J6.

Model CC5 ..... Complete $42.50

Model CC5-50, 144 and 148 (in kit form) $29.75

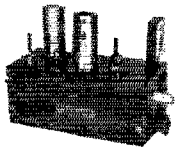


TECRAFT Models C3 & CC3

C3-21	15 meters
C3-26	10-11 meters
CC3-50	6 meters
CC3-144	2 meters
CC3-220	1¼ meters

Models C3 and CC3 ... Complete $34.95

kits except CC3-220 ..... pr. $24.95



The Miniverter

A natural for MOBILE use. Designed to use the broadcast band of any car radio for tuning. Compact enough to tuck away anywhere.

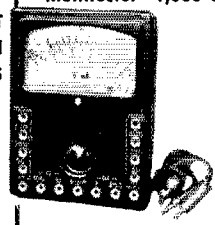
For 15 or 10-11 meters $23.95

For 6 or 2 or CAP $25.95

Tubes, crystal, power and antenna plugs included with all models. Other I.F. Frequencies on special order.

EXCLUSIVE!

ARROW'S Own Pocket AC-DC VOM multitester—1,000 ohms per volt



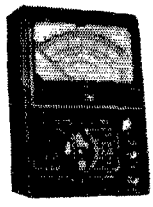
Rugged and compact. Large, easy-to-read scale on full 3" rectangular meter. 1% precision resistors; jeweled D'Arsonval microamp meter movement. Ranges: AC-DC and output volts: 0-10, 0-50, 0-250, 0-500, 0-1000 V. DC current: 0-1, 0-250 MA. Resistance: 0-10K and 0-100K ohms. Size: 4¾" x 3½" x 1½". Test lead and batteries included.

Shipping weight 2½ lbs.

Complete—$7.85 each

EXCLUSIVE!

ARROW'S Own Pocket AC-DC VOM multitester—2,000 ohms per volt



Extremely accurate and sensitive. Single selector switch for all ranges. 3" rectangular meter with easy-to-read scale. 1% precision resistors; jeweled D'Arsonval microamp meter movement, completely plastic-shielded against magnetizing. Rugged metal case. Ranges: AC-DC and output voltage: 0-5, 0-25, 0-100, 0-500, 0-1000 V. DC current; 0-500 μa, 0-25 MA, 0-500 MA. Resistance: 0-20K ohms, 0-2 Megohms. Decibels: 0-20 db to + 16 db. Size: 3½" x 5" x 1½". Shipping weight 3 lbs. Test leads and batteries included.

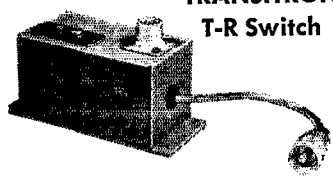
Complete—$11.95 each

12 VOLT DYNAMOTOR

Rated output: 625 volts DC at 225 MA. High efficiency; compact; no battery strain; latest design. Brand new, recent military production. 5" diameter; 9" long. Shipping weight 13 lbs. Worth two to three times this low price.

$11.95

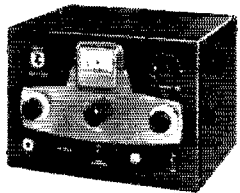
TRANSITRON T-R Switch



Immediate, automatic change-over from receiver to transmitter without coils, variable capacitors, or tuning adjustments. The Transitron Model TR-1000 Transmit-Receiver (T-R) Switch is the most practical and efficient answer to operation of amateur and commercial transmitters and receivers from a common antenna. Its peak power handling capacity of 1000 W. completely eliminates the difficulties encountered with heavy-duty antenna change-over relays. Over its operating range of 1.7 thru 32 megacycles, the insertion loss to the receiver never exceeds one S-Unit, while the power absorbed during transmission is negligible compared to transmitter output.

Net Price $9.95

Johnson Viking Adventurer



50 watt novice xmitter. TVI suppressed. Completely shielded. 80 to 10 meters. Pi network output. 50 to 600 ohms. Meter on front panel. VFO and modulator connections in rear. 6AG7, 807, 5U4G. Complete Kit with tubes.

240-181-1 ..... $54.95

TRADE-INS

Trade-ins welcomed. Check with Arrow for the best trade-in offers. Fast prompt service guaranteed.

ALL PRICES F.O.B. N.Y.C.

ARROW ELECTRONICS, INC.

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ARROW HEMPSTEAD — 215 FRONT STREET

IVanhoe 1-1826

W6ZGA/6[13]	22–A– 297	W9BRM/9	12–A– 162
W9AYU/9	21–A– 284	W3FXG/3	10–A– 135
KN2LFN/2	19–A– 270	K2JZT/2	14–B– 126
W9RKE/9	18–A– 243	W8EPB/8	8–A– 108
W1NJM/1	25–B– 225	K6IVK/6	14–B– 90
W1WYX/1	16–A– 216	W9YRW/9	6–A– 81
W9DLM/9	24–B– 216	VE3BJM/3	5–A– 68
W9CMT/4/9	21–B– 189	WØDEL/Ø	5–A– 68
W1LUW/1	14–A– 189	W5RNC/5	7–B– 63
W1IHL/1	14–A– 189	W8CBM/8	2–A– 54
W3CQN/3	13–A– 176	W1VPP/1	3–A– 41
WØOYS/9	13–A– 176	W5HQL/5	3–A– 41
W1QMN/1	12–A– 162	K6AMN/6	2–A– 27

CLASS D

Grouped in this tabulation are the scores of home stations operated from emergency power.

K4CDA	361	W2ZAL	37
K6AAJ[14]	267	VE3WY	37
W7YRV	178	W5FMO	23
W3LSS	61	KN2OGC	8
KN4CEB	58	W6DWJ	5

CLASS E

Grouped in this tabulation are the scores of home stations operated from commercial power sources.

W3QQO	463	W6KIL	38
W4YZC	296	W1CLF	38
W6MSO	247	W7WMY	37
W9DIK[15]	241	WN5KEC	37
K2DEM	232	W6WXG	36
W9EXL	177	W4EJP/4	36
W3YWT/3	163	KN2JYS	35
W4WEC	154	W7VWS	34
W9BZW	151	W6QIW	33
W3I8E	149	W1TXI	33
W9WAN	145	W9BCO	32
K2CUE[16]	144	W1ZJZ[19]	32
W2DRV	142	W9ASK	31
K2HVN	140	W9OEY/3	30
W6GQZ	138	W7SCL	30
W1LIG	133	W5CXJ	30
W8TZO	123	W4LYT	30
W9PNE	120	W3QZC	27
W9CHD	119	K4BFS	27
K6BBD	115	W3AHQ	27
W9HBP	102	W1DJ	27
W4DAF	101	W9CNF	25
W9VJD	100	W7PSS	25
K6CJZ	100	K2JVR	24
K6BFS	100	W9TAL	23
W8NWH	98	W9BWO	23
W4DHJ	97	W7ENU	23
W4CEB	96	K2AMP	23
W8DAE	85	W7VVC	22
W7TML	82	VE3DGX	21
K6COP	81	VE3BAJ/3	21
W1ZDX	81	K6GI	21
K6DYP	75	W5FEH	21
W7YKC	74	KN4DKA[20]	21
K2GMF	73	W8LGY	20
W6EFR	71	W1YOA	20
W4CQE	69	WN1CSM	18
K6ASX	68	W9QGA	17
W9CLH	66	K2JVF	17
K6BAM	64	W9DLM	16
W1AW[17]	64	W8VUV	15
W1WMH	64	W9WAX	14
K6HMO[18]	62	W9HWN	14
W3YNZ	62	K4BNI	13
W4DRT/4	61	W2OAE	13
W3YXL	60	VE3WH	11
K6EA	54	WN9MLO	10
W9YAC	52	KN6JGN	10
W3TN	52	W2LID	10
W1AMY	52	KN2LJU	10
W9KJJ	51	W1BB	10
W9JSE	51	W9UMF	8
W8NNX	51	W8WVL	8
KN2KET	51	W7CWN	8
VE7HD	50	W1YDS	8
W5FMO	50	W9ITM	7
K4AQU	50	W8YPT	6
WNØWWJ	49	WN8WWF	6
W8UMR	49	W2ENY	6
W5FTD	49	WN1DZA	6
W4BXV	47	W4KZB	5
W3YUW/4	47	WØTVI	4
W3TXY	44	W9MCK	3
W6AM	43	WN8UPH	3
W1QGU	40	WN3ZNF	3
W9UVX	39	K2DG	3
W3UJP	39	WØHAW	1
K2GZD	39		

[1] W5s CFG WAN, oprs. [2] W6s GTG OPY, oprs. [3] W5ODI, WØRSZ, oprs. [4] K2s HXI KML, oprs. [5] W3s QIY VEJ, oprs. [6] Two operators. [7] W8s QYR SKU, oprs. [8] WØHAW, opr. [9] W4s SHW TFP YI, oprs. [10] K6CNW, second opr. [11] K2s CHG IDH, W2s MIU ZOE, KN2KUC, oprs. [12] W4WWO, second opr. [13] W6AWU, second opr. [14] W6s LDJ NKU QBU, KN6s GWT KTF, oprs. [15] W9VZL, second opr. [16] K2DGM, second opr. [17] W1QIS, opr. [18] K6s HMO KDE, KN6KJA, oprs. [19] W1ZJY, second opr. [20] KN4BSF, second opr.

Correspondence

(Continued from page 98)

switch, but too late to save the rig. Total damage ran around $60.00 but I shudder to think what would have happened had I touched the rig at the time of the surge. Even though this was a one-in-a-million freak I believe it worth while to pass along, since it could happen to anyone.

— *Thomas E. Franks, W4WOG*

[EDITOR'S NOTE: Although an accident of this nature is not likely to happen frequently, it does serve to point out once more the importance of a good solid ground connection to a water pipe. Grounds such as described above should never be depended upon.]

ASIA SPEAKS

Suleiman Building
Kuala Lumpur, Malaya

Editor, *QST:*

The letter published from G2BVN in the July issue of *QST* has prompted me to write to you. Here in the Far East the position is very similar to that in Europe and the genuine amateur, who has assembled a station at considerable personal expense, finds the 20-meter 'phone band (i.e., 14,100 to 14,350) no longer a band on which he can enjoy contacts with other amateurs in different parts of the world due to the activities of MARS traffic operators with the prefix K. Several of these operators apparently believe that they are entitled to swamp the lower half of the band taking up an unnecessary amount of their time with "Mexico Radio Sugar, common spelling MRS going to a married lady, etc. etc." Why is this traffic not handled on the MARS frequencies, or at least on the c.w. portion of the amateur band; i.e., on 14,000 to 14,100?

The letter from DL4TU in the same issue of *QST* is not really understood in view of the fact that commercial services do exist between Europe and United States to handle such traffic at reasonable tariff rates. Here in Malaya we have a large number of military personnel who are an even greater distance away from their homes than the U. S. personnel in Europe, and all messages exchanged are handled efficiently by the normal commercial services. I would repeat again — why can't such traffic be handled on the MARS frequencies, or on the c.w. portion of the amateur band?

The privilege of carrying traffic has recently been withdrawn from the KA stations. Perhaps this regulation will be extended to KRs, KGs, DL4s, etc. in the near future, and then the twenty-meter band may again become an exclusive amateur allocation as agreed at the Atlantic City Conference eight years ago.

I have heard a lot of traffic on twenty-meter 'phone during the past three to four years and only on rare occasions could it honestly be described as priority traffic (as quoted by DL4TU). . . .

What amateurs are permitted to do within their own territories on 2, 5, and perhaps on 80 meters is a matter for their licensing authority but let us all try to keep the DX bands solely for amateur use.

Another point arising out of W1DL's letter (May *QST*) — as the KAs and KRs are licensed by the FCC, why are they permitted to operate 'phone between 14,100 and 14,200?

— *S. A. Faulkner, VS2DB*

[EDITOR'S NOTE: As pointed out in this column in August, KA stations in Japan had traffic privileges withdrawn to bring their operation in consonance with the regulations governing Japanese Nationals. When Germany recently became sovereign, DL4 administration passed from the military to the government, and resulted in the prohibition of third-party traffic.

KA and KR stations are not licensed by the FCC but are authorized by the military.]

WELL DONE

P. O. Box 474
Montrose, Pa.

Editor, *QST:*

For the amateur of the year we nominate W3MAC, Lew Papp, the blind operator in Easton, Pa.

(Continued on page 206)

Opening his station at 0530 Aug. 19th he established 3915 kc. as an emergency net frequency and acted as net control until flood waters, in the house and on the highway outside, stopped his operation. W3RYP and WN3BAL disregarded personal safety in getting Lew to higher ground.

The sacrifice of this fine station, to handle just a few more vitally-important messages, will long be remembered. Congratulations, Lew, on a splendid job under pressure.

— *Fred E. Wright, W3RRI*

Hints & Kinks

(*Continued from page 97*)

MORE ABOUT THE 6Y6 AS A CLAMP TUBE

RECENTLY, while attempting to plate and screen modulate one of the *Handbook* rigs, severe downward modulation occurred. The transmitter uses a Type 807 in the r.f. amplifier and employs a 6Y6 clamp-tube protective circuit. Although voltages on the 807 checked normal under static conditions, the plate current dipped from the full-load value to about 60 ma. when modulation was applied. A cure for this condition was effected merely by removing the 6Y6 from the circuit.

The problem and its cure led to an investigation of clamp-tube operation of several 6Y6s. It was determined that the tubes went into conduction with as much as -90 volts applied to the control grid whenever the plate-screen potential was raised to approximately 350 volts. Obviously, this is an undesirable condition for 'phone operation for it permits the clamp tube to operate as a clipper on the positive peaks of the modulation cycle.

The only solution to the problem appears to be either the removal or the disabling of the clamp tube when the r.f. amplifier is to be modulated. Of course, this leaves the modulated amplifier without protective bias unless some other form of fixed bias is installed.

— *William F. Baumruck, W9DTC*

REPAIRING ELECTROLYTIC CAPACITORS HAVING BROKEN LEADS

MANY junk-box electrolytic capacitors having broken leads too short to solder to can be salvaged as follows. If the lead has been broken off right at the retaining rivet, pry up the edge of the rivet from where the lead enters to a point 180 degrees around. Then, carefully force a half turn of the broken lead from under the pried-up section of the rivet, thus providing a short stub that an extension may be soldered to. Be sure and leave a full half turn of the old lead clamped under the rivet.

— *Allen Podell, W3WDA*

MEMBERSHIP CHANGES OF ADDRESS

Four weeks' notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of *QST* without interruption.

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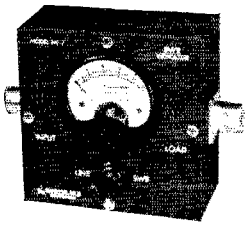

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- ★ Measures standing wave ratio in any co-axial feed antenna system.
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Specify whether for 52 ohm or 73 ohm cables

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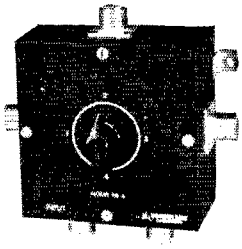

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Use this switch for switching to any four antennas or three antennas and dummy load

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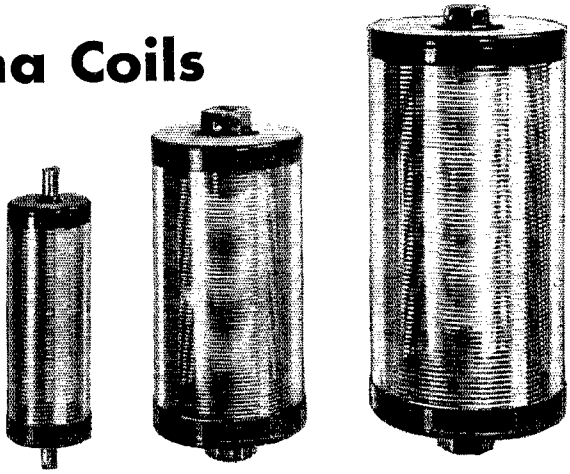
Extremely high "Q" super efficient air-wound loading coils housed in rugged transparent cases from which the air has been removed and replaced with pure helium. Impervious to rain, dust, dirt, and corrosion. Will raise antenna effectiveness of your mobile many times over the usual "run of the mill" low "Q" loading inductor. Engineered for use with your present 60" top rod and 36" bottom rod. Standard ⅜-24 threads. No pruning necessary regardless of antenna location on vehicle. Complete instructions supplied.



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(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (5) below

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature, and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply. To expedite handling of your copy please state whether you are a member of ARRL.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly. Typewritten copy preferred, but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. *Diamond Drill* Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9VIV, Troy, Ill.

WANTED: Early wireless gear, books, magazines and catalogs. Send description and prices. W6GH 1010 Monte Drive, Santa Barbara, Calif.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

SUBSCRIPTIONS. Radio publications. Latest Call Books, $4.00. Mrs. Earl Mead, Huntley, Montana.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

MICHIGAN HAMS! Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. NOrmandy 8-8696. NOrmandy 8-8262.

WANTED: All types aircraft & ground transmitters, receivers, ART-13, RT18/ARC1, R5/ARN7, BC610E, BC221 mounts and parts wanted. Fairest prices possible paid. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

LEECE-NEVILLE 6 volt system. 100 amp. alternator, regulator & rectifier, $60.00. Also Leece-Neville 12-volt system 100 amp. alternator, regulator & rectifier, $85.00. Good condition. H. A. Zimmermann, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

NEW and used Motorola, Link, RCA, G-E, etc., FM commercial communications equipment bought & sold. Allan M. Klein, W2FOU, Communication Assoc., 138-17 Springfield Ave., Springfield Gardens, L. I., N. Y.

WANTED: ART-13 transmitters. Write B. Spivey, 3117 Rolling Road, Chevy Chase, Md.

PANORAMIC Adapter AN/APA-10 Tech. Manuals $2.75 postpaid in U. S. A. Electronicraft, 27 Milburn St., Bronxville 8, N. Y.

SELL: Collins 75A-2, $295; 310C, $125.00; Dumont #241 'scope, $225; 32V2, $395.00; 12,000 ohm relays, 110 VAC dpdt, $1.75; Teletype equipment, Collins 30-J, $275.00; Want: APR-4 receiver and tuning units, ARN-7, ART-13, Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. Richmond 2-0916.

DX-O-OGRAPH. The Dx man's guide for band conditions. Know when, where, and what band. Foremost DXers use it. $2.50. Request flyer. Box 4596, Winston-Salem, N. C.

RECEIVERS repaired and aligned by competent engineers, using factory standard instruments. Hallicrafters, Hammarlund, National, Collins authorized service station. Our twentieth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

CHROME Zippo lighter, your call engraved. Lifetime guarantee $4.50 postpaid. Nice Xmas gift. Sharp Gifts, 129 W. Main, Ardmore, Okla.

NEW ICA deluxe Signatone Code Oscillator (Reg. $15.75); Special, $7.95. Key, $1.35 extra. Surplus RG-8/U cable, 100 ft., $5.95, 250 ft., $13.25, 500 ft., $25.00. Free Bargain Bulletin. Visit store for unadvertised bargains. Lectronic Research, 719 Arch St., Philadelphia 6, Pa.

W2BFD RTTY Converters, autostart panels. W3MKZ, 87 College Ave., Annapolis, Md.

WANTED: Bargains in transmitters, receivers, laboratory and test equipment, also miscellaneous and unusual gear, etc. What have you? Please state price desired. Especially interested in husky power supplies, large filter chokes and condensers, etc. Also need plate transformers putting out about 4,000 V or more each side center. Harold Schonwald, W5ZZ, 718 North Broadway, Oklahoma City 2, Oklahoma.

QSLS? SWLS? Finest and largest variety samples. 25¢ (refunded.) Callbooks (Winter), $4.00 postpaid. Subscriptions to radio publications. "Rus" Sakkers, W8DED, P. O. Box 218, Holland, Mich.

QSLS-SWLS. Meade WØKXL, 1507 Central Avenue, Kansas City, Kans.

QSLS-SWLS. 100, $2.85 up. Samples 10¢. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSLS. Nice designs. Samples. Beseparis, W3QCC, 207 S. Balliet St., Frackville, Pa.

QSL Specialists. Distinctive. Samples free. DRJ Studios, 1811 No. Lowell Ave., Chicago 39, Ill.

DELUXE QSLS — Petty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

100 Free QSL cards with order. Samples 10¢. World Printing, 166 Barkley, Clifton, N. J.

QSLS-SWLS. Samples free. Bartinoski, W1YHD, Williamstown, N. J.

QSLS of distinction! Three colors and up. 10¢ brings you samples of distinction. Uncle Fred, Box 86, Lynn, Penna.

QSLS. Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

QSLS "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSL-SWL cards. Sensational offer, Bristol stock 500 1 color $3.95, 2 color $4.95, 3 color $5.95. Super gloss $1.25 extra. Rainbow cards. Samples 10¢. QSL Press, Box 71, Passaic, N. J.

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WOODY's (Formerly Rosedale Press QSLS). Box 164, Asher Sta., Little Rock, Ark.

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QSLS-SWLS. Samples free. Cy Jones, W3EHA, 840 Terrace, North Hagerstown, Md.

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QSLS-SWLS. Samples free. Backus, 5318 Walker Ave., Richmond, Va.

QSLS-SWLS. Cartoons, colors, etc. Reasonable. Samples 10¢. Chris, W9PPA, 365 Terra Cotta, Crystal Lake, Ill.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS. Beautiful blue, silver and gold, 100: $3.85. 24 hour service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

HAMMARLUNDS, Nationals and Hallicrafters bought, sold and traded. 15 on hand. Phila., Marcy. Turner, 6-4007.

SELL or swap: Have 500 feet new ¾" copper coaxial cable worth $1.10 per ft.; 300 mm Code Beacon for tower, complete, worth $385 new; have 85 watt output $50 Mc. land station in gud condx worth new, $75; steel cutting lathe nearly new, with tools, motor, etc., worth $230. Want good communications receiver or cash offers. Arnold, K4AET, Gwynn, Va., Tel. Richmond 4-6071.

OUTSTANDING ham list revised monthly. Our prices on trade-ins are realistic and down to earth. We feature Johnson, National, Collins, Hallicrafters, Gonset, Elmac, Harvey-Wells, Morrow, Central Electronics and all leaders. We trade easy and offer time payments tailored for you. All leading brands of equipment in stock. Write today for latest bulletin and a copy of our new catalog just released. Stan Burghardt, WØBJV, Burghardt Radio Supply, Inc., Box 746 Watertown, So. Dak.

HALLICRAFTERS SX-96 receiver and R46B speaker, one month old, with FCC-90 bandedge marker, $290.00 value for only $220.00 F.O.B. Also National NSW-54 receiver. K2MQO, 130 East End Avenue, New York City 28.

HALLICRAFTERS SX-28 receiver with speaker: $100; Vibroplex key, like new, $10.00. Some other gear, reasonable. M. D. Welch, 2749-49th S.W., Seattle 16, Wn.

MULTI-BAND Antenna, 80-40-20-10, $18.95. Patented. Send stamp for information. Lattin Radio Laboratories, Owensboro, Ky.

UFO Patrol data. W5CA.

SELLING: New NC-88 receiver, never been used. Worth $119.95. Sacrifice for $99.00 plus postage. Need cash. Richard Pugh, W3WGJ, 2302 Franklin St., Johnstown, Penna.

120 ea.: RCA #5819 multiplier phototube. Used in scintillation counters for the detection and measurement of nuclear radiation, $15.00 each. Entire lot, $10.00 each. Arrow-Hart-Hegeman midget relays, 243 each. Cat. # 39202U, 110 volt, 10 amp. with 2 NO contacts, $1.00 each; 222 ea.: Cat. #28305U, 110 volt, 10 amp. with 2-NC contacts, $1 each; 122 ea. Cat. #28306U, 110 volt, 10 amp. with 2 NO contacts, $1 each. Power Electric Co., 1920 North Mill St., Jackson 5, Miss.

BACK to school. Sell: ARR-1, $3.00; 6J4S, $2 each; BC645, $10; Tri band, $35; RME-6-10 converter, $25; Abbott TR4B, $15; Communicator 2 meter 160 GE power supply, 1700V 400 Ma, $25; FM Monitor W. E., $75. K2HFK.

HRO60 with xtal calibrator and A, B, C, D coils with Central Elec. Model B Slicer, all like new. Best offer over $450 takes it. Will deliver within 100 miles. W2FOX. S. Lackoff, 684 Sunderland Rd., W. Englewood. N. J.

KEEP your QSLS filed for quick reference in our Hammerloid steel file, size 10" by 6½" by 5" with alphabetical index. Will initial call letters if desired. State call. Send $5.50. We will pay shipping. G. Kaminski, 2814 Albion St., Toledo 6, Ohio.

FOR Sale: RME-84 receiver, in A-1 condx, $74.50; HF 10-20 converter, new, $35; VHF152A, new, $35; MC-53 and MC-55 mobile converter, never used, make an offer. E. Shalkhauser, W9CSZ, Washington, Ill.

SALE: Two TS-1/ARR-1 test oscillators, gold plated cavity tuners, two 955s, unmodified, in excellent condition, $3.95 each. Dozen 316As, 25¢ each, two for 45¢. Pair selsyn motors, C-78411, 50 v. 60 cycles, $4.95. Clothbound books: Ghirardi Radio Physics course, $3; Morgan's Principles of Radio Communications, $2.25; Radio Data Book, Boyce & Roche, $4.00; Elements of Radio, Marcus & Horton, $3.95; Fundamentals of Radio, and Fundamentals of Electronics, H. L. Williams, both for $1.10; Editors & Engineers Handbooks, 11th and 12th Editions, $2.50 each; Howard Sam's Radio Servicing Course. 22 lessons, $1.50. Cecil G. Baumgartner, Box 343, Milton, Pa.

U. S. A. DX QSL Co-op. Free information write: Bill Tagan, WØDVN, P. O. Box 5938, Kansas City 11, Mo.

SX-71, in excellent condition. Matching R-46 speaker: $149.00 or best offer. Reason, leaving states. Lonnie Johnson, W9SQF/1, Quaker Hill Trailer Park, Portsmouth, R. I.

FOR Sale: HRO-7, A, B, C, D coils, power supply, speaker. In perfect condition: $150.00. N. S. Bernat, W6IOT, 215 Navone St., Vallejo, Calif.

SSB! Sell or trade 75 meter SSB exciter. Less than 50 bux. Write for full details. Will answer all queries. W4WQT, Wilson, Rte. 5, Clarksville, Tenn.

FOR Sale: S-38-C receiver. In perfect condition: $35.00. W4FMG, Jones, 406 W. Main St., Christiansburg, Va.

FOR Sale: Viking mobile VFO. Perfect condx. Used very little. Professionally wired and calibrated. $22.00 W2JKF, 852 Henry St., Uniondale, N. Y.

RUBBER Stamp with your call letters, name and address, $1.50; stamp pad 35 cents. El Kay Stamps, Box 5-WT, Toledo 12, Ohio.

FOR Sale: Bandmaster Deluxe TBS-50-D xmitter and APS-50 power supply. In new condition: $85.00. W5FMN, Albert B. White, Jr., 5345 Annette St., Baton Rouge 5, La.

TEACHER of physics and electronics; master's degree; advanced amateur ticket; wishes west coast or territorial location next fall. Suggestions appreciated. Woolfries, WØDSP, Box 1264, Sioux City, Iowa.

SELL new RCP tube tester and VTVM combination with probes and instruction manual: $85. R. Long, 933 E. Broadway, So. Boston, Mass.

FOR Sale: New BC-654 CW/Fone trans/recvr, $40.00; new PE-103 dynamotor w/cables, not altered, $30.00; PE-104 6–12 volt vibrator supply for the above, $15.00; connecting cables. Will ship in original crates. Complete: $75.00 F.o.b. Neligh, Nebraska. WØUJQ, Art Busshardt.

SELL: Novice 80-meter station, 15-watt xmitter; ARC5 receiver, complete, $45.00. W6BLZ, Marriner, 529 Colima St., La Jolla, Calif.

TELREX 3-element 15-meter beam, $75; 6-element 10-meter, $95. Both used three weeks. In like new condition. Complete with specifications as shipped from factory. WØCPM, Mashek, 1729 So. 86th Ave., Omaha, Nebr.

COMMUNICATOR I, in perfect condition. First $145 takes it. Robert Lewin, W2PIE, 28 Fenimore Drive, Harrison, N. Y. Phone Rye 7-3733.

SELL: Collins 70E-8A perm. tuned osc. strictly A-1, with manual. Oscillator alone, $65. In commercial cabinet as 80 meter exciter/transmitter control unit with power supply, similar to 310-C exciter, $85. Johnson Viking Ranger, push to talk, no bugs, A-1 condx, $200. G. B. Marrow, W4TTJ, 292 East Drive, Oak Ridge, Tenn.

SSB Station. Bandswitching, 20A(QT-1), 811As (450 watts) with variac controlled plate supply, 458VFO, dial and deluxe case. NC-183 receiver, speaker; Model A slicer (AP-1). Other equipment: coils, dynamotors, power supplies, VTVM, 5" 'scope, heavy rotator, etc. Write for details. W5AYZ, 3719 Zephyr, Houston 21, Texas.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallicrafters, Hammarlund, Johnson, Lysco, Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

NOVICES! Monitor your CW sending with a Bud CPO-130A Codemaster. Brand new condition. First $6.25 takes it. W4ISS, 1931 Walton Way, Augusta, Ga.

NEED CW3 receivers with Group 1 and Group 2 coils. T. Smith, Box 87, Littleton, Mass.

GENERAL License theory training course beginning early this month. Write Shack, Middletown, Box 78, Bushwick Station, Brooklyn, N. Y.

HT-9 transmitter. Latest model with Johnson 122 VFO. 500 watt transmitter plate modulated PP813s, in 6 ft. enclosed cabinet, fully metered, commercial in appearance; Eico 5" 'scope. All in excellent condition. Must sacrifice. No reasonable offer refused. W2ISS, H. Rogers, 118-36 224 St., St. Albans, L. I., 11, N. Y. Tel. LA 5-2164.

SELL: Viking II, professionally wired, original carton. Like new. $225.00. W8OPA, 3820 Hazel, Cincinnati 12, Ohio.

POSITION wanted. Direct mailing supervisor, with many years' experience, good electronic background. Can handle own correspondence. G. Samkofsky, W2YSF, 264 Division Ave., Brooklyn 11, N. Y.

WANTED: QST March and May 1916 $25.00 each or will swap any eight 1917 or 1919 issues for each. Have 1935 to 1954 complete. Four issues or more at 25¢ each. WØMCX, 1022 N. Rockhill Rd., Rock Hill 19, Mo.

SALE or trade: Gonset Clipper squelch unit, $15.00; Aerovox 1509M condenser 15μfd, 1500 volts, $14.00. Both new and never used. Want: PE-103 in good condition. A. H. Davis, 2585 Sylvan Road, Cuyahoga Falls, Ohio.

VERTICAL antenna: 20-40-80M, $59.50 to $89.50. Information on request. El Cajon Electronic Engineering Enterprises, Building 4, Gillespie Field, Santee, Calif.

GENERAL Electric Company plate voltage transformers: 2400 volts each side of the center tap at 1000 milliamps. Several with metal cases, some without cases: $20.00 each. Several without center taps, $10.00. Earl Brockway, 524 E. Third St., Flint, Mich. W8AGG.

FREQ. Meter, Lampkin 105B, like new, with calibrations and manual, $170.; RME Preselector, Mod. DB23, like new, $20.00; EV Model 630 mike and desk stand, like new, $13.00; RK4D32, never used, $13.00; Johnson Signal Sentry, like new, $9.00; National SW-54, like new, $30.00; New BC 458, factory converted for all-band SSB VFO in deluxe case, never used, $30.00; Deluxe Instructograph, phones, key, ten (10) tapes, like new, $30.00; Gonset 3012 FM tuner, 152-162MC, never used, $40.00; Precision E-200-C signal marker generator, never used, $50. Richard King, W9EUQ, 808 Ridgely Bldg., Springfield, Ill.

COLLINS 32V2, $395; HQ-129X, $95. Both are in wonderful condition. Bill Snyder, WØLHS. Sta. WDAY-TV, Fargo, No. Dakota.

FLORIDA Bound? Stop at Tamishaw Motel, a Ham's Haven. North Trail, Ft. Myers, Fla. "Eb" Long, K4GEW.

PRICED for quick sale: Collins 75A2 recvr; Collins 32V3 xmitter, complete with instruction books and original packing cartons. In excellent condition: $800. That's not all! New 4D32 tube and new Johnson Matchbox free. All inquiries answered. Cash, no trades. Ship prepaid upon arrival of money-order, bank draft, or ship C.o.d. truck. WØHWK, 1902 Chestnut St., Hannibal, Mo.

SS 75 and P. A. 400 Electronic Engineering Co. SSB exciter and linear amplifier. Brand new, never used. Sacrifice for $350, F.o.b. Brightwaters, L. I., N. Y. First check received. Cost $520.00. Will ship K2EAF. 509 Lombardy Blvd.

FOR Sale: Sonar VFO, $35.00; Meck T-60-1 xmittr, $50.00; Mitchell wireless interphone sets, $40.00 pr.; Gonset mobile noise limiter, $5.00; Pincor dynamotor input 6 vdc output 425 VDC at 375 Ma., $12.00; Hand crank generator output 540 Vdc at 200 Ma. and 6 VDC at 3 amps, $5.00; PE-73 dynamotor, $5.00; BC-459 xmittr, $8.00; BC-457 xmittr, $6.00; BC-683 1OM receiver, $15.00; tubes 304TLs, $4.00 each; 1619, 211, 1624 at 50¢ ea.; BC-375 tuning units, $2.00 ea; BC-605 interphone, $5.00; BC-746 tuning units, $1.00 ea. John H. Ashley, W4OSC, Box 254 Ware Shoals, So. Carolina.

SWAP: 75A-2 Collins for Lampkin frequency and deviation meters. Receiver is in perfect condition, not a scratch on it. Latest model 75A-2. Leo Liebl, W9NVS, Medford, Wis.

BARGAINS: WITH NEW GUARANTEE: S-38D $39.50; S-40A $69.00; S-47c $59.00; Lysco 600 $89.00; S-27 $79.00; S-76 $149.00; SX-71 $169.00; SX-42 $159.00; HRO-50T1 $299.00; Collins 75A3 $395.00; Sonar VFX 680 $29.50; Eldico TR75TV $35.00; Heath AT-1 $24.50; Meck T60 $39.50; HT-17 $29.95; EX Shifter $39.50; Globe Scout 40A $74.50; Globe Trotter $49.50; HT18 $69.00; Harvey Wells Sr. $69.00; Elmac A-54H $89.00; PSA-500 $27.50; Viking I $159.00; Viking II $229.00; SS-75 $139.00; Globe King 275 $249.00; Globe King 400A $299.00; 32V1 $365.00; 32V2 $425.00; and many others. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

WANTED: Gasoline-powered generator for Field Day, CD work. Oak Ridge Radio Club, Ken Warren, Secy-Treas., Box 291, Oak Ridge, Tenn.

2-Meter beams; 6 element, horizontal or vertical, all seamless aluminum. $6.95 prepaid. Wholesale Supply Co., Lunenberg, Mass.

VIKING I, factory-built, TVI-suppressed; VFO, mike, key, etc.: $245. Chris Lane, North St., Harrison, N. Y. K2DQH.

COLLINS 30K1, complete w/tubes, $850; 75A2, $325, both fine condition. 4D32, new, $15.00. F.o.b. Pittsfield, New Hampshire. A. J. Brizzolari, W1THM, RFD #1.

SELL Collins 75A1 w/spkr, in perfect condition. Best cash offer. A. G. Thompson, W7MTF, 201 Fir St., Forest Park, Glendive, Montana.

FOR Sale: Back issues of QST: December 1916 thru Sept. 1917; June 1919 thru December 1920. Bid single copies or sets. Condition generally good. Discolored by aging paper only; except Dec. '16 rear cover 6% torn; Feb. '17 small crack binding edge; March, April '17 half-inch damp stain lower corner; June '19 cover stain; April, June, July Sept. Oct. '20 opening edge small cover cracks; Nov. '20 small, Dec. '20 larger corner cut 3% defacement. W1RH.

WANTED: BC348 that is in good condition. Please state fully condition and price. W. S. Neely, Jr., W4BR, Chester, S. C.

CASH for BC-610E, BC-614E, BC-939, BC-729, BC-221, BC-312, 348, TCS, AN/GRC-9 and higher, and parts for all these. Amber Industrial Corporation, Surplus Div., 75 Varick Street, N. Y. C. 13, N. Y.

SELL: BC312M, $60.00. WN1GHH, 10 Salmond St., Belfast, Me.

GLOBE Scout 65, $70; Heathkit VFO and 350 volt power supply, $22; S-38D receiver, $37. John Brand, Box 131, Encampment, Wyoming.

SACRIFICE Babcock MT5B xmttr with Gonset VFO and Babcock 6 volt power supply, all connecting cables. New condition, new instruction book, original cartons. New cost $216.95. Going for best offer over $150.00. Tom Conner, W5UIJ, Route "C", Lamesa, Texas.

TREMENDOUS bargains: New and reconditioned Collins, Hallicrafters, National, Johnson, Elmac, all others. Completely reconditioned with new guarantee. Hallicrafter S38 $29.00; S40B $79.00; S76 $119.00; SX71 $149.00; SX62 $159.00; SX42 $169.00; SX96 $199.00; SX88 $395.00; HQ129X $169.00; HQ140X $199.00; National NC125 $129.00; NC173 $149.00; NC183 $199.00; HRO50T $239.00; NC183D $299.00; HRO50T1; HR060; Collins 75A1 $249.00; 75A2 $299.00; 75A3 $399.00; 32V1; 32V2; 32V3; Viking Ranger, Viking II: large stock of mobile receivers, transmitters, converters; hundreds of other items. Easy terms. Shipped on trial. Write for free list. Henry Radio, Butler, Mo.

BUY Heathkit, Johnson Viking and other transmitters and equipment wired and tested direct. New Heath DX-100 transmitter wired and tested, $241.50. Free list of used equipment, trades and easy terms. J. Lynch Electronic Co., P.O. Box 54, Glen Oaks Branch, Floral Park, New York.

FOR Sale: Rebuilt, improved S-16 recvr, new front end, miniature tubes, new Hammarlund IF's to be wired in, $35. New Thordarson first line components for 1000v. 800v- 225 Ma. dual power supply: 1 plate, 1 fil. xfrmrs, 2 chokes, 4 GE condensers (present net cost, $36) sacrifice for $21. Astatic T-3 mike, like new, $8. Hi-Fi C.H.T. MultiMatch 15 watt xfrmr, $9.00; T-17 mike, new, $4; 12 v. dynamotor 275V,110 Ma. output, $4; new PE-94, $2; new Gordon 1 Kw solenoid antenna changeover relay, $6. New BC-906-C freq. meter 14-23 Mcs., $18. First check buys, S. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck 62, N. Y.

SELL: 75A3 and model A slicer, $400.00; 10A exciter with tubeless VFO, $100. W9VSF, 903 S. Madison St., Hinsdale, Ill. Phone 1438.

FOR Sale or trade: Complete mobile rig. Viking mobile trans. Viking mobile VFO; Gonset Triband w/noise limiter 600 v. 250 Ma 6 v. dynamotor w/filter, relays, cables, ant. mount, Gen. filter. All like new. Will trade for gud recvr or Communicator or sell for best offer. Stan Pope, W4ZPU, Cramerton, N. C.

TRADE/Sell pair used 4X150As, Carter 5.5v 350v. 150 Ma. dynamotor; need 4-250As, 42" relay cabinet. Bob Knellinger, W5OER, 4224 Hanging Moss Road, Jackson 6, Miss.

100 Watt bandswitching (160-10) transmitter kit: $69.95. Includes tubes, cabinet, meter, keying filter, dual 807 pi-net final. Modulator kit for 55 watts phone: $19.95 extra. Details free. Hart Industries, 467 Parke, Birmingham, Mich.

W9ERU moving to antenna farm January first. Collection of years *must go!* 3-element 20 meter Shortbeam, $35; 7" TV, $25; 810s, $8.95, 813s, $7.95; 6C21s, $11.95; 304THs, $7.95, many more tubes. New Sprague 2 μfd, 4000v condensers, $4.95; TTV gear, selsyns, high power transformers, chokes, meters, GR decade box. Send stamped self-addressed envelope for list. W9ERU, 2511 Burrmont Road, Rockford, Ill.

USED 20 hours, excellent Viking II xmittr, VFO, Matchbox coupler, LP filter, SWR bridge and mike, $285.00; Teletype model 12 printer, keyboard, reperforator. Also send-receive distributor, transmitter. P. Jensen, W5PJN, 5844 Argonne St., New Orleans, La.

FOR Sale: Hammarlund HQ-140X brand new, never used, $220, and HQ-129X, in excellent condx, $150. Matt Klapp, W2EQV, 17 Kenosha St., Albany 9, N. Y.

LIQUIDATING estate: Sell BC-221, 348-Q, PE-103 all new; Signal Shifter, complete rack mounted, 400 watt 'phone. Many parts for KW rig already mounted with meters. Misc. Hi-pwr units, tubes, meters, etc. Ask for what you need and make offer. Powell May, 4916 Beverly Road, Knoxville, Tenn.

FOR Sale or trade: five sets of experimental antenna "traps" to build "'phone man's all-band antenna" as described in QST. Latest revision weatherproofed and guaranteed: $6.00 per matched pair, postpaid in U. S. A. All inquiries answered. Max Pemberton, W9YJH, 812 No. 9th St., Mattoon, Ill.

SWAP: Leica IIIF, F-1.4, 50 mm flash, 85 mm F-2, 35 mm F-35, and $60 leather case plus accessories, also 16 mm Bell & Howell 3 lens, for good xmitter or receiver, or both. Will pay difference. All inquiries answered. R. C. Clouse, 1970 Riverside Drive, Columbus 21, Ohio.

FOR Sale: HRO-5TA1 receiver, speaker, power supply: $115.00. H. B. Goss, W1AB, Box 157, Essex, Conn.

MODEL 26 TTY-, in excellent condx: E/W 26A table and power connections, maintenance practices, line relay. Best offer over $50.00. S. Doughman, W3KNK, 6 Rosewood Drive, Harrisburg, Pa.

SELL: Eico Model 470 7" 'scope (perfect), $75; Model 625 tube tester, $30.00; RME VHF 152A (2, 6, 10, 11 meter converter), like new, $40.00. All units delivered within 75 miles of Boston. W1WXC, 24 Monument St., Concord, Mass. EM 9-3919.

FOR Sale: Collins 310B-1, unmodified. Best offer. W1PVT, Leon S. Door, 36 Newmarch St., Ipswich, Mass. Tel: 1118.

FOR Sale: New DB22, National 240 and S-40B receivers; HT9 xmitter with Meissner Sig. Shifter; Command transmitter with power supply parts. Lew Saunders, W8MF, 123 Winter St., Battle Creek, Mich.

WANTED: Collins mechanical filter, 1.2 Kc. Sell HQ-129X in excellent condition: $110.00; Gonset Communicator, in excellent condition: $165.00. W2ADD.

FOR Sale: Thordarson modulation transformer, MultiMatch T11M77 — 300W, $20.00; One 829B (new), $6.00; Two 35TG Eimac (new), $3.50 each; one JBT freq. meter Model 30F 48-62 cycles (new), $7.00; one 0-30 AC amperes 3" Triplett (new), $4.00; one 10TA and one 40TA, B&W, antenna coil, $1.50 ea. W3BKL, Kenneth Blamey, 24 Conestoga Dr., Pittsburgh 34, Pa.

WANT: ART-13, ARC-1, ARC-3, APR-4, APR-5, APR-9, ARN-7, TDQ, BC-610-E, BC-614-E,BC-939A, BC-639, BC-640, SCR-573, BC-342, BC-312, BC-348, BC-221, RA-34, Teletype, Boehme, Manuals, Test Eqpt. CASH or TRADE for NEW Johnson Viking, Ranger,Hammarlund, National, Hallicrafters, B&W, Gonset, Elmac, Telrex, Central Elec. Fisher Hi-Fi etc. Alltronics, Box 19, Boston, 1, Mass. Richmond 2-0048. Stores: 44 Canal, Boston. 60 Spring, Newport, R. I.

COLLINS 75A1 receiver, in perfect condition, $250; Bud VFO for 40 and 80 meters, $15.00; BC906C frequency meter, $20.00; W.E. Signal Corps field strength meter, covers 144 Mc. band, $25.00. W6YC. DeTurck, 841 47th Ave., San Francisco 21, Calif.

SELL: New 4D32 tube, in factory carton, $14.00 postpaid. Roy Sawdey, 5255 Harper, Solon, Ohio.

QRM? Our Hetrofil, X-1, cuts it out. Price: $6.29. Details S. C. Herb Sweet, K2GBH, 9 Locust Ave, Oceanside, N. Y.

PERFORATED aluminum sheet, .051, 5/64" OD holes, ½" centers, $1.20 sq. ft.,; cut to size. Send for listing on Beams, Aluminum Tubing, etc. Radcliff's, Fostoria, Ohio.

SELL: National NC-98, excellent, like-new. Best offer over $85.00. Markson. Evenings, PY 8-8056 (Massapequa, L. I., N. Y.). Days NYC, Tel. MU 4-7823.

FOR Sale: No. 2 Gonset 2-meter rig, 3 months old, in like new condx Mike, crystal, mobile ant. A DC rotory voltage changer, 6-12 or 12-6, etc. $200.00. Cash. KN9BEH, Kenny Kern, Bedford Municipal Airport, Bedford, Ind.

FOR Sale: 3200 Vct, 250 Ma. xformr, 2-4μfd 2500V capacitors, dual 8 henry 250 Ma. choke, $30.00; Gonset 10-11 meter converter, $15.00; pair EE8B field telephones, $15.00. Speyers, 39 Lowell Ave., Summit, N. J.

WANTED: All kinds of used radio and electrical gear. Will pay cash. State details. Geo. Knopf, W3YYB, 4807 Beaufort Ave., Balto 15, Md.

ART-13 transmitter for sale. (with low freq. osc.) in good working condition. Needs ant. meter. $300 F.o.b. Orange, N. J. George Kimble, W2TR, 12 High St., Orange, N. J.

MERRY CHRISTMAS from the gang at Evans Radio. Make yourself a present from our large used equipment inventory. Here are a few samples: Central A slicer $59.95, 10A $99.95, AP-1 $6.95, QT-1 $9.95; Collins 310 $65.00, 32V-1 $395.00. 32V-2 $450.00, 32V-3 $550.00; Morrow 3BR $34.95, FTR $79.95, 5BRF $49.95; Radio-Craftsmen C-900 $84.50, C-1000 $139.50; Fisher FM-80 $124.50; Bogen DB-10 $34.50; Leece-Neville $75.00; Johnson Viking 1 TVIed $249.95, Viking VFO $44.95, Mobile $99.95, Viking I push-to-talk $199.95, Viking II $265.00, Mobile VFO $34.95; National NC-100 $75.00, HRO-60 $400.00; others available; write for latest list to Carl, W1BFT, Box 312, Concord, N. H.

WANTED: Viking II, LP filter, VFO, Matchbox and rcvr. Glenn M. Higgs, Rd 3, Box 390, Stroudsburg, Penna.

VIKING II, VFO, coaxial antenna relay, $225.00. Ed Matthews, W4ZMZ/2, Highland, N. Y.

HAVE TVI. Selling out. Highest bidder gets my Supreme AF100, Eimac 4-65A in final. Send instructions. 1 pack, you pay freight W7RMB, E. O. Watkins, Box 780, Rd. 3, Tucson, Ariz.

WANTED: Hallicrafters R-46 speaker n gud condx. WN7ZTB 4628 N.E. 85th Ave., Portland, Ore.

SELL: NC98, $125.00; NC125, $130.00 w/spkr; BC453 modified, $10.00; TV for Radiomen by Noll, new, $5.00; back issues of QST. All plus shipping. M. Marshall, 455 Washington Ave., Dumont, N. J.

VIKING II xmittr, VFO and Matchbox for sale, $295.00 complete, all factory wired. Also two tape recorders: Webcor Model 2110, with case, $119.00; Masco Model 52 with case, $89.00. All equipment like new and in perfect operating condition. F.o.b. Hackensack. N. J. H. S. Ferber, K2BMV, 235 Spring Valley Ave. Tel. Phone HU 7-1726.

GELOSO 4/101 v.f.o. exciter unit, $34.95; all-band tank coil, $4.50; see CQ Oct. 1954. "World Radio-Television Handbook" due January 1956, $2.00; "Radio Control for Model Ships, Boats and Aircraft", $1.98. Gilfer Associates, Box 239, Grand Central Sta., New York 17, N. Y.

STANCOR ST-203A, Gonset Tri-band, Gonset Clipper, PE103A, whip and mount, in excellent condition, $65.00. Extra Gonset Clipper, $7.50; complete Master Mobile 80-meter antenna, new appearance, $12.50. Whitley, W2LPG, 133 Airsdale Ave., Long Branch, N. J.

STOLEN around March 17th this year: Johnson Viking II transmitter and Johnson Viking VFO, from Uniontown Amateur Radio Club (W3PIE), Serial No. on transmitter is 8395. $50.00 reward for information leading to recovery of this equipment. Write to Bill Sheperd, 20 Forman Ave., Uniontown, Pa.

AMATEUR 300 watt radio phone transmitter with 813 final, plate screen Class B 811 modulator, 2500 and 400 volt power supply completely enclosed in 2 Bud grey cabinets; TVI suppressed. See July 1951 QST, p. 11. Come and take it with you at a giveaway price of $75.00, R. W. Ackerman, 143 Park Ave., Caldwell, N. J. Phone CA 6-4325.

W8JS fall cleaning: SSB Slicer with selectable 3 Kc. pass band $35.00; Dumont 208 'scope, $60.00; Dumond 224-A 'scope, $50; Heath 0-5 'scope, $40.00; TS-126-AP, $25; BC-453, new, $15.00; PCA-2T-200 Panoramic Adaptor for 456 Kc, $50.00; Super Pro power supply, $25.00; copies of QST, IRE, Radio News, CQ. Write for list of other miscellaneous items. Richelieu, 3536 Vista Avenue, Cincinnati 8, Ohio.

HT-18 VFO exciter with N.F.M. $50.00; NC-100 with speaker, $50.00 F.o.b. Antioch, Calif. W6IDE, Marchetti, 19 Rossi Ave., Antioch, Calif.

GONSET Communicators for sale: new and used; two and six meters. Ditto Linear amplifiers, VFOs, tuners, etc. Complete line of Gonset mobile equipment immediately available. Graham Company (Robert T. Graham, W1KTJ) Stoneham, Mass. ST 6-1966.

FOR Sale: Triplet Tube tester and VR-MA model 3480, very clean: $50; 20,000 ohms per volt, Eico TV-FM sweep signal generator, Mod. 360, very clean, $15; Heathkit grid dip meter, GD-18, very clean, $15.00; AN/APA-10 Panormaic adapter (for rec. with 455 IFs) converted to 110 volt AC with Handbook, very clean, $45.; UHF 152A, like new, $35.00. W9WFH, Paul R. Schmidt, 9736 Reeves, Franklin Park, Ill.

FOR Sale: Three Bell amplifiers A3725. Never been used. $65.00 each. Suitable for P.A. systems. A. Turner, 20104 Alger, St. Clair Shores, Mich.

FOR Sale: Viking II, factory-wired, like new, bought March 1955: $250; Johnson Matchbox, $30.00. W2NVX, 20 Dover Lane, Yonkers, N. Y.

WØPPZ Estate: National HRO 50-T, complete with 6 coils, spkr, xtal, $250.00; 350 watt xmittr, pr 812As, final, worked 101 zones: $150.00; Johnson Viking II, $235.00; Johnson VFO, $40.00; Matchbox, $35.00; National receiver NC-98 with spkr, $140.00; Hickok vacuum tube voltmeter, $35.00; 15 year run of QSTs. Send stamp for *big parts list. Mrs W. A. Haeussinger, 1102 Marian St., Winona,* Minnesota.

SELLING out for best offers on like-new equipment: Viking I, factory-wired and TVI-suppressed; Central Electronics 10A exciter and signal splicer; BC-454 VFO for 10A; Hammarlund Super Pro SP400X; RME VHF-152A; Gonset converter and noise limiter. Bascomb, 2456 Greenleaf, Chicago, Ill. Phone RO 1-3502.

SELL: HRO with power supply: $85.00. Walter Schuppin, 4904 Foster Ave., Brooklyn 3, N. Y.

SEASON'S Greetings from WØFIR and XYL WØVUR. New QTH: Route 9, Box 395, St. Louis 23, Mo.

SALES Representative wanted by distributor of nationally known industrial communication systems and mobile-radio equipment to cover states of Pennsylvania, Delaware, Virginia, W. Virginia, Maryand and D. C. Send résumés to P. O. Box 1709, Wilmington, Del.

FOR Sale: Partially wired kilowatt amplifier for T-200, and four 838s modulators. Two heavy power supplies, speech clipper, and automatic C bias; brand new cabinet. Cannot ship. Write for pictures and more information. $500 cash. W. A. Kuehl, 6647 Kenton, Lincolnwood, Ill.

FOR Sale: SX-71: $135; 32VI, $325. Both are in excellent condition. C. B. Story, W7TGZ, 540 Wyoming Ave., Sheridan, Wyoming.

SELL: 200 watts, 'phone, xmittr, home-brew steel cabinet, oversized parts, 813 final; extra tubes: $100.00; 129X receiver, $140.00; HF 10-20 converter, $25.00. W2DI, BU 8-8507.

FOR Sale: National SW-3 and Wilcox CW-3 receivers. Robert Blaney, Box 391, Ft. Wayne, Ind. W8LZD/9.

BARGAINS! Reconditioned! 90-day new set guarantee! S-38, $29.00; S-38C, $34.50; S-40B, $79.50; SX-42, $159.50; SX-43, $129.50; S-53, $59.00; S-53A, $65.00; SX-71, $169.50; S-72, $59.00; S-76, $139.00; S-77A, $74.00; SX-62, $199.00; S-81, $32.50; S-82, $29.50; S-85, $89.00; SX-99, $124.50; SX-96, $224.50; NC-98, $119.50; NC-125, $129.50; HFS, $99.50; HQ-129X, $169.00; Gonset Super-Six, $42.50; Meissner EX, $39.50; HT-9, $139.00; HT-19, $229.00; 32V2, $419.00; 32V3, $599 (factory reconditioned); TR75, $29.50; TBS-50, $59.50; TBS-50A, $69.50; Viking II plus VFO, $255.00; A54H, $100.00. Many more on hand. Send for complete list. Liberal budget terms. Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.

ANTIQUE QSTs, other magazines; DeForest tubes, etc. Mrs. Conrad Beardsley, 103 Wythburn Rd. So., Portland, Me.

SELL Hallicrafters SX-32, $95. Prefer local deal. L. Aulik, 556 Wittich Ter., River Vale, N. J.

GEIGER counters, used, for sale. W4MDE, Hall, 903 Howard, Greensboro, N. C.

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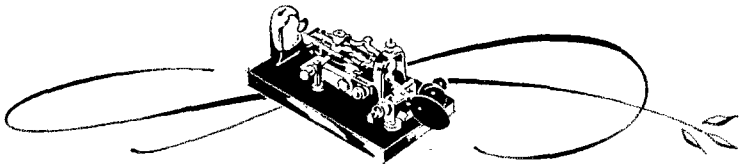

Congratulations to QST

on its fortieth birthday...

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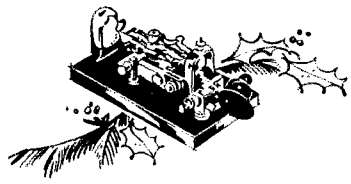

...and a very Merry Christmas to all our Ham friends

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Serving the Amateur Since 1921

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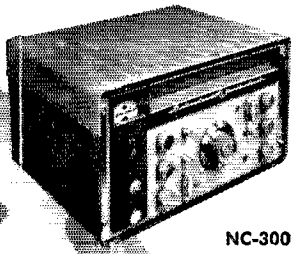
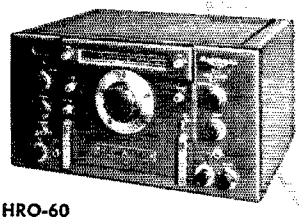


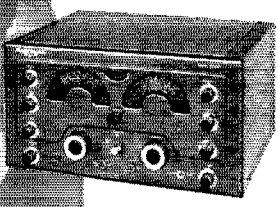
NC-300

The NC-300 incorporates all the features most hams want . . . at a price most hams are willing to pay! It features a sensitivity of 3-6 db noise figure on all amateur bands. Warm-up drift less than .01%. It has the longest slide rule dial ever 7 ft. with 10 dial scales for coverage of 160 to 1¼ meters with National's exclusive new converter provision for 6, 2, 1¼ meters. These are only a few of the highlights!



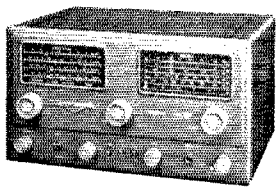
HRO-60

Latest and greatest of a great series! Frequency range: 1.7 to 30 mcs., additional coils available from 50 kc to 35 mcs. Gives you dual conversion on all frequencies above 7 mcs plus 12 permeability-tuned circuits in the three 456-kcs IF stages! Has current-regulated heaters in the high-frequency oscillator and the 6BE6 mixer. High-frequency oscillator and S-meter amplifier are voltage regulated.



NC-183D

Has dual conversion above 4 mcs . . . steep-sided skirt selectivity with 3 IF stages (16 tuned circuits on the 3 high bands—12 on all other bands) plus a new crystal filter. Approximately 1 microvolt sensitivity on 6 meters for a 10db signal-to-noise ratio! Frequency range: .54 mcs to 31 mcs plus 47–55 mcs.

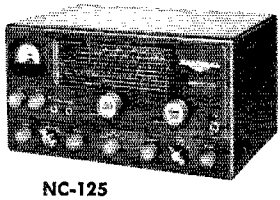


NC-88

Compare these features! Calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands . . . advanced A. C. superhet circuit uses 8 high gain miniature tubes plus rectifier . . . covers 540 kcs to 40 mcs in 4 bands . . .tuned RF stage . . . two IF stages . . . 2 audio stages with phono input and two position tone control . . . built-in speaker . . . antenna trimmer . . . separate high frequency oscillator . . . sensitivity control . . . series valve noise limiter . . . delayed A. V. C. . . . headphone jack . . . standby-receive switch.

NC-98

The lowest priced receiver with a crystal filter, the NC-98 has calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands . . . advanced A. C. superhet circuit uses 8 high gain miniature tubes plus rectifier . . . covers 540 kcs to 40 mcs in 4 bands . . . tuned RF stage . . . two IF stages and 2 audio stages with phono input and two position tone control. ALSO, antenna trimmer, separate high frequency oscillator, sensitivity control, series valve noise limiter, delayed A. V. C., headphone jack, standby-receive switch. Available with a calibrated bandspread scale for the SWL bands.

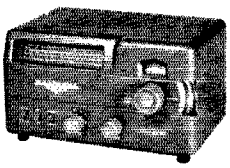


NC-125

Frequency range: .56 to 35 mcs. Has built-in SELECT-O-JECT audio filter. Average sensitivity 3 microvolts for 10 db signal to noise ratio. Has AVC, noise limiter, voltage regulated stabilized oscillator. Audio system essentially flat to 10,000 cps. Provision for NFM Adaptor.

SW-54

The most astonishing little receiver on the market today! Covers broadcast and 3 shortwave bands—540 kcs to 30 mcs. Receives voice or code. Police, ship, amateur, foreign stations clearly marked. Uses new miniature tubes for improved sensitivity. Easy-to-read indirectly lighted scale. Accurate "logging scale" also provided. Provision for headphones. Send-Receive switch for "ham" use with transmitter. Measures only 11" x 7". AC-DC operation.



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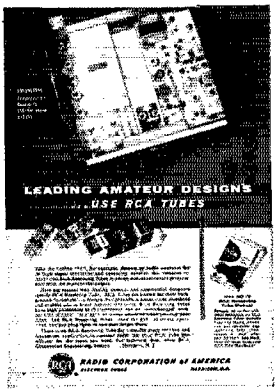
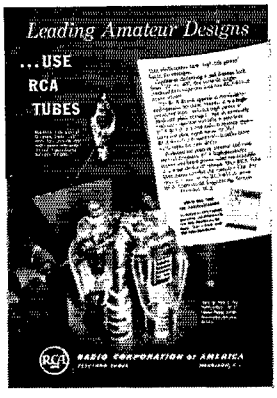
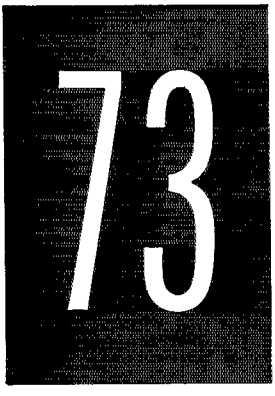
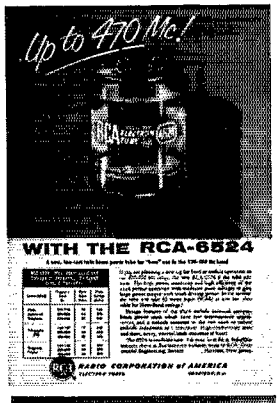
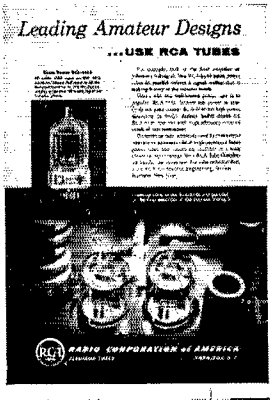


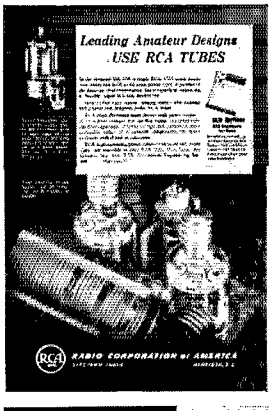


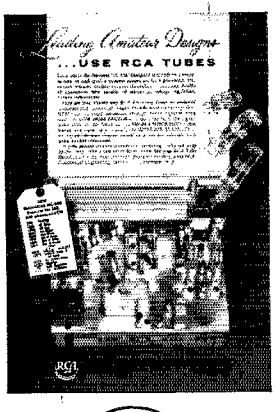


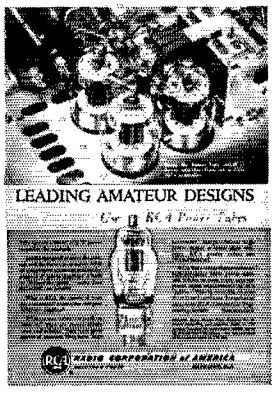




...and happy hunting for '56







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